

# Brownswood Inert Clay Facility W0280-01 Annual Environmental Report 2017



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Appendix D: Tank And Pipeline Testing And Inspection Report

Appendix E: Closure, Restoration & Aftercare Management Plan

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## 1.0 Introduction

### 1.1 Scope And Objectives

This Annual Environmental Report (AER) is prepared for the Brownswood Inert Clay Facility operated by Roadstone Limited. This AER covers the period from January 2017 to December 2017.

The Environmental Protection Agency (EPA) issued a waste licence to Roadstone Ltd., in respect of an inert waste recovery facility at Brownswood, Enniscorthy, Co. Wexford on 18<sup>th</sup> December 2014 (Current Licence Number: W0280-01).

This EPA licence under which the facility operates, specifies a number of environmental controls:

*“in order to minimise the risk of environmental pollution and nuisance to the public arising from the activities at the facility”*

Accordingly, the content of this AER complies with the requirements of the facility waste licence, and in particular the requirements presented in Schedule D of the waste licence (Schedule D requirements listed in Table 1). The report has a number of other objectives which include but are not limited to the following:

- It serves to update all stakeholders on the environmental controls, monitoring and reporting of emissions as detailed in ‘*Schedule B: Emission Limits*’ of the facility licence. These comprise the following;
  - B.1 Emissions to Air;
  - B.2 Emissions to Water;
  - B.3 Noise Emissions; and
  - B.4 Dust Deposition Limits.
- It documents the measures taken or adopted at site in relation to the prevention of environmental damage;
- It reaffirms the financial provisions which are in place in relation to the underwriting of costs for remedial actions following anticipated events or accidents / incidents;
- It summarises the methods and procedures in place at the facility to ensure that Condition 8 of the facility licence – ‘*Materials Handling*’ is undertaken explicitly as directed by the facility licence.

Finally, the report follows the recommended guidelines in the ‘*Annual Environmental Report: Standardised Reporting Guidance For All IPPC And Waste Licences*’ document published by the EPA.

### 1.2 Structure And Content

Within the facility waste licence, the annual environmental report content which is required is presented in Schedule D. The table below presents these content requirements, and the sections in this report in which they are addressed.

**Table 1: Schedule D, Annual Environmental Report Content** <sup>Note1</sup>

Item	Section In This Report Where Item Is Addressed
Emissions from facility	Section 5
Waste management record	Section 6
Complaints summary	Section 8.3
Environmental management programme – report for previous year	Section 3
Environmental management programme – proposal for current year	Section 3
Pollutant release and transfer register – report for previous year	Section 4
Pollutant release and transfer register – proposal for current year	Section 4
Noise monitoring report summary	Section 5.1
Tank and pipeline testing and inspection report	Section 7
Reported incidents summary	Section 8.2
Development / infrastructural works summary (completed in previous year or prepared for current year)	Section 8.1
Reports on financial provision made under this licence, management and staffing structure of the facility and a programme for public information	Section 10
Review of closure, restoration & aftercare management plan	Section 9
Statement of measures in relation to prevention of environmental damage and remedial actions (Environmental liabilities)	Section 10
Any other items specified by the agency	N/A

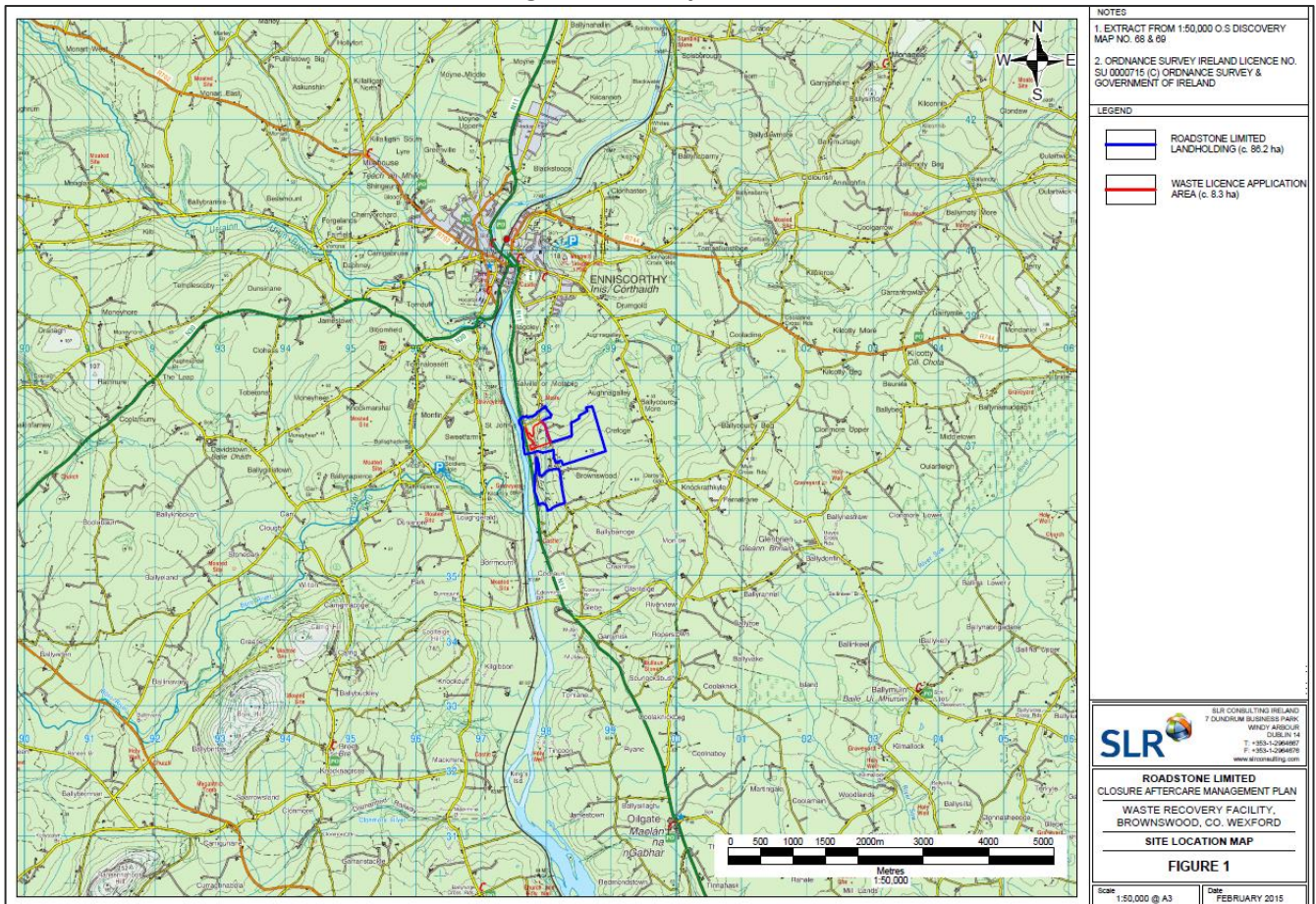
**Note 1:** Content may be revised subject to the approval of the Agency

## 2.0 Site Description

### 2.1 Facility Location And Layout

The licenced inert soil waste recovery facility is located entirely within the townland of Brownswood, Co. Wexford, approximately 2.5km south of the town of Enniscorthy, at the location shown on Figure 1.

Figure 1: Facility Location



The waste licence site is located within an existing construction materials production facility operated by Roadstone Ltd., within a landholding identified as the 'Old Quarry'. The licensed waste facility covers an area of approximately 8.3 hectares (20.0 acres) and comprises a worked-out quarry largely developed in granodiorite rock, together with adjoining established site infrastructure.

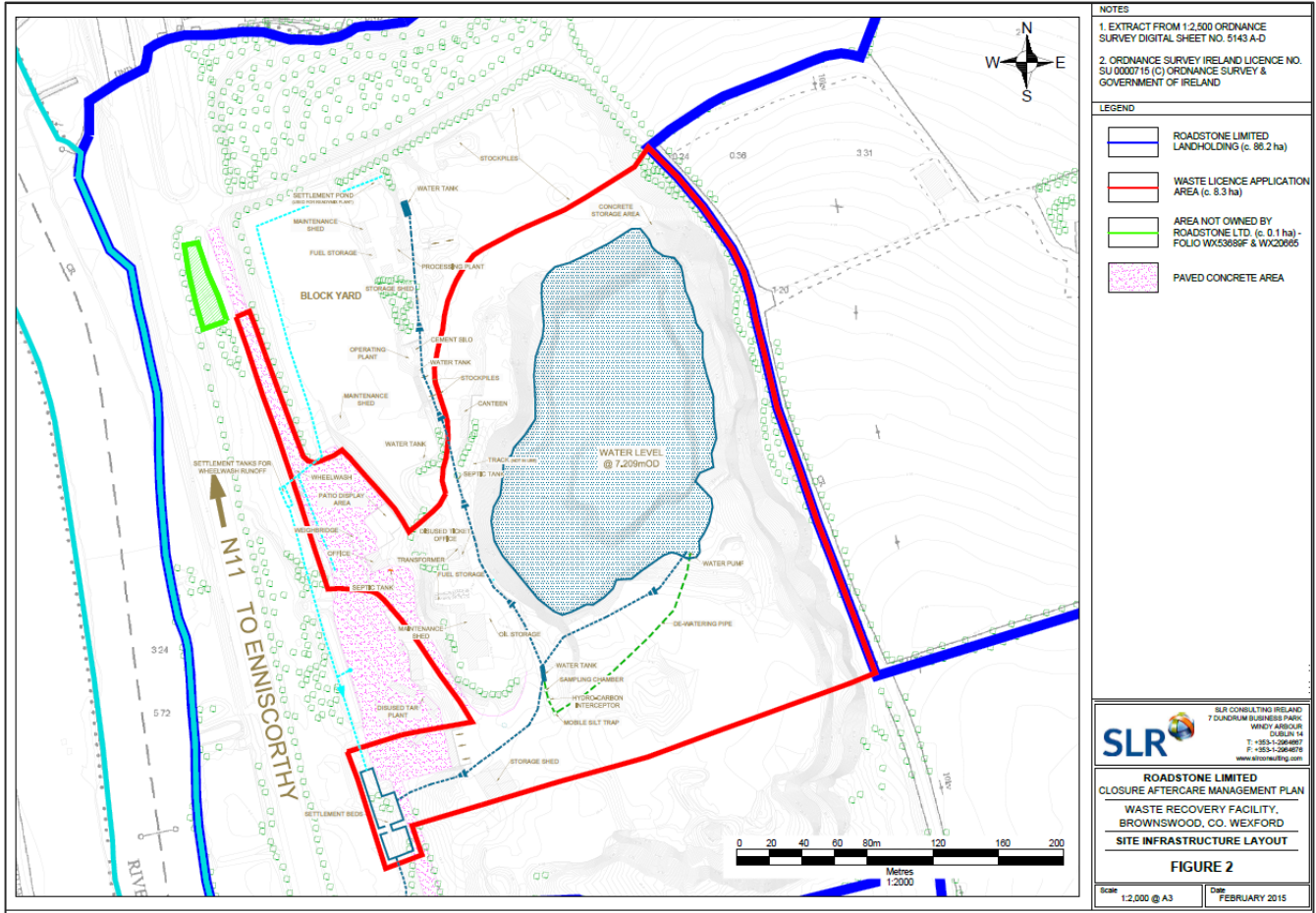
Ground levels across the waste recovery facility generally fall south and westwards, from a maximum of approximately 55mOD (Malin) on the eastern side to 12mOD to 14mOD on the southern side. The worked out quarry void covers an area of approximately 3.4 hectares (8.2 acres).

Floor level at the base of the worked out quarry lies at -22mOD approximately and its depth from existing ground level typically varies from 50m to 36m at its northern and southern faces, and from 30m on its western side to over 70m along its eastern faces.

Although the footprint of the licensed waste facility seeks to avoid conflict with other established activities around the quarry void including concrete, asphalt and block production areas, it includes access roadways and all shared infrastructure required to operate the inert waste / soil recovery facility. The licensed facility also

extends up to the existing outfall pipe for treated surface water discharging to the River Slaney, in the south-western corner of Roadstone's landholding.

**Figure 2: Site Infrastructure Layout**



## 2.2 Legislative Framework

### 2.2.1 European Legislation

The Waste Framework Directive 98/2008/EC on waste sets out the general obligations for the collection, transport, recovery and disposal of waste. The Directive requires all member states to take necessary measures to ensure waste is recovered or disposed of without endangering human health or causing harm to the environment. This includes collection registration, permitting, registration and inspection requirements.

The directive is made up of a series of 27 Articles. Each has a different theme or topic covering environmental protection, waste definition, waste handling, waste movement etc. Article 13 addresses the protection of human health and the environment:

*Member States shall take the necessary measures to ensure that waste management is carried out without endangering human health, without harming the environment and, in particular:*

- Without risk to water, air, soil, plants or animals;*
- Without causing a nuisance through noise or odours; and*
- Without adversely affecting the countryside or places of special interest.*

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## 2.2.2 Irish Legislation

The Waste Directive is implemented in Ireland by The Waste Management Act 1996, the Waste Management (Amendment) Act 2001 and the Protection of the Environment Act 2003. Up until July 2016, the Department of the Environment, Community and Local Government had overall responsibility for waste management policy. These functions have now been transferred to the Department of Communications, Climate Action and Environment. The Waste Management Act creates a series of waste authorisations appropriate to the level of risk and complexity of the waste activity. The waste licence for Brownswood (Ref. No. W0280-01) was issued by the Environmental Protection Agency (EPA) on 18<sup>th</sup> December 2014.

## 2.3 Waste Recovery Processes

As detailed in 'Schedule A: Limitations' of the facility licence the following waste recovery processes are authorised:

*'importation, stockpiling and recovery of soil and stone through deposition for the purposes of quarry restoration.'*

Quarry restoration using inert waste soil and stone is a recovery operation which does not have a clear assignment to recovery (R) codes, however, legislative reporting obligations have been defined for backfilling operations. The following waste activities are licensed onsite in accordance with the Forth Schedule of the Waste Management Act 1996 as amended:

- Class R 3. Recycling / reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes), which includes gasification and pyrolysis using the components as chemicals.
- Class R 5. Recycling / reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials.
- Class R 13. Storage of waste pending any of the operations numbered R 1 to R 12 (excluding temporary storage (being preliminary storage according to the definition of 'collection' in section 5(1), on the site where the waste is produced).

Additionally the waste licence authorises the following activities onsite:

- i. Backfilling of a total quantity of 1,330,000 tonnes of soil and stone and the EWC codes listed in Table A.1.1 Waste Categories and Quantities of the waste licence (note this does not include material required for final profiling as may be required by the Planning Authority and agreed by the Agency;
  - ii. Separation of any non-inert construction and demolition waste (principally metal, timber, PVC pipes and plastic) unintentionally imported to site;
  - iii. Transfer of any separated waste streams to a dedicated waste inspection and quarantine facility for temporary storage, pending inspection, testing and potential removal to off-site authorised waste disposal or recovery facilities;
  - iv. Stockpiling and storage of imported topsoil pending re-use as cover material during final phase of restoration;
  - v. Progressive restoration of the backfilled void (including placement of cover soils and seeding) and return to a natural grassland habitat; and
  - vi. Environmental monitoring of noise, dust, surface water and groundwater for the duration of the proposed site restoration works and for a short aftercare period.
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### 2.3.1 Inert Waste

Inert wastes do not biologically, chemically or physically degrade. Inert waste is defined in the Waste Management Act and the Waste Framework Directive:

*“Inert waste means waste that does not undergo any significant physical, chemical or biological transformations. Inert waste will not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm human health. The total leachability and pollutant content of the waste and the ecotoxicity of the leachate must be insignificant, and in particular not endanger the quality of surface water and / or groundwater.”*

### 2.3.2 EWC Codes Accepted

A European Union wide harmonised list of wastes (LOW) and accompanying coding system was established in June 2015. The different types of waste in the list are fully defined by a six digit code which identifies the source of the waste and the waste type. This ensures that the collection, transportation, storage and treatment of waste is carried out in a manner that provides protection for the environment and human health and in compliance with legal requirements.

Material which is acceptable for recovery at the facility, along with the accompanying EWC codes are shown in Table 2.

**Table 2: Brownswood Licenced Waste Categories And Quantities**

EWC Code	Waste Type <small>Notes 1 &amp; 2</small>	Maximum (Tonnes per annum)
17 05 04	Soil and stones other than those mentioned in 17 05 03	400,000
20 02 02	Soil and stones	
17 01 01	Concrete	1,000
17 01 02	Bricks	
17 01 03	Tiles and ceramics	
17 01 07	Mixtures of concrete, bricks, tiles and ceramics (other than those mentioned in 17 01 06)	
	Total	401,000

**Note 1:** Any proposals to accept other compatible inert waste types shall be agreed in advance by the Agency.

**Note 2:** The limitation on individual inert waste types may be varied with the agreement of the Agency subject to the total limit for inert waste staying the same.

The total amount of material licenced to be used to backfill the quarry is **1,330,000 tonnes**. This does not include material required for final profiling as may be required by the Planning Authority and agreed by the Agency.

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## 3.0 Environmental Management System (EMS)

### 3.1 Introduction

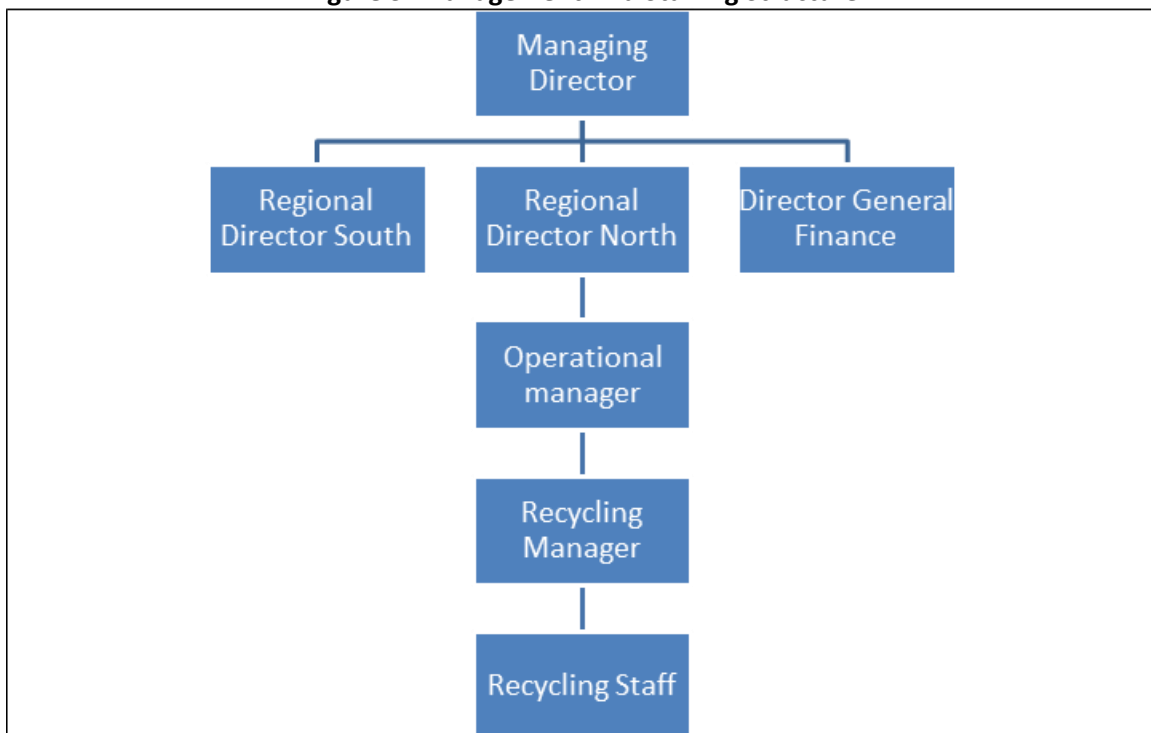
Roadstone implements a comprehensive Environmental Management System (EMS) at all of its facilities which predominantly comprise quarrying and construction material production activities. In recent years, the scope of the EMS has been expanded to include inert soil / C & D waste recovery activities. As part of its EMS, Roadstone has developed standard procedures to address waste acceptance and handling activities, as well as an emergency response plan. These are all available for at the facility.

### 3.2 Site Management Structure

Roadstone Ltd. currently employs 7 people at the facility on a full time basis. The organisation and management structure in the facility is provided in Figure 2. It shows a section of the overall organisation to highlight the management and reporting structure of the facility department. The staff at the facility include the following:

- Management staff;
- Technical staff; and
- Weighbridge staff.

**Figure 3: Management And Staffing Structure**



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### 3.3 Staff Awareness And Training

Staff training which was carried out in 2017 is summarised in Table 4.

**Table 3: Summary Of Staff Training**

Personnel	Date	Training Details	Comment
John Fennell	30/03/2017	Waste Management Training – Waste Legislation	Provided by Environmental Training Solutions Ltd.
Leonard Grogan	11/10/2017 to 12/10/2017	Hazardous Waste Classification & Advanced Waste Classification	Provided by One Touch Data Ltd.


### 3.4 Public Communications Programme

The public can, by appointment, call in to the weighbridge office to view information about the facility. Additional information is available on Roadstone's website.

Records which are available for public inspection at the site office include:

- EPA issued Waste Licence W0280-01;
  - Monitoring Records;
  - Complaints Register;
  - Incidents Register; and
  - EPA correspondence file.
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## 4.0 Pollutant Release And Transfer Register

 Environmental Protection Agency		PRTR# : W0280   Facility Name : Brownswood Inert Waste Recovery Facility   Filename : W0280_2017.xls   Return Year : 2017	
		<a href="#">Guidance to completing the PRTR workbook</a>	
		<h1>PRTR Returns Workbook</h1>	
		<small>Version 1.1.19</small>	
<b>REFERENCE YEAR</b>		2017	
<b>1. FACILITY IDENTIFICATION</b>			
Parent Company Name	Roadstone Limited		
Facility Name	Brownswood Inert Waste Recovery Facility		
PRTR Identification Number	W0280		
Licence Number	W0280-01		
Classes of Activity			
	<b>No.</b>	<b>class_name</b>	
	-	Refer to PRTR class activities below	
Address 1	Brownswood		
Address 2	Enniscorthy		
Address 3	County Wexford		
Address 4			
	Wexford		
Country	Ireland		
Coordinates of Location	-6.5636835852.47881886		
River Basin District	IESE		
NACE Code	3821		
Main Economic Activity	Treatment and disposal of non-hazardous waste		
<b>AER Returns Contact Name</b>	Marie Kelleher		
<b>AER Returns Contact Email Address</b>	mkelleher@roadstone.ie		
<b>AER Returns Contact Position</b>	HSE Officer		
<b>AER Returns Contact Telephone Number</b>	0217336336		
<b>AER Returns Contact Mobile Phone Number</b>			
<b>AER Returns Contact Fax Number</b>			
<b>Production Volume</b>	0.0		
<b>Production Volume Units</b>			
<b>Number of Installations</b>	0		
<b>Number of Operating Hours in Year</b>	0		
<b>Number of Employees</b>	1		
<b>User Feedback/Comments</b>	There were no reject loads or waste transfers during 2017		
<b>Web Address</b>			
<b>2. PRTR CLASS ACTIVITIES</b>			
<b>Activity Number</b>	▼	<b>Activity Name</b>	▼
50.1		General	
<b>3. SOLVENTS REGULATIONS (S.I. No. 543 of 2002)</b>			
Is it applicable?			
Have you been granted an exemption ?			
If applicable which activity class applies (as per Schedule 2 of the regulations) ?			
Is the reduction scheme compliance route being used ?			
<b>4. WASTE IMPORTED/ACCEPTED ONTO SITE</b>			
<a href="#">Guidance on waste imported/accepted onto site</a>			
Do you import/accept waste onto your site for on-site treatment (either recovery or disposal activities) ?			
Yes			
<small>This question is only applicable if you are an IPPC or Quarry site</small>			

## 4.1 Releases To Air

4.1 RELEASES TO AIR		Link to previous years emissions data				PRTR#: W0280   Facility Name : Brownswood Inert Waste Recovery Facility   Filename : W0280_2017.xls   Return Year : 2017				29/03/2018 10:32	
SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS											
RELEASES TO AIR											
Please enter all quantities in this section in KGs											
POLLUTANT		METHOD			ADD EMISSION POINT	QUANTITY					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year			
					0.0	0.0	0.0	0.0			
ADD NEW ROW		DELETE ROW *		* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button							
SECTION B : REMAINING PRTR POLLUTANTS											
RELEASES TO AIR											
Please enter all quantities in this section in KGs											
POLLUTANT		METHOD			ADD EMISSION POINT	QUANTITY					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year			
02	Carbon monoxide (CO)	C	OTH	EPA Calculation Toolset	7.5	7.5	0.0	0.0			
03	Carbon dioxide (CO2)	C	OTH	EPA Calculation Toolset	2212.0	2212.0	0.0	0.0			
05	Nitrous oxide (N2O)	C	OTH	EPA Calculation Toolset	0.1	0.1	0.0	0.0			
07	Non-methane volatile organic compounds (NMVOC)	C	OTH	EPA Calculation Toolset	2.4	2.4	0.0	0.0			
08	Nitrogen oxides (NOx/NO2)	C	OTH	EPA Calculation Toolset	23.0	23.0	0.0	0.0			
11	Sulphur oxides (SOx/SO2)	C	OTH	EPA Calculation Toolset	2.2	2.2	0.0	0.0			
86	Particulate matter (PM10)	C	OTH	EPA Calculation Toolset	1.5	1.5	0.0	0.0			
ADD NEW ROW		DELETE ROW *		* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button							
SECTION C : REMAINING POLLUTANT EMISSIONS (As required in your Licence)											
RELEASES TO AIR											
Please enter all quantities in this section in KGs											
POLLUTANT		METHOD			ADD EMISSION POINT	QUANTITY					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year			
					0.0	0.0	0.0	0.0			
ADD NEW ROW		DELETE ROW *		* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button							

## 4.2 Releases To Waters

**4.2 RELEASES TO WATERS** [Link to previous years emissions data](#) | PRTR#: W0280 | Facility Name : Brownswood Inert Waste Recovery Facility | Filename : W0280\_2017.xls | Return Year : 2017 | 29/03/2018 10:32

**SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS** Data on ambient monitoring of storm/surface water or groundwater, conducted as part of your licence requirements, should NOT be submitted under AER / PRTR Reporting as this c

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			ADD EMISSION POINT	QUANTITY		
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
						0.0	0.0	0.0
ADD NEW ROW		DELETE ROW *		* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button				

**SECTION B : REMAINING PRTR POLLUTANTS**

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			ADD EMISSION POINT	QUANTITY		
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
						0.0	0.0	0.0
ADD NEW ROW		DELETE ROW *		* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button				

**SECTION C : REMAINING POLLUTANT EMISSIONS (as required in your Licence)**

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			ADD EMISSION POINT	QUANTITY		
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
						0.0	0.0	0.0
ADD NEW ROW		DELETE ROW *		* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button				

## 4.3 Releases To Wastewater Or Sewer

**4.3 RELEASES TO WASTEWATER OR SEWER** [Link to previous years emissions data](#) | PRTR#: W0280 | Facility Name : Brownswood Inert Waste Recovery Facility | Filename : W0280\_2 | 29/03/2018 10:32

**SECTION A : PRTR POLLUTANTS**

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			ADD EMISSION POINT	QUANTITY		
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
						0.0	0.0	0.0
ADD NEW ROW		DELETE ROW *		* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button				

**SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)**

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			ADD EMISSION POINT	QUANTITY		
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
						0.0	0.0	0.0
ADD NEW ROW		DELETE ROW *		* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button				

## 4.4 Releases To Land

4.4 RELEASES TO LAND [Link to previous years emissions data](#) | PRTR#: W0280 | Facility Name : Brownswood Inert Waste Recovery Facility | Filename : W0280\_2017.xls | Return Year : 2017 | 29/03/2018 10:32

**SECTION A : PRTR POLLUTANTS**

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			ADD EMISSION POINT	QUANTITY	
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

ADD NEW ROW | DELETE ROW \* | \* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

**SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)**

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			ADD EMISSION POINT	QUANTITY	
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

ADD NEW ROW | DELETE ROW \* | \* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

## 4.5 Treatment And Transfers Of Waste

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE | PRTR#: W0280 | Facility Name : Brownswood Inert Waste Recovery Facility | Filename : W0280\_2017.xls | Return Year : 2017 | 29/03/2018 10:32 3

Please enter all quantities on this sheet in Tonnes

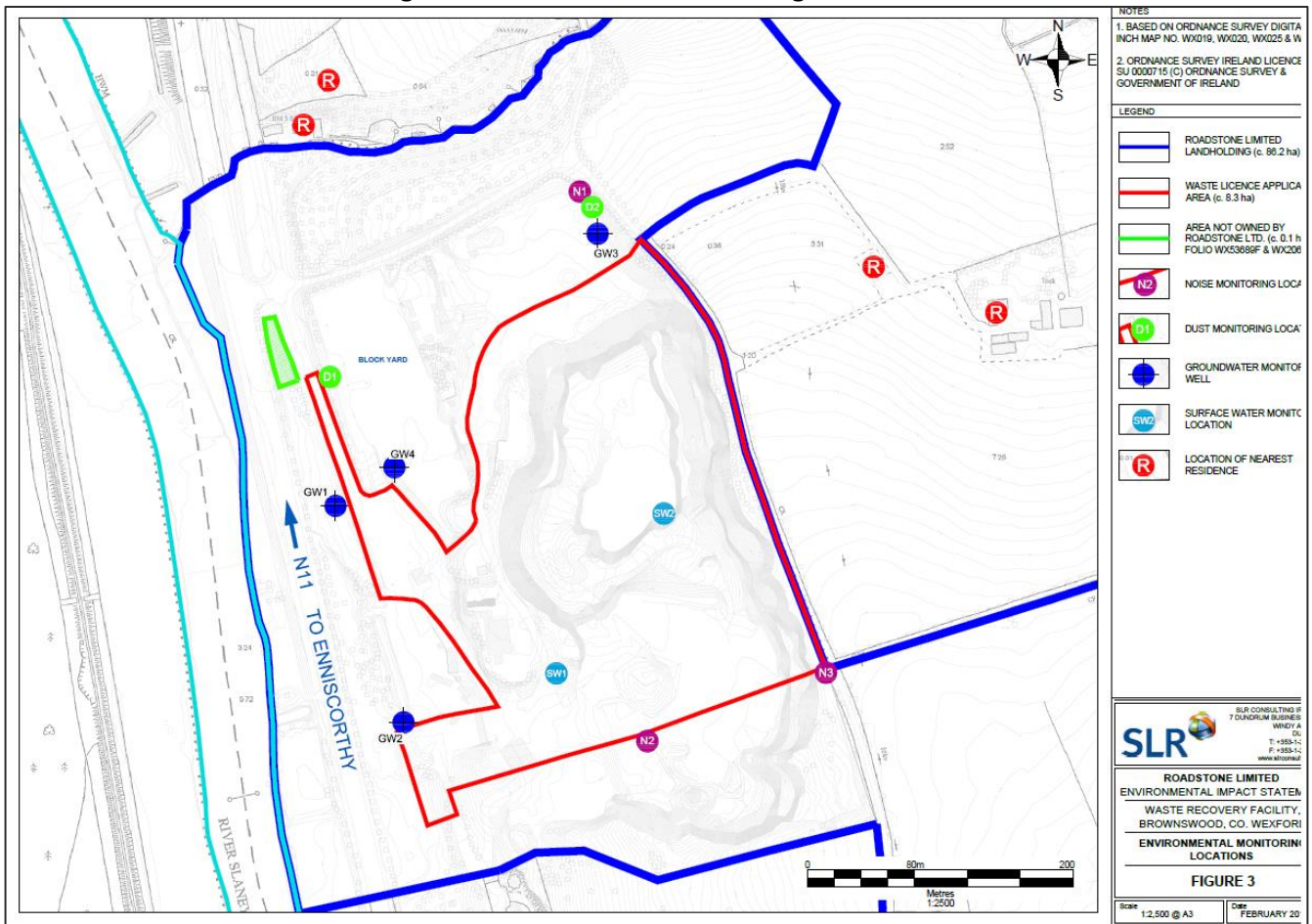
Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility	Haz Waste : Address of Next Destination Facility	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used		Non-Haz Waste: Name and Licence/Permit No of Recover/Disposer	Non-Haz Waste: Address of Recover/Disposer		

ADD NEW ROW | DELETE ROW \* | \* Select a row by double-clicking the Description of Waste then click the delete button

## 5.0 Emissions From The Facility

Environmental monitoring of surface water, groundwater, noise and dust is undertaken at designated locations across the facility. These are shown in Figure 4. An established programme of environmental monitoring associated with the ongoing rock extraction, aggregate processing and concrete / asphalt production activity is undertaken across the Brownswood Quarry Complex. The environmental monitoring requirements of the facility waste licence W0280-01 are undertaken in collaboration with the requirements set out in other site licences and permits. Only the environmental monitoring requirements detailed in the Waste Licence W0280-01, under which the recovery facility operates, are presented in this report.

**Figure 4: Environmental Monitoring Locations**





## 5.1 Noise Monitoring

### 5.1.1 Requirements

Noise monitoring is undertaken at the facility at a frequency as required by the Agency. Roadstone therefore undertake noise monitoring on a bi-annual basis. Noise data collection, analysis and subsequent reporting is carried out by BHP environmental consultancy who are based in Thomondgate, Co. Limerick.

The dates when the two rounds of monitoring were undertaken are shown in Table 5. The full report containing the data, analysis and conclusions undertaken by BHP is appended to this report in Appendix A.

**Table 4: Noise Monitoring Dates 2017**

Monitoring Round	Daytime Measurements	Night-time Measurements
First	08/03/2017	Not undertaken
Second	10/04/2017 & 09/06/2017	30/06/2017

### 5.1.2 Limits And Frequency

The noise emission limits are presented in the facility licence in *Schedule B.3 Noise Emissions*. These limits are presented in Table 6 below.

**Table 5: Noise Emissions**

Daytime dB <sub>Lar,T</sub> (30 minutes)	Evening dB <sub>Lar,T</sub> (30 minutes)	Night-time dB <sub>LAeq,T</sub> (15 – 30 minutes)
55	50	45 <sup>Note 1</sup>

**Note 1:** There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at any noise-sensitive location.

In order to ensure compliance with the noise emission limits monitoring is undertaken in accordance with the required survey duration and periods as shown in Schedule C.2 Noise Monitoring of the facility licence. These survey durations and periods are presented in Table 7 below. The monitoring locations are shown in Figure 4.

**Table 6: Noise Monitoring Frequency**

Period	Minimum Survey Duration <sup>Note 1</sup>
Daytime (07:00hrs to 19:00hrs)	A minimum of 3 sampling periods at each noise monitoring location.
Evening-time (07:00hrs to 23:00hrs)	A minimum of 1 sampling period at each noise monitoring location.
Night-time <sup>Note 2</sup> (23:00hrs to 07:00hrs)	A minimum of 2 sampling periods at each noise monitoring location.

**Note 1:** Sampling period T will be in accordance *Schedule B.3 Emission Limits* of the facility licence. This applies to day, evening and night time periods.

**Note 2:** Night-time measurements shall be made between 2300hrs and 0400hrs, Sunday to Thursday, with 2300 hrs being the preferred start time.

The survey programme was undertaken in accordance with the methodology specified in the 'Guidance note for noise: Licence applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)' as published by the EPA, and also in adherence of the following standards:

- International Standard (ISO 1996-1: 2003E) Acoustics - Description, measurement and assessment of Environmental Noise. Part 1. Basic quantities and assessment procedures.

- International Standard (ISO 1996-2: 2007E) Acoustics - Description, measurement and assessment of Environmental Noise. Part 2. Determination of environmental noise levels.

British Standard: BS 7445 Part 3: 1991 (ISO 1996-3: 1987) Description and measurement of Environmental Noise. Part 3. Guide to application to noise limits.

### 5.1.3 Noise Monitoring Results

The results from the noise monitoring reports undertaken in 2017 can be summarised as follows:

- The noise contribution from EPA licenced recovery activity did not exceed the daytime limit of 55dBA at all locations;
- The noise contribution from EPA licenced recovery activity did not exceed the evening time limit of 50dBA at all locations;
- The noise contribution from site activity did not exceed the night time limit of 45dBA at the entrance; and
- There was no evidence of tonal or impulsive qualities to the recorded noise from the quarry at the nominated locations.

The full noise monitoring reports are appended to this report in Appendix A.

## 5.2 Dust Monitoring

### 5.2.1 Requirements

Roadstone have implemented a number of measures onsite for the control of dust. The operations onsite do not result in any fugitive dust emissions from the facility.

In order to minimise airborne dust nuisance during periods of dry weather water sprinklers are utilised. For those site roads and other areas used by vehicles which are not serviced by water sprinklers, a water bowser is used to ensure dust suppression. The road network in the vicinity of the facility is kept free from any debris caused by vehicles entering or leaving the facility. Any such debris or deposited materials is removed without delay.

### 5.2.2 Limits And Monitoring Frequency

Dust monitoring is undertaken in compliance with the facility licence on a bi-annual basis. Dust is monitored at the monitoring locations as shown in Figure 4.

**Table 7: Dust Deposition Limits**

Level (mg/m <sup>2</sup> /day) <sup>Note 1</sup>
350

**Note 1:** 30 day composite sample with the results expressed as mg/m<sup>2</sup>/day.

The analysis method / technique used is the VDI 2119 (Bergerhoff method). Monitoring is undertaken by BHP laboratories. BHP are ISO 17025 INAB accredited.

### 5.2.3 Dust Monitoring Results

Dust monitoring at the facility was undertaken in November 2017 and December 2017. The full test reports (November results – Test report no. 144681 and December results – Test Report No. 145478) are appended to this report in Appendix B. A summary of the results are presented in Table 9.

**Table 8: Bi-Annual Dust Monitoring Results**

Monitoring Point	November Results (mg/m <sup>2</sup> /day)	December Results (mg/m <sup>2</sup> /day)
D1	301	23
D2	100	25

Both sampling locations were within the EPA limits of 350mg/m<sup>2</sup>/day for both sampling events in 2017.

## 5.3 Emissions To Water

### 5.3.1 Requirements

The facility water emission point reference number is SW1. This is shown on Figure 4. This is the last point at which water discharges from the facility after it has gone through the facility settlement ponds. The receiving waters are the River Slaney.

### 5.3.2 Limits And Monitoring Frequency

The emission limit values are shown in Table 10.

**Table 9: Surface Water Emission Limits**

Parameter	Unit	Emission Limit Value
Temperature	°C	25 (max)
pH	pH units	6 – 9
BOD	mg/l	1.5
Suspended Solids	mg/l	10.0
Ammonia (as N)	mg/l	0.5
Orthophosphate (as P)	mg/l	0.2

The parameters which are analysed at SW1 and the corresponding sampling frequency required for each parameter are shown in Table 11.

**Table 10: W4 Monitoring Frequency And Parameters**

Control Parameter	Monitoring Frequency	Analysis Method / Technique
Visual Inspection	Daily	Sample and examine for colour & odour
Flow	Weekly	Flow meter
Temperature	Weekly	Temperature probe
pH	Weekly	pH electrode / meter
BOD	Weekly	Standard Method
Suspended Solids (mg/l)	Weekly	
Ammonia (as N)	Weekly	
Orthophosphate (as P)	Weekly	
Dissolved Metals <sup>Note 1</sup>	Quarterly	
Total Dissolved Solids	Quarterly	
Total Petroleum Hydrocarbons	Biannually	
Diesel Range Organics	Biannually	
Petrol Range Organics	Biannually	

**Note 1:** Cd, Cu, Fe, Pb, Mg, Mn, Ni and Zn.

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### 5.3.3 Monitoring Results

The monitoring results for 2017 show that all water discharged from the facility was within the emission limit value for all parameters. The weekly discharge results are presented in Table 12.

**Table 11: Weekly Water Monitoring Results**

Sampling Date	pH	Temperature (°C)	BOD (mg/l)	Total Suspended Solids (mg/l)	Total Ammonia (mg/l)	Orthophosphate (mg/l)
03/11/2017	7.6	12.2	0.8	<10	0.22	<0.066
07/11/2017	7.5	11.4	1.3	<5	<0.01	<0.01
24/11/2017	7.7	12.1	0.8	<5	<0.01	<0.066
28/11/2017	7.7	7.5	0.5	13	<0.01	<0.01
20/12/2017	7.6	12.1	1.4	<5	<0.01	0.01

The results of the full bi-annual surface water monitoring round which was undertaken on 7<sup>th</sup> November 2017 are presented in Table 13.

**Table 12: Bi-Annual Water Monitoring Results**

Parameter	Units	Result
Temperature	°C	11.4
pH	pH Units	7.52
BOD	mg/l	1.3
Total Suspended Solids	mg/l	<5
Ammonia (as N)	mg/l	<0.01
Orthophosphate (as P)	mg/l	<0.01
Cadmium	mg/l	<0.0006
Copper	mg/l	<0.009
Iron	mg/l	<0.23
Lead	mg/l	<0.006
Magnesium	mg/l	13.8
Manganese	mg/l	0.229
Nickel	mg/l	0.0036
Zinc	mg/l	<0.018
Total Dissolved Solids	mg/l	265
Total Petroleum Hydrocarbons	mg/l	<0.1
Petrol Range Organics	mg/l	<0.1
Diesel Range Organics	mg/l	<0.1

The results from both the weekly monitoring and the full suite of bi-annual analyses show that emissions to water remained within the limit values for the duration of the two months of operation of the facility in 2017.

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## 5.4 Groundwater Monitoring

There are four groundwater monitoring points at the facility – GW1, GW2, GW3 and GW4. Groundwater sampling and analysis is undertaken by BHP laboratories. The sampling frequency and the parameters which are tested are shown in Table 14.

**Table 13: Groundwater Sampling Frequency**

Parameter	Monitoring Frequency	Analysis Method / Techniques
pH	Quarterly	pH electrode / meter
BOD		Standard Method
Ammonia (as N)		
Orthophosphate (as P)		
Nitrate		
Total Nitrogen (as N)		
Total Dissolved Solids		
Dissolved Metals <sup>Note 1</sup>		
Total Petroleum Hydrocarbons		
Diesel Range Organics		
Petrol Range Organics		
Total Coliforms	Bi-annual	
Faecal Coliforms		

**Note 1:** Cd, Cu, Fe, Pb, Mg, Mn, Ni and Zn.

### 5.4.1 Groundwater Monitoring Results

Groundwater monitoring was undertaken on 7<sup>th</sup> December 2017 in all four groundwater monitoring points as shown on Figure 4. The results of the monitoring is presented in Table 15.

**Table 14: Groundwater Monitoring Results**

Parameter	Units	GW1	GW2	GW3	GW4
pH	pH Units	6.75	6.77	6.47	6.61
BOD	mg/l	0.4	0.6	0.7	0.4
Ammonia (as N)	mg/l	<0.01	<0.01	<0.01	<0.01
Total Nitrogen	mg/l	3.3	3.0	6.5	5.2
Nitrate	mg/l	2.4	2.3	5.6	4.7
Orthophosphate	mg/l	0.02	0.02	0.04	0.01
Total Dissolved Solids	mg/l	343	293	123	252
Cadmium	mg/l	<0.0006	<0.0006	<0.0006	<0.0006
Copper	mg/l	<0.009	<0.009	<0.009	<0.009
Iron	mg/l	<0.23	<0.23	<0.23	<0.23
Lead	mg/l	<0.006	<0.006	<0.006	<0.006
Magnesium	mg/l	10.6	13.4	5.72	10.3
Manganese	mg/l	<0.007	0.0308	<0.007	<0.007
Nickel	mg/l	<0.003	0.0038	<0.003	0.0102
Zinc	mg/l	<0.018	<0.018	<0.018	<0.018
Total Petroleum Hydrocarbons	mg/l	<0.01	0.032	<0.01	<0.01
Petrol Range Organics	mg/l	<0.01	<0.01	<0.01	<0.01
Diesel Range Organics	mg/l	<0.01	<0.01	<0.01	<0.01
Total Coliforms	MPN/100ml	225	146	4	133
Faecal Coliforms	MPN/100ml	ND	ND	ND	ND

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## 6.0 Waste Management Record

The results of the chemical analyses undertaken on recovered soil and stone at the facility is presented in the Figure 5. The results show that all soil and stone accepted at the facility for recovery in 2017 was within the facility waste acceptance criteria (WAC) limits.

The total soil and stone intake for the two months during which the facility was operational (November 2017 – December 2017) was **10,020.48 tonnes**.

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Figure 5: Waste Management Record

Lab ID	Date	Site Project Code	Date Result received From Jones Env.	Total Organic Carbon (%)	Sum of BTEX (mg/kg)	Sum of 7 PCBs (mg/kg)	Mineral Oil (mg/kg)	PAH Sum of 6 (mg/kg)	PAH Sum of 17 (mg/kg)	Arsenic	Barium	Cadmium	Chromium	Copper	Mercury	Molybdenum	Nickel	Lead	Antimony	Selenium	Zinc	Chloride	Fluoride	Sulphate as SO4	Total Dissolved Solids	Phenol	Dissolved Organic Carbon
	Limit			3	6	-	500	-	100	0.5	20	0.04	0.5	2	0.01	0.5	0.4	0.5	0.06	0.1	4	800	10	1000	4000	1	500
RSB-001	16/11/2017	377914	06/12/2017	0.39	<0.025	<0.035	<45	<0.22	<0.64	<0.025	<0.03	<0.005	<0.015	<0.07	<0.0001	0.03	<0.02	<0.05	0.03	<0.03	<0.03	11	<3	60.6	3170	<0.1	140
RSB-002	20/11/2017	377914	15/12/2017	0.26	<0.025	<0.035	<45	<0.22	<0.64	<0.025	<0.03	<0.005	<0.015	<0.07	<0.0001	<0.02	<0.02	<0.05	<0.02	<0.03	<0.03	13	<3	60.8	2709	<0.1	60
RSB-003	29/11/2017	377914	15/12/2017	0.33	<0.025	<0.035	52	<0.22	<0.64	<0.025	0.10	<0.005	<0.015	<0.07	<0.0001	<0.02	<0.02	<0.05	<0.02	<0.03	<0.03	6	<3	97.1	680	<0.1	60

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## 7.0 Tank And Pipeline Testing And Inspection

The tank and pipeline testing and inspection report was completed by Environmental Efficiency consultancy on 22<sup>nd</sup> December 2016. Environmental Efficiency have the following ISO accreditations:

- ISO 9001; and
- ISO14001.

During the field visit by Environmental Efficiency, nine individual inspections were undertaken on bunds located onsite and within the W0280-01 licenced area. Each bund was assessed for its compliance against the following requirements:

- Adequacy of size;
- Of suitable construction;
- Protection from rain; and
- Interceptor at refuelling area.

The results of the tank and pipeline testing are presented in the report Document Number: 1880-06 v1.0. This is attached as Appendix D. All bunds were found to be adequate size, integrity, protected from the rain and correctly labelled. No remedial actions were required.

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## 8.0 Facility Operations Summary

### 8.1 Development / Infrastructural Works Summary

Roadstone continue to implement infrastructural works and improvements at the facility. A summary of the works which have been completed in 2017 are shown in Table 16 below.

**Table 15: Infrastructural Works At The Facility**

Infrastructural Work	Completion Date	Improvement
Wheel Cleaner Upgrade	November 2017	Mechanical improvements to the wheel cleaner system
Haul Road Upgrade	September 2017	Resurfacing and improvement of haul road into quarry
Hardstanding Areas	September 2017	Improvements to facility hardstanding areas

The infrastructural works proposed for 2018 comprise the following:

- Upgrade of sprinkler system for dust suppression – expected start May 2018; and
- Installation of additional facility road signage – expected start July 2018.

### 8.2 Reported Incidents Summary

There were no reported incidents during 2017.

### 8.3 Complaints Summary

No complaints were made as a result of the operation of the facility during 2017.

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## 9.0 Closure, Restoration & Aftercare Management Plan

The updated facility closure, restoration and aftercare management plan (CRAMP) was completed by SLR and is appended to this report in Appendix E. This CRAMP is reviewed annually and updated where necessary to take account of any facility or process changes, technology changes and costing changes (inflation).

The CRAMP was prepared in accordance with the EPA publication '*Guidance on Assessing and Costing Environmental Liabilities (2014)*'. The plan envisages that the licensed facility will achieve a clean closure, such that on cessation of waste recovery operations, plant and equipment are decommissioned, decontaminated and / or removed from the facility in order to ensure that the facility presents no environmental liabilities or risk of long-term environmental pollution.

The facility CRAMP has identified that the cost of the facility closure will be €745,000 (including 15% contingency). The anticipated costs of the site restoration and aftercare management will be €382,405 (including 15% contingency).

Subject to Agency approval and agreement, Roadstone Ltd. will make financial provision for the closure and restoration of the waste recovery facility at Brownswood by lodging an insurance company bond with the Agency, coupled with an agreement which will empower it to apply such security (or part thereof as may be required) to ensure the satisfactory completion of site restoration and aftercare works at Brownswood.

The initial amount of the bond will be agreed with the Agency on the basis of the assessments provided in this plan and will be adjusted as necessary each year thereafter to take account of ongoing review and revisions of the CRAMP.

The full CRAMP report is appended to this report in Appendix E.

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## 10.0 Environmental Liabilities Risk Assessment

An environmental liabilities risk assessment (ELRA) was undertaken by SLR consulting in April 2015. The ELRA was prepared in accordance with the EPA publication *'Guidance on Assessing and Costing Environmental Liabilities (2014)'*.

The environmental liability was assessed based on the worst case scenario identifies a requirement for a financial provision of €499,885 (including 15% contingency and 23% VAT). This amount is deemed to be the maximum liability which could arise from the future operation of the facility.

It is assumed for the purposes of assessing potential environmental liability at the Brownswood recovery facility that the worst case scenario would involve a leak or spill occurred from the existing 50,000 litre fuel tank and / or associated pipework. It is considered that if this risk did ultimately materialise, it would not precipitate any other environmental incidents, nor would it increase the likelihood that any other identifiable environmental risks would occur.

Roadstone Ltd. has the following insurance cover in place by way of provisioning for potential environmental liabilities in respect of the waste recovery facility at Brownswood:

- Employers liability insurance – indemnified for up to €22.7 million; and
- Public liability insurance – indemnified for up to €13 million.
- Environmental liability / contractors all costs insurance – indemnified for at least €2 million (with the initial €1m self-insured by Roadstone's parent, CRH plc.).

As detailed in the ELRA report:

*'Roadstone will make the financial provision necessary to cover the amount of the assessed environmental liability by lodging an insurance company bond with the Agency, coupled with an agreement which will empower it to apply such security (or part thereof as may be required) in the event that a liability event materialises at the waste recovery facility at Huntstown.'*

Details of Roadstone's current employers liability insurance and public liability insurance are provided in the full ELRA Report which is appended to this AER in Appendix F.

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## 11.0 Close

During the reporting year 2017, Brownswood recovery facility has been managed, operated and controlled in accordance with all of the licence conditions in the facility licence W0280-01. Intake of material to the facility took place in November and December 2017 only. Roadstone consider that as a result of facility compliance, the facility has not caused environmental pollution or breached any environmental quality or emission standard. The recovery facility continues in operation in an environmentally progressive manner.

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## **APPENDIX A**

### Noise Monitoring Reports

**TEST REPORT 135090**



**Client:**

**RoadstoneWood Ltd  
Fortunestown  
Tallaght  
Dublin 24**

**BHP Ref No.: 17/03/0702**

**Order No.:**

**Date Received: 8<sup>th</sup> March 2017**

**Date Tested: 8<sup>th</sup> March 2017**

**Test Specification: Noise Monitoring**

**BHP**

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E Mail  
dervlapurcell@bhp.ie

**FAO: Cillian Casey**

*Item: Noise survey at noise sensitive locations at the Roadstone operation located at Brownswood, (Harris operation), Co. Wexford.*

**For and on behalf of BHP Ltd.**

A handwritten signature in black ink, appearing to read 'Dervla Purcell'.

**Dervla Purcell**

**Date Issued: 22<sup>nd</sup> March 2017**

*Supplement to report No. N/A*

Test results relate only to this item. This test report shall not be duplicated except in full and with the permission of the test laboratory

## **Contents**

- 1.0 Scope
- 2.0 Survey Approach
- 3.0 Date of Survey
- 4.0 Results
  - 4.1 Noise levels
- 5.0 Interpretation of results
  - 5.1 Noise Levels
- 6.0 Conclusions

Appendix A: Map showing noise monitoring locations

Appendix B: Photographs indicating noise monitoring locations

## **1.0 Scope of survey**

At the request of Roadstone, BHP undertook noise monitoring at their operation in the Harris operation at Brownswood, Co. Wexford. The purpose of this survey was to provide Roadstone with the noise data and analysis required as part of their planning requirements.

This report deals with three nominated noise locations at the Harris operation in Brownswood, Co. Wexford.

## **2.0 Survey approach**

Three sound level meters (SLM's) were used in the survey, a Cirrus 171C type 1 (serial number G068852) and Cirrus 831C type 1's (serial numbers D21298FF). The SLM's were calibrated at the start of the survey with a CRL 515 calibrator (serial number 74767). The same calibrator was used to check the SLM at the end of the survey, to inspect the microphone drift.

Monitoring and the interpretation of acquired data is to the following standards:

- International Standard (ISO 1996-1: 2003E) Acoustics – Description, measurement and assessment of Environmental Noise. Part 1. Basic quantities and assessment procedures.
- International Standard (ISO 1996-2: 2007E) Acoustics – Description, measurement and assessment of Environmental Noise. Part 2. Determination of environmental noise levels.
- British Standard: BS 7445 Part 3: 1991 (ISO 1996-3: 1987) Description and measurement of Environmental Noise. Part 3. Guide to application to noise limits.

60-minute daytime levels were measured at three locations.

## **3.0 Date of Survey**

The noise survey was carried out on the 8<sup>th</sup> March 2017 by Aidan Daffy.

## **4.0 Results**

### **4.1 Noise levels:**

Levels are presented on the following pages.



**Day-time Measurements - Noise Locations – Harris operation, Brownswood, Co. Wexford (8<sup>th</sup> March 2017)**

<b>Location</b>	<b>Sampling Interval</b>	<b>Duration (mins)</b>	<b>L<sub>AEQ</sub> dB</b>	<b>L<sub>A10</sub> dB</b>	<b>L<sub>A90</sub> dB</b>	<b>Wind speed m/s</b>	<b>Sampling notes</b>
N1	11:35-12:35Hrs	60	39	41	35	1-2 m/s	The quarry is not operational / audible. Some distant traffic audible at 35-40dBA. Birdsong audible at up to 45dBA.
N2	10:38-11:38Hrs	60	44	46	39	1-2 m/s	The quarry is not operational / audible. Some distant traffic audible at 40-45dBA. Aircraft overhead audible at up to 50dBA. Occasional sounds from Brownswood Quarry were audible at 45-48dBA.
N3	11:55-12:55Hrs	60	53	55	39	1-2 m/s	The quarry is not operational / audible. Traffic noise is audible at 40-45dBA. Crows overhead audible at up to 58dBA. Power tool operating at nearby house for period during monitoring at up to 52dBA.

## **5.0 Interpretation of results**

### **5.1 Noise levels;**

The daytime noise limits for the Roadstone, Harris operation in Brownswood, Co. Wexford are as follows:

Daytime Limit       $L_{Aeq}$  55dBA

#### **5.1.1 Day-time levels :**

As can be seen in section 4.1,  $L_{Aeq}$  levels at the noise monitoring locations are less than the limit at all the locations.

## **6.0 Conclusions**

There was no audible noise coming from the site.

There were no exceedances of the noise limits attributable to the quarry.

## Appendix A

### Site map showing noise monitoring locations



**NOTE:** Noise monitoring locations N1-N3 are from the Roadstonewood Ltd. licence application for an extension of the Brownswood quarry. The map in the EIS deriving the locations is from Nov 2002 and is Figure 3.7.1

## Appendix B

### Photographs of Noise Monitoring Locations

#### Noise monitoring location N1



#### Noise monitoring location N2



## Noise monitoring location N3



**TEST REPORT NO: 139044**



**Client:**

**Roadstone Wood Ltd  
Fortunestown  
Tallaght  
Dublin**

**BHP Ref No.: 17/06/2327**

**Order No.:**

**Date Received: 10th April, 9<sup>th</sup> May & 9<sup>th</sup>  
& 30<sup>th</sup> June 2017**

**Date Tested: 10th April, 9<sup>th</sup> May & 9<sup>th</sup> &  
30<sup>th</sup> June 2017**

**Test Specification: Noise Monitoring**

**FAO: Cillian Casey**

**BHP**

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*Item: Noise survey at noise sensitive locations at the Roadstone operation located at Brownswood, Co. Wexford.*

**For and on behalf of BHP Ltd.**

A handwritten signature in black ink, appearing to read 'Dervla Purcell'.

**Dervla Purcell**

**Date Issued: 3<sup>rd</sup> September 2017**

**Supplement to report No. N/A**

Test results relate only to this item. This test report shall not be duplicated except in full and with the permission of the test laboratory

## **Contents**

- 1.0 Scope
- 2.0 Survey Approach
- 3.0 Date of sampling
- 4.0 Results
  - 4.1 Noise levels
- 5.0 Interpretation of results
  - 5.1 Noise Levels
- 6.0 Conclusions

Appendix A: Map showing noise monitoring locations

Appendix B: Photographs indicating noise monitoring locations

## **1.0 Scope of survey**

At the request of Roadstonewood Ltd., BHP undertook noise monitoring at their operation in Brownswood, Co.Wexford. The purpose of this survey was to provide Roadstone with the noise data and analysis required as part of their planning requirements.

This report deals with six nominated noise locations at the operation in Brownswood, Co. Wexford. This is the second quarterly report for 2017 for this site.

## **2.0 Survey approach**

A Cirrus 831A Type 1 sound level meter was used to monitor noise levels. Monitoring and the interpretation of acquired data are to the following standards:

- British Standard: BS 7445 Part 1: 1991 (ISO 1996-1: 1982) Description and measurement of Environmental Noise. Part 1. Guide to quantities and procedures.
- British Standard: BS 7445 Part 2: 1991 (ISO 1996-2: 1987) Description and measurement of Environmental Noise. Part 2. Guide to the acquisition of data pertinent to land use.
- British Standard: BS 7445 Part 3: 1991 (ISO 1996-3: 1987) Description and measurement of Environmental Noise. Part 3. Guide to application to noise limits.

60-minute daytime levels were to be measured at six locations. The locations were labelled as N1-N6 and are identified on the map included in Appendix A. One 15 minute night-time measurement was also taken at the entrance to the operation.

Appendix B contains photographs of the noise monitoring equipment at the monitoring points.

## **3.0 Date of sampling**

Day time survey was carried out on the 10<sup>th</sup> April, 9<sup>th</sup> June 2017 by Aidan Daffy and the 9<sup>th</sup> of May 2017 by Tara Foley. The night time survey was carried out on 30<sup>th</sup> June 2017 by Dervla Purcell

## **4.0 Results**

### **4.1 Noise levels:**

Levels are presented on the following pages.



**Day-time Measurements - Noise Locations – Brownswood, Co. Wexford (10<sup>th</sup> April, 9<sup>th</sup> May & 9<sup>th</sup> June 2017)**

<b>Location</b>	<b>Sampling Interval</b>	<b>Duration (mins)</b>	<b>L<sub>AEQ</sub> dB</b>	<b>L<sub>A10</sub> dB</b>	<b>L<sub>A90</sub> dB</b>	<b>Wind speed m/s</b>	<b>Sampling notes</b>
N1	10:30-11:30Hrs	60	57	60	42	0-1 NW	10/04/2017: Loading shovel working nearby was audible up to 50-60dBA with reversing siren at up to 65dBA for 40minutes of the monitoring period. Some traffic noise was audible at up to 50dBA.
N2	11:47-12:47Hrs	60	52	55	47	1-2 NW	10/04/2017: Traffic noise from the N11 was up to 55dBA. Some activity audible from the quarry at 45-50dBA.
N3	09:57-10:57Hrs	60	47	53	33	0	09/05//2017: Passing traffic on local roads was audible up to 60dBA. Quarry was not audible. Birdsong was at 37-40dBA
N4	11:30-12:30Hrs	60	48	49	42	2-3 SE	09/06/2017: Passing traffic on the local road was audible at up to 60dBA. Some distant traffic from the N11 reached levels of 45-50dBA. Some wind noise in nearby trees was at 45-50dBA
N5	12:12-13:12Hrs	60	50	55	44	2-3 SW	10/04/2017: Wind noise in nearby trees was at 45-50dBA and up to 55dBA. Some loading activity from the quarry was audible at 45-50dBA. Passing traffic on the local road reached levels of up to 66dBA.
N6	10:40-11:40Hrs	60	64	67	55	0-1 NW	10/04/2017: Frequent noise from the N11 road reached levels of 60-70dBA. The cement plant itself was audible at 50-55dBA and up to 60dBA at times.

**Night-time Measurements - Noise Locations – Brownswood, Co. Wexford (30<sup>th</sup> June 2017)**

<b>Location</b>	<b>Sampling Interval</b>	<b>Duration (mins)</b>	<b>L<sub>AEQ</sub> dB</b>	<b>L<sub>A10</sub> dB</b>	<b>L<sub>A90</sub> dB</b>	<b>Wind speed m/s</b>	<b>Sampling notes</b>
Gate entrance	21.09-21.24Hrs	15	60	63	40	0-1 SW	30/06/17: Traffic was frequent and audible at up to 66dBA. Birdsong was audible at 50-54dBA and up to 58dBA at times with crows passing overhead. Quarry was not audible.



## 5.0 Interpretation of results

### 5.1 Noise levels;

The daytime noise limits for the Roadstone operation in Brownswood, Co.Wexford are as follows:

Daytime Limit             $L_{Aeq}$  55dBA

Night time Limit         $L_{Aeq}$  45dBA

#### 5.1.1 Day-time levels :

As can be seen in section 4.1,  $L_{Aeq}$  levels at the noise monitoring locations are less than the limit for all locations except N1 and N6.

At N1 the main noise source was the loading shovel operating for 40 minutes during the monitoring period. The quarry was audible in the range of 50-65dBA. This is considered an exceedance of the day time limits by the quarry.

At N6 there were two main noise sources – the N11 and the cement plant operating inside the quarry. The N11 was audible at 60-70dBA for the duration of the monitoring period while the concrete plant was audible at 50-55dBA and up to 60dBA at times during the reading. Once the plant was finished operating, levels did not drop back down due to the N11. The level of noise measured at the location is not fully attributable to the quarry and there is too much interference for the N11 to accurately measure the levels from the quarry. This is therefore not considered an exceedance of the limit by the quarry.

#### 5.1.2 Night-time levels :

As can be seen in section 4.1,  $L_{Aeq}$  levels at the entrance are above the night time limit of 60dBA. The quarry was not operational nor audible with the N11 being the main noise source at this location. This is not considered an exceedance of the limit by the quarry.

## 6.0 Conclusions

The noise contribution made by the operation exceeds the daytime limit of 55dBA at location N1.

The noise contribution made by the operation does not exceed the night time limit of 45dBA at the entrance to the quarry.

## Appendix A

**Map 1:** Site map showing noise monitoring locations N1-N6



**NOTE:** Noise monitoring locations N1-N6 are derived from the Roadstonewood Ltd. waste licence application. The licence is for the waste recovery facility, Brownswood, Co. Wexford. Noise monitoring locations are taken from Figure 8-1, June 2011. The locations N2 and N3 have been moved south towards noise sensitive locations rather than on the boundary as outlined in Figure 8-1 of the application.

## Appendix B

### Photographs of noise monitoring equipment on-site during monitoring

#### Noise monitoring location N1



#### Noise monitoring location N2



**Noise monitoring location N3**



**Noise monitoring location N4**



### Noise monitoring location N5



### Noise monitoring location N6





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## **APPENDIX B**

### Dust Monitoring Reports

**Client: Roadstone Limited**

Fortunestown  
Tallaght  
Dublin  
Co. Dublin

**BHP Ref. No:** 17/12/0674-0675  
**Quote Ref:** QC001947  
**Order No:** To Follow  
**Sales Order:** 35112  
**Date Received:** 07/12/2017  
**Date Sampled:** 07/12/2017  
**Date Completed:** 14/12/2017  
**Sample Type:** Environmental Dust  
**Sampling Period:** 07/11/2017 - 07/12/2017



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Fax: +353 61 455261  
Email: colettehannan@bhp.ie

**FTAO:** Cillian Casey  
**Site:** Brownswood EPA Waste Facility  
**BHP Ref:** Monthly\_ Environmental Dust

TestName	ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition <small>Acc</small>	D1	mg/m <sup>2</sup> /day	301	14/12/2017	BHP AC 017
Inorganic Deposition	D1	mg/m <sup>2</sup> /day	116	14/12/2017	BHP AC 017
Organic Deposition	D1	mg/m <sup>2</sup> /day	185	14/12/2017	BHP AC 017
Dust Deposition <small>Acc</small>	D2	mg/m <sup>2</sup> /day	100	14/12/2017	BHP AC 017
Inorganic Deposition	D2	mg/m <sup>2</sup> /day	35	14/12/2017	BHP AC 017
Organic Deposition	D2	mg/m <sup>2</sup> /day	65	14/12/2017	BHP AC 017

**Authorised by:**

**Colette Hannan**  
**Technical Manager**

**Date Authorised:** 18/12/2017**Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**Notes:** All sample locations were inside the EPA limit of 350 mg/m<sup>2</sup>/day.

Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.  
Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.

**Sample Conditions:** Sample jar at location D1 showed major discolouration and turbidity due to organic matter.

**Client: Roadstone Limited**

Fortunestown  
Tallaght  
Dublin  
Co. Dublin

**BHP Ref. No:** 18/01/0469-0470  
**Quote Ref:** QC001947  
**Order No:** To Follow  
**Sales Order:** 36204  
**Date Received:** 08/01/2018  
**Date Sampled:** 08/01/2018  
**Date Completed:** 10/01/2018  
**Sample Type:** Environmental Dust  
**Sampling Period:** 07/12/2017 - 08/01/2018



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Analysing  
Consulting



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**FTAO:** Cillian Casey  
**Site:** Brownswood EPA Waste Facility  
**BHP Ref:** Monthly\_ Environmental Dust

TestName	ClientRef	Units	Results	DateAnalysed	Method
Dust Deposition <small>Acc</small>	D1	mg/m <sup>2</sup> /day	23	10/01/2018	BHP AC 017
Inorganic Deposition	D1	mg/m <sup>2</sup> /day	15	10/01/2018	BHP AC 017
Organic Deposition	D1	mg/m <sup>2</sup> /day	8	10/01/2018	BHP AC 017
Dust Deposition <small>Acc</small>	D2	mg/m <sup>2</sup> /day	25	10/01/2018	BHP AC 017
Inorganic Deposition	D2	mg/m <sup>2</sup> /day	4	10/01/2018	BHP AC 017
Organic Deposition	D2	mg/m <sup>2</sup> /day	21	10/01/2018	BHP AC 017

**Authorised by:**

**Colette Hannan**  
**Technical Manager**

**Date Authorised:** 16/01/2018**Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**Notes:** All sample locations were inside the EPA limit of 350 mg/m<sup>2</sup>/day.

Total dust residues were ashed at 600°C for 1 hour to determine inorganic dust deposition.

Organic deposition was determined by subtracting the inorganic dust deposition from the total dust deposition.

**Sample Conditions:** All samples in acceptable condition.

---

## **APPENDIX C**

### Water Monitoring Reports

**TEST REPORT NO: 143465**

**Client:** Roadstone Limited  
 Fortunestown  
 Tallaght  
 Dublin  
 Co. Dublin

**BHP Ref. No:** 17/11/0555  
**Quote Ref:** QC001774  
**Order No:** To Follow  
**Sales Order:** 33480  
**Date Received:** 03/11/2017  
**Date Sampled:** 03/11/2017  
**Date Completed:** 15/11/2017  
**Sample Type:** Trade Waste



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**Analysing**  
**Consulting**



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**FTAO:** Cillian Casey  
**Site:** Brownswood Quarry  
**BHP Ref:** Weekly\_Trade Waste  
**Client Ref:** SW1 Waste Licence

Test	Units	Results	Customer Limits	Date Analysed	Method
pH	pH Units	7.60	6-9	03/11/2017	BHP AC 009
Temperature - Field	°C	12.2	25	03/11/2017	BHP AC 067
B.O.D.	mg/L	0.8	1.5	09/11/2017	BHP AC 005
Total Suspended Solids	mg/L	<10	10	08/11/2017	BHP AC 012
Total Ammonia (as N)	mg/L	0.22	0.5	15/11/2017	BHP AC 095
OrthoPhosphate (as P)	mg/L	<0.066	0.2	03/11/2017	BHP AC 019

**Authorised by:**

**John O'Halloran**  
**Technical Manager**

**Date Authorised:** 16/11/2017

Additional Information:(Opinions, where stated, are not covered by accreditation)

Acc.: INAB Accredited

ND: None detected in volume analysed

^ Potable water matrix

\* Subcontracted to an approved accredited laboratory

\*\* This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised.

~ : Sample Condition : ACCEPTABLE

**TEST REPORT NO: 143636**

**Client:** Roadstone Limited  
 Fortunestown  
 Tallaght  
 Dublin  
 Co. Dublin

**BHP Ref. No:** 17/11/0956  
**Quote Ref:** QC001842  
**Order No:** To Follow  
**Sales Order:** 33722  
**Date Received:** 07/11/2017  
**Date Sampled:** 07/11/2017  
**Date Completed:** 17/11/2017  
**Sample Type:** Trade Waste



**Testing**  
**Analysing**  
**Consulting**



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**Email:** johnhalloran@bhp.ie

**FTAO:** Cillian Casey  
**Site:** Brownswood EPA Waste Facility  
**BHP Ref:** Bi-annually\_Trade Waste  
**Client Ref:** SW1

Test	Units	Results	Customer Limits	Date Analysed	Method
Temperature - Field	°C	11.4		07/11/2017	BHP AC 067
pH - Field	pH Units	7.52		07/11/2017	BHP AC 067
B.O.D.	mg/L	1.3		09/11/2017	BHP AC 005
Total Suspended Solids	mg/L	<5		13/11/2017	BHP AC 012
Ammonia (as NH <sub>3</sub> -N)	mg/L	<0.01		15/11/2017	BHP AC 095
OrthoPhosphate (as P)	mg/L	<0.01		08/11/2017	BHP AC 095
Cadmium (Dissolved as Cd)	mg/L	<0.0006		16/11/2017	WAS049
Copper (Dissolved as Cu)	mg/L	<0.009		16/11/2017	WAS049
Iron (Dissolved as Fe)	mg/L	<0.23		16/11/2017	WAS049
Lead (Dissolved as Pb)	mg/L	<0.006		16/11/2017	WAS049
Magnesium (Dissolved as Mg)	mg/L	13.8		16/11/2017	WAS049
Manganese (Dissolved as Mn)	mg/L	0.229		16/11/2017	WAS049
Nickel (Dissolved as Ni)	mg/L	0.0036		16/11/2017	WAS049
Zinc (Dissolved as Zn)	mg/L	<0.018		16/11/2017	WAS049
Total Dissolved Solids	mg/L	265		13/11/2017	BHP AC 011
Total Petroleum Hydrocarbons (>C <sub>6</sub> -C <sub>40</sub> )	mg/L	<0.1~		17/11/2017	GEO35
Petrol Range Organics (>C <sub>6</sub> -C <sub>10</sub> )	mg/L	<0.1~		17/11/2017	GEO35
Diesel Range Organics (>C <sub>10</sub> -C <sub>20</sub> )	mg/L	<0.1~		17/11/2017	GEO35

**Authorised by:**

**John O'Halloran**  
**Technical Manager**

**Date Authorised:** 24/11/2017

**Additional Information:**(Opinions, where stated, are not covered by accreditation)

**Acc.:** INAB Accredited

**ND:** None detected in volume analysed

**^** Potable water matrix

**\*** Subcontracted to an approved accredited laboratory

**\*\*** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised.

**~ :** Sample Condition : ACCEPTABLE - - Total Petroleum Hydrocarbons (>C<sub>6</sub>-C<sub>40</sub>):- Reporting limit raised due to matrix interference. - - Petrol Range Organics (>C<sub>6</sub>-C<sub>10</sub>):- Reporting limit raised due to matrix interference. - - Diesel Range Organics (>C<sub>10</sub>-C<sub>20</sub>):- Reporting limit raised due to matrix interference.

**TEST REPORT NO: 144241**

**Client:** Roadstone Limited  
 Fortunestown  
 Tallaght  
 Dublin  
 Co. Dublin

**BHP Ref. No:** 17/11/2455  
**Quote Ref:** QC001947  
**Order No:** To Follow  
**Sales Order:** 34552  
**Date Received:** 24/11/2017  
**Date Sampled:** 24/11/2017  
**Date Completed:** 06/12/2017  
**Sample Type:** Trade Waste



**Testing**  
**Analysing**  
**Consulting**



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**FTAO:** Cillian Casey  
**Site:** Brownswood EPA Waste Facility  
**BHP Ref:** Weekly\_Trade Waste  
**Client Ref:** SW1

Test		Units	Results	Customer Limits	Date Analysed	Method
Temperature - Field		°C	12.1		24/11/2017	BHP AC 067
pH	Acc.	pH Units	7.73		24/11/2017	BHP AC 009
B.O.D.		mg/L	0.8		01/12/2017	BHP AC 005
Total Suspended Solids	Acc.	mg/L	<5		29/11/2017	BHP AC 012
Ammonia (as NH <sub>3</sub> -N)	Acc.	mg/L	<0.01		28/11/2017	BHP AC 095
OrthoPhosphate (as P)	Acc.	mg/L	<0.066		24/11/2017	BHP AC 019

**Authorised by:**

**John O'Halloran**

**Date Authorised:** 08/12/2017

**Technical Manager**

Additional Information:(Opinions, where stated, are not covered by accreditation)

Acc.: INAB Accredited

ND: None detected in volume analysed

^ Potable water matrix

\* Subcontracted to an approved accredited laboratory

\*\* This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised.

~ : Sample Condition : ACCEPTABLE

**TEST REPORT NO: 144379**

**Client:** Roadstone Limited  
 Fortunestown  
 Tallaght  
 Dublin  
 Co. Dublin

**BHP Ref. No:** 17/11/2735  
**Quote Ref:** QC001947  
**Order No:** To Follow  
**Sales Order:** 34728  
**Date Received:** 28/11/2017  
**Date Sampled:** 28/11/2017  
**Date Completed:** 06/12/2017  
**Sample Type:** Trade Waste



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**FTAO:** Cillian Casey  
**Site:** Brownswood EPA Waste Facility  
**BHP Ref:** Weekly\_Trade Waste  
**Client Ref:** SW1

Test	Units	Results	Customer Limits	Date Analysed	Method
Temperature - Field	°C	7.5		28/11/2017	BHP AC 067
pH - Field	pH Units	7.75		28/11/2017	BHP AC 067
B.O.D.	mg/L	0.5		01/12/2017	BHP AC 005
Total Suspended Solids	mg/L	13		29/11/2017	BHP AC 012
Ammonia (as NH <sub>3</sub> -N)	mg/L	<0.01		30/11/2017	BHP AC 095
OrthoPhosphate (as P)	mg/L	<0.01		30/11/2017	BHP AC 095

**Authorised by:**

**John O'Halloran**  
**Technical Manager**

**Date Authorised:** 08/12/2017

Additional Information:(Opinions, where stated, are not covered by accreditation)

Acc.: INAB Accredited

ND: None detected in volume analysed

^ Potable water matrix

\* Subcontracted to an approved accredited laboratory

\*\* This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised.

~ : Sample Condition : ACCEPTABLE



**TEST REPORT NO: 145201**

**Client:** Roadstone Limited  
 Fortunestown  
 Tallaght  
 Dublin  
 Co. Dublin

**BHP Ref. No:** 17/12/1846  
**Quote Ref:** QC001947  
**Order No:** To Follow  
**Sales Order:** 35799  
**Date Received:** 20/12/2017  
**Date Sampled:** 20/12/2017  
**Date Completed:** 26/12/2017  
**Sample Type:** Surface Water



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**FTAO:** Cillian Casey  
**Site:** Brownswood EPA Waste Facility  
**BHP Ref:** Weekly\_Surface Water  
**Client Ref:** SW1

Test	Units	Results	Customer Limits	Date Analysed	Method
Temperature - Field	°C	12.1		20/12/2017	BHP AC 067
pH - Field	pH Units	7.58		20/12/2017	BHP AC 067
B.O.D.	mg/L	1.4		21/12/2017	BHP AC 005
Total Suspended Solids	Acc. mg/L	<5		22/12/2017	BHP AC 012
Ammonia (as NH <sub>3</sub> -N)	Acc. mg/L	<0.01		21/12/2017	BHP AC 095
OrthoPhosphate (as P)	Acc. mg/L	0.01		21/12/2017	BHP AC 095

**Authorised by:**

**John O'Halloran**  
**Technical Manager**

**Date Authorised:** 26/12/2017

**Additional Information:(Opinions, where stated, are not covered by accreditation)**

**Acc.:** INAB Accredited

**ND:** None detected in volume analysed

**^** Potable water matrix

**\*** Subcontracted to an approved accredited laboratory

**\*\*** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised.

**~ :** Sample Condition : ACCEPTABLE

**TEST REPORT NO: 144681 .1**

**Client:** Roadstone Limited  
 Fortunestown  
 Tallaght  
 Dublin  
 Co. Dublin

**BHP Ref. No:** 17/12/0669  
**Quote Ref:** QC001947  
**Order No:** To Follow  
**Sales Order:** 35110  
**Date Received:** 07/12/2017  
**Date Sampled:** 07/12/2017  
**Date Completed:** 22/12/2017  
**Sample Type:** Bore



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**FTAO:** Cillian Casey  
**Site:** Brownswood EPA Waste Facility  
**BHP Ref:** Bi-annually\_Bore  
**Client Ref:** GW1

Test	Units	Results	Customer Limits	Date Analysed	Method
pH - Field	pH Units	6.75		07/12/2017	BHP AC 067
B.O.D.	mg/L	0.4		13/12/2017	BHP AC 005
Ammonia (as NH <sub>3</sub> -N) Acc.	mg/L	<0.01		08/12/2017	BHP AC 095
Total Nitrogen (as N)	mg/L	3.3		14/12/2017	BHP AC 095
Nitrate (as NO <sub>3</sub> -N) Acc.	mg/L	2.4		08/12/2017	BHP AC 019
OrthoPhosphate (as P) Acc.	mg/L	0.02		08/12/2017	BHP AC 095
Total Dissolved Solids	mg/L	343		14/12/2017	BHP AC 011
Cadmium (Dissolved as Cd) *	mg/L	<0.0006		22/12/2017	WAS049
Copper (Dissolved as Cu) *	mg/L	<0.009		22/12/2017	WAS049
Iron (Dissolved as Fe) *	mg/L	<0.23		22/12/2017	WAS049
Lead (Dissolved as Pb) *	mg/L	<0.006		22/12/2017	WAS049
Magnesium (Dissolved as Mg) *	mg/L	10.6		22/12/2017	WAS049
Manganese (Dissolved as Mn) *	mg/L	<0.007		22/12/2017	WAS049
Nickel (Dissolved as Ni) *	mg/L	<0.003		22/12/2017	WAS049
Zinc (Dissolved as Zn) *	mg/L	<0.018		22/12/2017	WAS049
Total Petroleum Hydrocarbons (>C <sub>6</sub> -C <sub>40</sub> ) *	mg/L	<0.01		15/12/2017	GEO35
Petrol Range Organics (>C <sub>6</sub> -C <sub>10</sub> ) *	mg/L	<0.01		15/12/2017	GEO35
Diesel Range Organics (>C <sub>10</sub> -C <sub>20</sub> ) *	mg/L	<0.01		15/12/2017	GEO35
Total Coliforms Acc.	MPN/100mL	225		07/12/2017	BHP AC 020

**Authorised by:**

**John O'Halloran**

**Date Authorised:** 12/01/2018

**Technical Manager**

**Additional Information:**(Opinions, where stated, are not covered by accreditation)

**Acc.:** INAB Accredited

**ND:** None detected in volume analysed

**^** Potable water matrix

**\*** Subcontracted to an approved accredited laboratory

**\*\*** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised.

**~ :** Sample Condition : ACCEPTABLE

**TEST REPORT NO: 144681 .1**

**Client:** Roadstone Limited  
 Fortunestown  
 Tallaght  
 Dublin  
 Co. Dublin

**BHP Ref. No:** 17/12/0669  
**Quote Ref:** QC001947  
**Order No:** To Follow  
**Sales Order:** 35110  
**Date Received:** 07/12/2017  
**Date Sampled:** 07/12/2017  
**Date Completed:** 22/12/2017  
**Sample Type:** Bore



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**FTAO:** Cillian Casey  
**Site:** Brownswood EPA Waste Facility  
**BHP Ref:** Bi-annually\_Bore  
**Client Ref:** GW1

Test	Units	Results	Customer Limits	Date Analysed	Method
E. coli	MPN/100mL	ND		07/12/2017	BHP AC 020

**Authorised by:**

**John O'Halloran**  
**Technical Manager**

**Date Authorised:** 12/01/2018

Additional Information:(Opinions, where stated, are not covered by accreditation)

Acc.: INAB Accredited

ND: None detected in volume analysed

^ Potable water matrix

\* Subcontracted to an approved accredited laboratory

\*\* This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised.

~ : Sample Condition : ACCEPTABLE

**TEST REPORT NO: 144681 .2**

**Client:** Roadstone Limited  
 Fortunestown  
 Tallaght  
 Dublin  
 Co. Dublin

**BHP Ref. No:** 17/12/0670  
**Quote Ref:** QC001947  
**Order No:** To Follow  
**Sales Order:** 35110  
**Date Received:** 07/12/2017  
**Date Sampled:** 07/12/2017  
**Date Completed:** 22/12/2017  
**Sample Type:** Bore



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**FTAO:** Cillian Casey  
**Site:** Brownswood EPA Waste Facility  
**BHP Ref:** Bi-annually\_Bore  
**Client Ref:** GW2

Test	Units	Results	Customer Limits	Date Analysed	Method
pH - Field	pH Units	6.77		07/12/2017	BHP AC 067
B.O.D.	mg/L	0.6		13/12/2017	BHP AC 005
Ammonia (as NH <sub>3</sub> -N) Acc.	mg/L	<0.01		08/12/2017	BHP AC 095
Total Nitrogen (as N)	mg/L	3.0		14/12/2017	BHP AC 095
Nitrate (as NO <sub>3</sub> -N) Acc.	mg/L	2.3		08/12/2017	BHP AC 019
OrthoPhosphate (as P) Acc.	mg/L	0.02		08/12/2017	BHP AC 095
Total Dissolved Solids	mg/L	293		14/12/2017	BHP AC 011
Cadmium (Dissolved as Cd) *	mg/L	<0.0006		22/12/2017	WAS049
Copper (Dissolved as Cu) *	mg/L	<0.009		22/12/2017	WAS049
Iron (Dissolved as Fe) *	mg/L	<0.23		22/12/2017	WAS049
Lead (Dissolved as Pb) *	mg/L	<0.006		22/12/2017	WAS049
Magnesium (Dissolved as Mg) *	mg/L	13.4		22/12/2017	WAS049
Manganese (Dissolved as Mn) *	mg/L	0.0308		22/12/2017	WAS049
Nickel (Dissolved as Ni) *	mg/L	0.0038		22/12/2017	WAS049
Zinc (Dissolved as Zn) *	mg/L	<0.018		22/12/2017	WAS049
Total Petroleum Hydrocarbons (>C <sub>6</sub> -C <sub>40</sub> ) *	mg/L	0.032		15/12/2017	GEO35
Petrol Range Organics (>C <sub>6</sub> -C <sub>10</sub> ) *	mg/L	<0.01		15/12/2017	GEO35
Diesel Range Organics (>C <sub>10</sub> -C <sub>20</sub> ) *	mg/L	<0.01		15/12/2017	GEO35
Total Coliforms Acc.	MPN/100mL	146		07/12/2017	BHP AC 020

**Authorised by:**

**John O'Halloran**

**Date Authorised:** 12/01/2018

**Technical Manager**

**Additional Information:**(Opinions, where stated, are not covered by accreditation)

**Acc.:** INAB Accredited

**ND:** None detected in volume analysed

**^** Potable water matrix

**\*** Subcontracted to an approved accredited laboratory

**\*\*** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised.

**~ :** Sample Condition : ACCEPTABLE

**TEST REPORT NO: 144681 .2**

**Client:** Roadstone Limited  
 Fortunestown  
 Tallaght  
 Dublin  
 Co. Dublin

**BHP Ref. No:** 17/12/0670  
**Quote Ref:** QC001947  
**Order No:** To Follow  
**Sales Order:** 35110  
**Date Received:** 07/12/2017  
**Date Sampled:** 07/12/2017  
**Date Completed:** 22/12/2017  
**Sample Type:** Bore



**Testing**  
**Analysing**  
**Consulting**



**BHP Laboratories**  
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 Tel: +353 61 455399  
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 EMail: johnhalloran@bhp.ie

**FTAO:** Cillian Casey  
**Site:** Brownswood EPA Waste Facility  
**BHP Ref:** Bi-annually\_Bore  
**Client Ref:** GW2

Test	Units	Results	Customer Limits	Date Analysed	Method
E. coli	MPN/100mL	ND		07/12/2017	BHP AC 020

**Authorised by:**

**John O'Halloran**  
**Technical Manager**

**Date Authorised:** 12/01/2018

Additional Information:(Opinions, where stated, are not covered by accreditation)

Acc.: INAB Accredited

ND: None detected in volume analysed

^ Potable water matrix

\* Subcontracted to an approved accredited laboratory

\*\* This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised.

~ : Sample Condition : ACCEPTABLE

**TEST REPORT NO: 144681 .3**

**Client:** Roadstone Limited  
 Fortunestown  
 Tallaght  
 Dublin  
 Co. Dublin

**BHP Ref. No:** 17/12/0671  
**Quote Ref:** QC001947  
**Order No:** To Follow  
**Sales Order:** 35110  
**Date Received:** 07/12/2017  
**Date Sampled:** 07/12/2017  
**Date Completed:** 22/12/2017  
**Sample Type:** Bore



**Testing**  
**Analysing**  
**Consulting**



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**Tel:** +353 61 455399

**Fax:** +353 61 455261

**Email:** johnhalloran@bhp.ie

**FTAO:** Cillian Casey  
**Site:** Brownswood EPA Waste Facility  
**BHP Ref:** Bi-annually\_Bore  
**Client Ref:** GW3

Test	Units	Results	Customer Limits	Date Analysed	Method
pH - Field	pH Units	6.47		07/12/2017	BHP AC 067
B.O.D.	mg/L	0.7		13/12/2017	BHP AC 005
Ammonia (as NH <sub>3</sub> -N) Acc.	mg/L	<0.01		08/12/2017	BHP AC 095
Total Nitrogen (as N)	mg/L	6.5		14/12/2017	BHP AC 095
Nitrate (as NO <sub>3</sub> -N) Acc.	mg/L	5.6		08/12/2017	BHP AC 019
OrthoPhosphate (as P) Acc.	mg/L	0.04		08/12/2017	BHP AC 095
Total Dissolved Solids	mg/L	123		14/12/2017	BHP AC 011
Cadmium (Dissolved as Cd) *	mg/L	<0.0006		22/12/2017	WAS049
Copper (Dissolved as Cu) *	mg/L	<0.009		22/12/2017	WAS049
Iron (Dissolved as Fe) *	mg/L	<0.23		22/12/2017	WAS049
Lead (Dissolved as Pb) *	mg/L	<0.006		22/12/2017	WAS049
Magnesium (Dissolved as Mg) *	mg/L	5.72		22/12/2017	WAS049
Manganese (Dissolved as Mn) *	mg/L	<0.007		22/12/2017	WAS049
Nickel (Dissolved as Ni) *	mg/L	<0.003		22/12/2017	WAS049
Zinc (Dissolved as Zn) *	mg/L	<0.018		22/12/2017	WAS049
Total Petroleum Hydrocarbons (>C <sub>6</sub> -C <sub>40</sub> ) *	mg/L	<0.01		15/12/2017	GEO35
Petrol Range Organics (>C <sub>6</sub> -C <sub>10</sub> ) *	mg/L	<0.01		15/12/2017	GEO35
Diesel Range Organics (>C <sub>10</sub> -C <sub>20</sub> ) *	mg/L	<0.01		15/12/2017	GEO35
Total Coliforms Acc.	MPN/100mL	4		07/12/2017	BHP AC 020

**Authorised by:**

**John O'Halloran**

**Date Authorised:** 12/01/2018

**Technical Manager**

**Additional Information:**(Opinions, where stated, are not covered by accreditation)

**Acc.:** INAB Accredited

**ND:** None detected in volume analysed

**^** Potable water matrix

**\*** Subcontracted to an approved accredited laboratory

**\*\*** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised.

**~ :** Sample Condition : ACCEPTABLE

**TEST REPORT NO: 144681 .3**

**Client:** Roadstone Limited  
 Fortunestown  
 Tallaght  
 Dublin  
 Co. Dublin

**BHP Ref. No:** 17/12/0671  
**Quote Ref:** QC001947  
**Order No:** To Follow  
**Sales Order:** 35110  
**Date Received:** 07/12/2017  
**Date Sampled:** 07/12/2017  
**Date Completed:** 22/12/2017  
**Sample Type:** Bore



**Testing**  
**Analysing**  
**Consulting**



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 Tel: +353 61 455399  
 Fax: +353 61 455261  
 EMail: johnhalloran@bhp.ie

**FTAO:** Cillian Casey  
**Site:** Brownswood EPA Waste Facility  
**BHP Ref:** Bi-annually\_Bore  
**Client Ref:** GW3

Test	Units	Results	Customer Limits	Date Analysed	Method
E. coli Acc.	MPN/100mL	ND		07/12/2017	BHP AC 020

**Authorised by:**

**John O'Halloran**  
**Technical Manager**

**Date Authorised:** 12/01/2018

Additional Information:(Opinions, where stated, are not covered by accreditation)

Acc.: INAB Accredited

ND: None detected in volume analysed

^ Potable water matrix

\* Subcontracted to an approved accredited laboratory

\*\* This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised.

~ : Sample Condition : ACCEPTABLE

**TEST REPORT NO: 144681 .4**

**Client:** Roadstone Limited  
**Fortunestown**  
**Tallaght**  
**Dublin**  
**Co. Dublin**

**BHP Ref. No:** 17/12/0672  
**Quote Ref:** QC001947  
**Order No:** To Follow  
**Sales Order:** 35110  
**Date Received:** 07/12/2017  
**Date Sampled:** 07/12/2017  
**Date Completed:** 22/12/2017  
**Sample Type:** Bore



**Testing**  
**Analysing**  
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**Fax: +353 61 455261**

**Email: johnhalloran@bhp.ie**

**FTAO:** Cillian Casey  
**Site:** Brownswood EPA Waste Facility  
**BHP Ref:** Bi-annually\_Bore  
**Client Ref:** GW4

Test	Units	Results	Customer Limits	Date Analysed	Method
pH - Field	pH Units	6.61		07/12/2017	BHP AC 067
B.O.D.	mg/L	0.4		13/12/2017	BHP AC 005
Ammonia (as NH <sub>3</sub> -N) Acc.	mg/L	<0.01		08/12/2017	BHP AC 095
Total Nitrogen (as N)	mg/L	5.2		14/12/2017	BHP AC 095
Nitrate (as NO <sub>3</sub> -N) Acc.	mg/L	4.7		08/12/2017	BHP AC 019
OrthoPhosphate (as P) Acc.	mg/L	0.01		08/12/2017	BHP AC 095
Total Dissolved Solids	mg/L	252		14/12/2017	BHP AC 011
Cadmium (Dissolved as Cd) *	mg/L	<0.0006		22/12/2017	WAS049
Copper (Dissolved as Cu) *	mg/L	<0.009		22/12/2017	WAS049
Iron (Dissolved as Fe) *	mg/L	<0.23		22/12/2017	WAS049
Lead (Dissolved as Pb) *	mg/L	<0.006		22/12/2017	WAS049
Magnesium (Dissolved as Mg) *	mg/L	10.3		22/12/2017	WAS049
Manganese (Dissolved as Mn) *	mg/L	<0.007		22/12/2017	WAS049
Nickel (Dissolved as Ni) *	mg/L	0.0102		22/12/2017	WAS049
Zinc (Dissolved as Zn) *	mg/L	<0.018		22/12/2017	WAS049
Total Petroleum Hydrocarbons (>C <sub>6</sub> -C <sub>40</sub> ) *	mg/L	<0.01		15/12/2017	GEO35
Petrol Range Organics (>C <sub>6</sub> -C <sub>10</sub> ) *	mg/L	<0.01		15/12/2017	GEO35
Diesel Range Organics (>C <sub>10</sub> -C <sub>20</sub> ) *	mg/L	<0.01		15/12/2017	GEO35
Total Coliforms Acc.	MPN/100mL	133		07/12/2017	BHP AC 020

**Authorised by:**

**John O'Halloran**

**Date Authorised:** 12/01/2018

**Technical Manager**

**Additional Information:**(Opinions, where stated, are not covered by accreditation)

**Acc.:** INAB Accredited

**ND:** None detected in volume analysed

**^** Potable water matrix

**\*** Subcontracted to an approved accredited laboratory

**\*\*** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised.

**~ :** Sample Condition : ACCEPTABLE



**TEST REPORT NO: 144681 .4**

**Client:** Roadstone Limited  
 Fortunestown  
 Tallaght  
 Dublin  
 Co. Dublin

**BHP Ref. No:** 17/12/0672  
**Quote Ref:** QC001947  
**Order No:** To Follow  
**Sales Order:** 35110  
**Date Received:** 07/12/2017  
**Date Sampled:** 07/12/2017  
**Date Completed:** 22/12/2017  
**Sample Type:** Bore



**Testing**  
**Analysing**  
**Consulting**



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 EMail: johnhalloran@bhp.ie

**FTAO:** Cillian Casey  
**Site:** Brownswood EPA Waste Facility  
**BHP Ref:** Bi-annually\_Bore  
**Client Ref:** GW4

Test	Units	Results	Customer Limits	Date Analysed	Method
E. coli	MPN/100mL	ND		07/12/2017	BHP AC 020

**Authorised by:**

**John O'Halloran**  
**Technical Manager**

**Date Authorised:** 12/01/2018

Additional Information:(Opinions, where stated, are not covered by accreditation)

Acc.: INAB Accredited

ND: None detected in volume analysed

^ Potable water matrix

\* Subcontracted to an approved accredited laboratory

\*\* This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised.

~ : Sample Condition : ACCEPTABLE

---

## **APPENDIX D**

### Tank And Pipeline Testing And Inspection Report



Environmental  
Efficiency

Bray (Ireland) 01 276 1428  
Cork (Ireland) 021 453 6155  
Lisburn (N. Ireland) 028 9262 6733  
Birmingham (GB) 0121 673 1804

# Bund Integrity Assessment

## Roadstone Ltd.

## Site/Quarry: Brownswood

Document Number 1880-06 v1.00

---

Email: [energy@enviro-consult.com](mailto:energy@enviro-consult.com) [www.enviro-consult.com](http://www.enviro-consult.com)

Registered Office: Parnell House, 19 Quinsboro Road, Bray, Co. Wicklow A98 XV04. Registered Number 243 412

Directors: Robert B. Sutcliffe, Ronan T. Sutcliffe

### Environmental Services for Industry Including –

- ▶ Air, Noise & Water Monitoring
- ▶ Bund Testing
- ▶ Environmental Management Systems to ISO 14001
- ▶ Air & Noise Modelling
- ▶ Energy & Water use reduction
- ▶ IPC/IED/Waste Licence Compliance
- ▶ EIS & Planning
- ▶ Occupational Dust & Noise

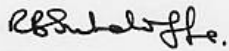
### Affiliations & Accreditations

- ▶ ISO9001:2008 Registration No. 2015/2170
- ▶ ISO14001:2004 Registration No. 2012/1427
- ▶ MCERTS Certified personnel for stack testing
- ▶ Member of Royal Society for Prevention of Accidents
- ▶ Member Environmental Services Association
- ▶ EMPI Membership



## QF 1. v2 Document Lead Sheet

Document Title	Bund Integrity Assessment
Project No.	1880
Document No.	1880-06
Client	Roadstone
Site	Brownswood

Issue	Status	Date	Author	Signed for and on behalf of	
				Environmental Efficiency	Client
1.00	Approved	22/12/2016	RBS		

SR02 v1.11

**EEC Document Author:** Bob Sutcliffe, CEng, MIEI**Conditions relating to the issue of this report:**

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2. Where this report is reproduced, it shall only be reproduced in full.
3. Reports remain the property of Environmental & Efficiency Consultants (Ireland) Limited until paid for in full.

History

Issue 1.00 Issued

## 1. Summary

Bund ref.	Bund integrity Result	Bund adequate size	Bund suitable construct'n	Bund protected from rain	Refuelling area has interceptor	Essential Action Required	Optional Action
Gas Oil Bund	Pass visual	Yes	Yes	Yes	N/A	None	None
Garage Oil Bund	Pass visual	Yes	Yes	Yes	N/A	None	None
Additive	Pass visual	Yes	Yes	Yes	N/A	None	None

Notes

## 2. Bund inspection results

### 2.1 Marked Gasoil

**Table 2-1 Bund integrity assessment**

Aspect	Value/Finding	Comment
Date of Assessment	20-Dec 16	
Assessment method	Visual	
Location	garage	
Bund type	Local (self banded tank)	
Bund construction	Steel	
Wall integrity defects	walls inspected - no defects	
Base Integrity defects	No defects	
Assessment result	Pass	

#### **Capacity check**

Aspect	Value/Finding	Comment
Bund capacity, Litres	Not recorded	
110% largest tank, litres	N/A	
25% of all tanks, litres	-	
Assessment result	N/A	

**Table 2-2 Good practice**

Aspect	Value/Finding	Comment
Bund protected from rain?	Yes (Pass)	Best practice is to protect from rain
Maximum quantity of rainwater marked?	N/A as protected from rain	Best practice is to mark maximum quantity of allowable rainwater
Is rainwater discharged by gravity?	N/A as protected from rain	Best practice is not for gravity discharge.
Is rainwater discharge point securely locked?	N/A as no gravity discharge or no rain water	Best practice is securely lock gravity discharge points.
Are tank filling points within bund?	N/A as self bunded	Best practice is for tank filling points to be within the bund.
Do pipes pass through bund wall?	N/A for steel or plastic construction	For masonry bunds, best practice is to route pipes over bund walls.
Is bund protected from vehicle strikes?	N/A as bund of steel construction	Best practice is to protect block and plastic bunds from vehicle strikes.
Is bund fitted with a self-test?	Yes (Pass)	Best practice is for self bunded tanks to have a self-test device.
Is self-test working?	Yes (Pass)	Best practice is for self bunded tanks to have the self-test device regularly tested.
Does self-test device indicate a leak?	No (Pass)	Where a leak is detected in a self bunded tank this may indicate a rupture of the inner skin.

**Table 2-3 Interceptor**

Aspect	Value/Finding	Comment
Associated refuelling area?	Yes	
Impermeable ground?	Yes (Pass)	Best practice is for refuelling areas to be impermeable
Interceptor?	Yes (Pass)	Best practice is for refuelling areas to have an interceptor
Defects/Comments	None	

**Essential action**

- None

**Optional action**

- None



**Figure 1 Interceptor**





**Figure 2 Self-bunded tank**

## 2.2 Additive

**Table 2-4 Bund integrity assessment**

Aspect	Value/Finding	Comment
Date of Assessment	20-Dec 16	
Assessment method	Visual	
Location	concrete plant	
Bund type	Local	
Bund construction	RMC	
Wall integrity defects	walls inspected - no defects	
Base Integrity defects	base inspected - no defects	
Assessment result	Pass	

### Capacity check

Aspect	Value/Finding	Comment
Bund capacity, Litres	2,912	
110% largest tank, litres	1,100	
25% of all tanks, litres	250	
Assessment result	Pass	

**Table 2-5 Good practice**

Aspect	Value/Finding	Comment
Bund protected from rain?	Yes	Best practice is to protect from rain.
Maximum quantity of rainwater marked?	N/A as protected from rain	Best practice is to mark maximum quantity of allowable rainwater
Is rainwater discharged by gravity?	N/A as protected from rain	Best practice is not for gravity discharge.
Is rainwater discharge point securely locked?	N/A as no rain water	Best practice is securely lock gravity discharge points.
Are tank filling points within bund?	No (Pass)	N/A as no filling points.
Do pipes pass through bund wall?	No (Pass)	Only applicable for masonry bunds
Is bund protected from vehicle strikes?	N/A as bund of RMC construction	Only applicable for block and plastic bunds.

**Table 2-6 Interceptor**

Aspect	Value/Finding	Comment
Associated refuelling area?	No	
Impermeable ground?	N/A as no refuelling area	
Interceptor?	N/A as no refuelling area	
Defects	N/A as no refuelling area	

Essential action

- None

Optional action

- None



**Figure 3 Additive bund**

### 2.3 Garage Oil Bund

**Table 2-7 Bund integrity assessment**

Aspect	Value/Finding	Comment
Date of Assessment	20-Dec 16	
Assessment method	Visual	
Location	garage	
Bund type	Local	
Bund construction	Steel	
Wall integrity defects	walls inspected - no defects	
Base Integrity defects	base inspected - no defects	
Assessment result	Pass	

**Table 2-8 Good practice**

Aspect	Value/Finding	Comment
Bund protected from rain?	Yes	Best practice is to protect from rain.
Maximum quantity of rainwater marked?	N/A as protected from rain	N/A as protected from rain.
Is rainwater discharged by gravity?	N/A as protected from rain	N/A as protected from rain.
Is rainwater discharge point securely locked?	N/A as no rain water	N/A as protected from rain
Are tank filling points within bund?	N/A	N/A as no filling points.
Do pipes pass through bund wall?	N/A as bund of steel construction	Only applicable for masonry bunds
Is bund protected from vehicle strikes?	N/A as bund of steel construction	Only applicable for block and plastic bunds.

**Table 2-9 Interceptor**

Aspect	Value/Finding	Comment
Associated refuelling area?	No	
Impermeable ground?	N/A as no refuelling area	
Interceptor?	N/A as no refuelling area	
Defects	N/A as no refuelling area	

#### Essential action

- None

#### Optional action

- None



Figure 2 Garage oil bund

---

## **APPENDIX E**

### Closure, Restoration & Aftercare Management Plan



global environmental solutions

## **Brownswood Inert Waste Recovery Facility**

**Brownswood  
Enniscorthy  
Co. Wexford**

## **CLOSURE, RESTORATION AND AFTERCARE MANAGEMENT PLAN (CRAMP)**



**April 2015**  
**SLR Ref: 501.00180.00110 CRAMP Rev 0**

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## EXECUTIVE SUMMARY

### **Activity Details**

Name	Brownswood Soil Recovery Facility
Address	Brownswood, Enniscorthy, Co. Wexford
Licence No.	W0280-01
Activities Licensed	<p><i>Class R5</i> : Recycling / reclamation of other materials, which includes soil cleaning resulting in recovery of soil and recycling of inorganic construction materials (Principal Activity)</p> <p><i>Class R3</i> : Recycling / reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes) which includes gasification and pyrolysis using the components as chemicals.</p> <p><i>Class R13</i> : Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage (being preliminary storage according to the definition of 'collection' in Section 5(1)), pending collection, on the site where the waste is produced).</p>

### **Report Preparation**

This closure and restoration / aftercare management plan has been independently prepared on behalf of Roadstone Ltd. by SLR Consulting Ireland, of 7 Dundrum Business Park, Windy Arbour, Dublin 14.

### **Comparison with Previous Plans**

This plan updates a draft closure and restoration / aftercare management plan previously submitted to the EPA by Roadstone Ltd. in September 2013 in support of its waste licence application. However, no financial provision was formally agreed with the EPA on foot of the draft plan prepared at that time.

### **Overview of the Plan**

This closure and restoration / aftercare management plan has had regard to the requirements outlined in Condition 10.3 of the Waste Licence and was prepared in accordance with the EPA publication *Guidance on Assessing and Costing Environmental Liabilities (2014)*.

### **Scope**

The closure plan envisages that the licensed waste facility will achieve a clean closure, such that, on cessation of waste recovery operations, plant and equipment are decommissioned, decontaminated and/or removed from the facility in order to ensure that the facility presents no environmental liabilities or risk of long-term environmental pollution.

### **Cost Summary**

As a result of this assessment, the total combined cost of the facility closure, restoration and aftercare management is calculated at **€208,640** (including 15% contingency and 23% VAT)

### ***Financial Provision***

Arising out of this assessment, Roadstone Ltd. has made the required financial provision in respect of closure and aftercare costs by means of a financial bond submitted under separate cover to the EPA.

### ***Review***

This Closure Plan will be reviewed annually and updated where necessary to take account of any facility or process changes, technology changes and costing changes (inflation). Details of the review shall be included in the Annual Environmental Report (AER) submission to the EPA.

## 1.0 INTRODUCTION

### 1.1 Brownswood Soil Recovery Facility

The Environmental Protection Agency (hereinafter '*the Agency*' or '*EPA*') issued a waste licence to Roadstone Ltd. (hereinafter '*Roadstone*') in respect of an inert soil waste recovery facility at Brownswood, Enniscorthy, Co. Wexford on 18<sup>th</sup> December 2014 (Ref. W0280-01). The principal waste activity at the site will be backfilling of the existing quarry void using imported inert soil and stone. It is anticipated that waste activities will commence on-site in the late spring / early summer of 2015.

The waste licence provides for

- Importation of up to 1,300,000 tonnes of naturally occurring waste materials, principally excess inert soil, stones and/or broken rock excavated on construction and development sites, to re-use in backfilling and restoring a large quarry void created by previous extraction of bedrock;
- Separation of any non-inert construction and demolition waste (principally metal, timber, PVC pipes and plastic) unintentionally imported to site and its temporary storage a dedicated inspection and quarantine facility, prior to removal off-site to appropriately licensed waste disposal or recovery facilities;
- Restoration of the backfilled void (including placement of cover soils and seeding) and return to natural grassland habitat and
- Environmental monitoring of noise, dust, surface water and groundwater for the duration of the proposed site restoration works and for a short aftercare period.

### 1.2 Site Description

The licensed inert soil waste recovery facility is located entirely within the townland of Brownswood, Co. Wexford, approximately 2.5km south of the town of Enniscorthy, at the location shown on an extract from the Discovery Series map of the area in Figure 1.

The waste licence site is located within an existing construction materials production facility operated by Roadstone Ltd., within a landholding identified as the 'Old Quarry'. The licensed waste facility covers an area of approximately 8.3 hectares (20.0 acres) and comprises a worked-out quarry largely developed in granodiorite rock, together with adjoining, established site infrastructure. The existing site layout is shown in Figure 2

Ground levels across the waste recovery facility generally fall south and westwards, from a maximum of approximately 55mOD (Malin) on the eastern side to 8mOD on the western side and from approximately 28mOD on the northern side to 12m to 14mOD on the southern side. The worked out quarry void covers an area of approximately 3.4 hectares (8.2 acres).

Floor level at the base of the worked out quarry lies at -22mOD approximately and its depth from existing ground level typically varies from 50m to 36m at its northern and southern faces, and from 30m on its western side to over 70m along its eastern faces.

Although the footprint of the licensed waste facility seeks to avoid conflict with other established activities around the quarry void including concrete, asphalt and block production areas, it includes access roadways and all shared infrastructure required to operate the inert waste / soil recovery facility. The licensed facility also extends up to the existing outfall pipe for treated surface water discharging to the River Slaney, in the south-western corner of Roadstone's landholding. The existing site layout, together with additional infrastructure required to support waste recovery activities, is shown in Figure 2.

### **1.3 Planning Status - Former / Existing / Planned Activities**

As the Old Quarry was established and operating prior to the introduction of planning controls under the Local Government (Planning and Development) Act of 1963, no formal planning permission was ever issued (or required) for former quarrying activities.

In 2003, planning permission was granted on appeal by An Bord Pleanala for an eastern extension of the Old Quarry onto agricultural land on the opposite side of the existing local road (Planning Ref. 2002.3756, PL26.202259). It is expected that development of these lands will commence in the near future. The quarry extension will not be impacted by operation of the soil recovery facility around the Old Quarry.

In April 2005, established activities at the Old Quarry were registered with Wexford County Council as required by Section 261 of the Planning and Development Act. In accordance with powers granted to it under Section 261, the Council imposed conditions on quarry activities in April 2007 (Quarry Registration Ref. Q/03). Condition 14 required Roadstone to restore the quarry in accordance with a plan agreed with Wexford County Council.

In June 2009, planning permission was secured on appeal to An Bord Pleanala for the erection and operation of a) a replacement semi-mobile asphalt / macadam mixing plant and b) a replacement concrete batching plant at the Old Quarry (Planning Ref. 2007.3977, PL26.231927). The planned plant replacements will not be impacted by operation of the soil recovery facility around the Old Quarry.

Following a European Court Judgement against Ireland in 2008, which identified shortcomings in the State's transposition of the EU Environmental Impact Assessment (EIA) and Habitats Directives into Irish law, amending legislation ('Section 261A') was introduced via the Planning and Development (Amendment) Act of 2010 to ensure that the regulation and control of quarries had due regard to the requirements of the two Directives. A review of the planning status of the Old Quarry at Brownswood was undertaken by Wexford County Council in 2012, in accordance with the requirements of Section 261A. That review determined that no further action was required in order to regularise the planning status of extraction related activities and achieve compliance with EU EIA and Habitats Directives.

The quarry restoration plan for the Old Quarry prepared by Roadstone provides for backfilling of the void using imported inert soil and stones. This is technically designated a waste activity under national waste management legislation. A planning application for the proposed quarry restoration, supported by an Environmental Impact Statement, was submitted to Wexford County Council in August 2011 (Planning Register Ref. No. 20110746). Planning permission for the proposed activity was granted by Wexford County Council in September 2012. The planning permission did not include any specific requirement in respect of site closure, other than that provided for in the planning application, and is valid for a 20 year period, up to 2032.

### **1.4 Classes of Licensed Waste Activities**

The waste licence issued to Roadstone by the Environmental Protection Agency (EPA) provides for the following licensed activities (as per the Fourth Schedule of the Waste Management Acts 1996-2014)

- Class No. R5 - recycling and reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials (Principal Activity)
- Class No. R3 – recycling / reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes), which includes gasification and pyrolysis using the components as chemicals and
- Class No. R13 (storage of waste pending any of the operations R1 to R12).

## 1.5 Licence Requirements

This Closure, Restoration and Aftercare Management Plan (CRAMP) is prepared in compliance with Condition 10.2 of the waste licence for an inert soil waste recovery facility at Brownswood, Enniscorthy, Co. Wexford (Ref. W0280-01).

### 10.2 Closure, Restoration and Aftercare Management Plan (CRAMP)

- 10.2.1 *The Licensee shall prepare, prior to commencement of the activity and to the satisfaction of the Agency, a revised, fully detailed and costed plan for the closures, restoration and aftercare of the facility or part thereof. This plan shall have regard to the commitments given in the application documentation for Licence Register W0280-01 (as may be varied in the AER and approved in writing by the Agency).*
- 10.2.2 *The plan shall be reviewed annually and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the agreement of the Agency.*
- 10.2.3 *The licensee shall have regard to the Environmental Protection Agency's Guidance on Assessing and Costing Environmental Liabilities (2014) when implementing Conditions 10.2.2, 10.2.2 and 10.2.3 above.*

## 1.6 Scope of this CRAMP

In preparing this plan, regard has been had to requirements outlined in Condition 10.3 of the Waste Licence which include

- *A scope statement for the plan;*
- *The criteria which define the successful closure and restoration of the facility or part thereof, which ensures minimum impact to the environment;*
- *A programme to achieve the stated criteria;*
- *Where relevant, a test programme to demonstrate the successful implementation of the CRAMP;*
- *Details of the long-term supervision, monitoring, control, maintenance and reporting requirements for the restored facility;*
- *Details of the costings for the plan and the financial provisions to underwrite those costs.*

The objective of this CRAMP is to ensure that on completion / cessation of the inert soil waste recovery activities at Brownswood, the formed quarry void will be substantially re-integrated into the surrounding pastoral landscape, with much of the land restored to grassland and/or natural habitat.

The scope of this CRAMP comprises:

- a Site Evaluation, which presents details of its planning history and an inventory of existing mobile plant and fixed infrastructure;
- the Closure Considerations and Criteria for successful closure;
- an outline Closure Plan Costing and measures for the Closure Plan update, review, implementation and validation; and
- the Facility Restoration and Aftercare proposals, including a restoration and aftercare management costing.

The CRAMP has also been prepared in accordance with the recent EPA publication, *Guidance on Assessing and Costing Environmental Liabilities (2014)*.

## **2.0 SITE EVALUATION**

### **2.1 Operator Performance**

#### **2.1.1 Environmental Management Systems**

Roadstone implements an Environmental Management System (EMS) at all its facilities in respect of its core quarrying and construction material production activities. In recent years it has extended the scope of the EMS to encompass inert soil / C&D waste recovery activities. As part of its EMS, Roadstone has developed standard procedures to address waste acceptance and handling activities, as well as an emergency response plan.

#### **2.1.2 Compliance History**

As previously noted, no formal planning permission was ever issued (or required) for historical quarrying activities at the Old Quarry. In 2005, Roadstone registered the quarry as required by Section 261 of the Planning and Development Acts 2000-2014. It has broadly complied with the conditions subsequently imposed on quarry activities by Wexford County Council (Quarry Registration Ref. Q/03) and no planning compliance or enforcement actions have ever been initiated.

#### **2.1.3 Incident History**

No material has been imported to the waste recovery facility to date, nor has any material or waste been deposited within the quarry void. There is some Made Ground beneath the shared access roads and shared infrastructure areas, much of which comprises crushed rock and/or glacial till sourced from the quarry and/or surrounding land.

On foot of a direction issued by Wexford County Council under Section 55 of the Waste Management Acts, a ground investigation was undertaken by Geotech Specialists in 2008 to examine the extent of alleged fly tipping / dumping of waste and potential soil contamination arising from oil spillages at a number of locations surrounding the former quarry. The scope of the investigation was agreed with officials of Wexford County Council and comprised 10 No. trial pits and 6 boreholes.

The trial pit excavations Inspection of trial pit excavations identified no evidence of waste (other than inert waste) at a location immediately beyond the north-eastern boundary of the licensed site. Evidence of localised soil contamination by hydrocarbons was however identified locally around an oil bund at the rear (south) of the existing maintenance shed / garage and at the former site of the primary crusher. On foot of these findings, Wexford County Council directed that four groundwater monitoring boreholes be installed around the Old Quarry in 2010 to establish the potential for contamination of groundwater by historical activities at the site, specifically relating to oil and/or fuel leakage from quarry related plant and equipment. Monitoring of these wells did not identify any evidence of ground contamination and the issue was subsequently resolved and closed out to satisfaction of officials from Wexford County Council.

#### **2.1.4 Environmental Monitoring**

Environmental monitoring of surface water, groundwater, noise and dust is undertaken at designated locations across the licensed facility, at the locations indicated in Figure 3. Many of these monitoring locations have been used for extended periods for environmental management of concrete and asphalt production activities at the Old Quarry.

##### *Surface Water*

There is no surface water watercourse located within the licensed facility. The pond which previously formed within the quarry void was created by inflow of groundwater on cessation

of dewatering. Surface water run-off from across the Old Quarry landholding is passed through settlement ponds and a hydrocarbon interceptor before being discharged, via drainage pipework crossing beneath the N11 National Primary Road, to the River Slaney.

#### *Groundwater*

Four groundwater monitoring wells have previously been installed in and around the Old Quarry; their locations are shown in Figure 3. Sampling and testing of groundwater quality in these wells indicates that groundwater quality at the facility and in the surrounding area is generally good, and slightly alkaline.

Elevated levels of total coliforms and nitrate indicate some contamination of the groundwater (organic pollution), from a human or agricultural source. There is no evidence of any hydrocarbon contamination of groundwater. The only obvious sources of organic pollution in the area are the foul waste from houses (septic tanks) and farms surrounding the licensed site. The well-drained, thin subsoils, in the area, permit rapid percolation of effluent from these sources into the bedrock, where only minimal attenuation takes place.

A septic tank is installed adjacent to the existing site office (at the location indicated in Figure 2) and currently services toilets, wash hand basins and sink units in the office. Another septic tank is located south of the canteen and it services the canteen toilets, wash hand basins and sink units. The treated effluent from both septic tanks discharges to groundwater via designed percolation areas.

#### *Dust*

The Schedule of Conditions imposed by Wexford County Council under Section 261 of the Planning and Development Act, 2000 (Quarry Registration Ref. No. Q/03) specify an emission limit value for dust deposition (at the property boundary) of 350 mg/m<sup>2</sup>/day (30 day composite sample) when measured using the conventional 'Bergerhoff' method. It also requires monitoring be undertaken and reported to the Local Authority twice a year.

Atmospheric emissions related to site activities are primarily associated with dust emissions associated with aggregate processing and exhaust emissions from traffic along the N11 and heavy good vehicle (HGV) / truck movements on unpaved roads around the Old Quarry. Dust deposition monitoring is undertaken at two locations identified in Figure 3 and designated D01 and D02.

Dust deposition monitoring undertaken between 2007 and 2010 indicated that dust deposition levels around the Old Quarry at that time were generally low at both locations, with the average measured dust deposition levels around the perimeter of the existing quarry generally well within the prescribed emission limit value of 350 mg/m<sup>2</sup>/day. Measured dust levels only marginally exceeded the limit of 350mg/m<sup>2</sup>/day on one occasion in May 2009.

#### *Noise*

Condition No. 18 of the Schedule of Conditions imposed by Wexford County Council under Section 261 of the Planning and Development Act, 2000 (Quarry Registration Ref. No. Q/03) and the Waste Licence both specify a noise emission limit value of 55 dB(A) L<sub>Aeq</sub> at the property boundary during day-time hours, with a reduced limit of 45 dB(A) L<sub>Aeq</sub> during night-time hours. It also requires that no audible tonal or impulsive component be audible at surrounding noise sensitive locations and that monitoring be undertaken and reported to the Local Authority twice a year.

The principal noise impact associated with the operation of the inert soil waste recovery facility is the increased noise generated by moving HGV trucks and/or earthworks equipment during daytime hours (07:00 to 19:00 hrs). No recovery operations or traffic movements are undertaken at the recovery facility during either evening time (19:00 to 23:00 hrs) or night-time hours (23:00 to 07:00 hrs).

Environmental noise monitoring surveys were previously carried out between 2007 and 2009 at several locations around the Old Quarry in order to comply with Condition No. 18 imposed by Wexford County Council under Quarry Registration Ref. Q/03. Noise monitoring was undertaken at three locations identified in Figure 3, designated N01, N02 and N03.

The noise surveys indicated that the averaged ambient noise levels recorded around the Old Quarry during daytime operating hours typically ranged between 40.7dB(A)  $L_{Aeq}$  and 59.5dB(A)  $L_{Aeq}$ . Noise levels in excess of the 55 dB(A) threshold limit were recorded at monitoring locations closest to the N11 National Primary Road, immediately west of the quarry, and are elevated principally due to the high volume of traffic (and HGV's) travelling along the road.

## **2.2 Environmental Pathways and Sensitivity**

### **2.2.1 Geology**

The Teagasc subsoil map of the Brownswood area indicates that little no subsoil is present at the licensed facility, with bedrock outcropping at or close to the ground surface. Where it does occur, subsoil comprises alluvium along the valley floor and the banks of the River Slaney and glacial till derived from Lower Palaeozoic sandstone and shale on higher ground. The soils and subsoil material which previously occurred across the licensed site were previously striped and stockpiled for use in future restoration.

The most recent geological map of the Enniscorthy area published by the Geological Survey of Ireland (GSI) indicates that the area around the Old Quarry is underlain by rocks of the Campile formation. The Campile formation comprises rhyolites and rhyolitic tuffs in grey and brown slaty mudstones, with occasional andesites and andesitic tuffs.

The rocks within the Old Quarry are described as a granodiorite and therefore are generally untypical of those of the Campile formation. In the quarry, the quality of the rock is variable, being quite fresh in places and heavily weathered elsewhere. Within the quarry, other rock types occur also, and these are generally identified as greywackes.

### **2.2.2 Hydrology**

The River Slaney is the major surface water feature in the vicinity of the licensed site and flows approximately 100m west of it. The estuary of the River Slaney reaches as far north as Oilgate which is approximately 5km south of Brownswood. Tidal effects on flow are however detected as far upstream as Enniscorthy town. The water level of the river opposite the Old Quarry is of the order of 1mOD to 2mOD, depending on river flow and tidal conditions.

Aside from the River Slaney, there are also two small south westerly flowing streams, to the north and south of the Old Quarry, that drain the general area. The northerly stream flows into the River Slaney, close to the northern property boundary. The southerly stream flows into the Slaney at Edermine Bridge, approximately 1.5km south of Brownswood.

The River Slaney is a designated Salmonid Water under the Freshwater Fish Directive (78/659/EEC) and the River Slaney Valley is a designated candidate Special Area of Conservation (cSAC) under the Habitats Directive (92/43/EC). The upper River Slaney estuary water quality was assessed as good for the period 2010-2012. Current river water quality data for the River Slaney at the site indicates that is rated as being of moderate status, with a Q Value of 3-4.

### **2.2.3 Hydrogeology**

The Campile formation is classified by the GSI as a regionally important aquifer in the Wexford-South Kilkenny-East Waterford region with numerous records of large well yields (up to 1,000m<sup>3</sup> / day), particularly from rhyolites.



While there is groundwater seepage into the worked out void at the 'Old Quarry', volumes are relatively small. The granodiorite is considered to be an aquitard (a poor aquifer) and most groundwater movement is confined to fractures or weathered zones in the rock

Groundwater vulnerability maps published by the EPA on its website ([www.epa.ie](http://www.epa.ie)) indicate that the site is located in an area with high to extreme groundwater vulnerability status where rock is close to the surface. The groundwater vulnerability reflects the potential for rapid groundwater movement through subsoil deposits into the underlying bedrock aquifer and is generally high or extreme where subsoil deposits are thin or absent and therefore provide little or no attenuation for potential pollutants or contaminants.

#### **2.2.4 Sensitive Receptors**

The principal sensitive receptors in the vicinity of the licensed facility comprise 19 private residences within 500m of the perimeter and Brownswood Country House (a protected structure). The nearest occupied residential properties to the waste recovery facility are located approximately 200m and 250m beyond the existing eastern site boundary.

The receptor locations considered for ecological exposure are those which might be adversely affected by any form of environmental emission. For the purposes of assessment, the most sensitive ecological receptor is deemed to be the nearby River Slaney which is included in two designated European Natura 2000 sites, the River Slaney Valley Special Area of Conservation (SAC) (Site Code 000781) and the Wexford Harbour and Slob Special Protection Area (SPA) (Site Code 004076).

The River Slaney is designated an SAC as it contains a number of designated habitats listed in Annex I of the EU Habitats Directive, including alluvial wet woodlands, estuaries, mudflats and old oak woodlands. It also supports populations of several species listed on Annex II of the EU Habitats Directive. It is designated an SPA as it is one of the most important sites in the State for numbers and diversity of waterbirds and over wintering birds.

#### **2.2.5 Pathways**

The only surface water emission / monitoring point at the licensed facility is the discharge point downstream of the settlement ponds and hydrocarbon interceptor located beyond the south-western corner of the quarry void (location SW1, shown on Figure 3). The treated surface water flows off-site through existing buried drainage infrastructure and is ultimately discharged to the River Slaney, approximately 100m west of and beyond the waste license area. Water quality is a key indicator of conservation value for the nearby River Slaney Valley SAC and Wexford Harbour and Slob SPA and as such, the surface water infrastructure is a critical environmental pathway for the licensed facility.

Most noise and dust emissions from the waste recovery facility are generated by HGV truck movements and by earthworks equipment (bulldozer) engaged in haulage and backfilling activities. There are no fixed (point) noise or dust emission sources at the facility. Air borne emissions of dust and noise transmission from the waste recovery facility have the potential to impact on the occupants of the nearest residential properties.

### **2.3 Site Processes and Activities**

As previously noted, much of the licensed area was previously quarried. Quarrying activity ceased around 2003 and at the present time, there is no established activity across much of the licensed facility. The quarry void gradually filled with incipient rainfall and natural groundwater once rock extraction activity ceased and dewatering pumps were turned off. The quarry is currently being dewatered from approximately 7.2mOD to the former floor level of -22mOD.

Since rock extraction ceased at the Old Quarry, Roadstone has continued to excavate rock at another quarry immediately to the south of it, at a location known as 'Murphy's Quarry'.

Rock excavated at this quarry is used to produce concrete, blocks and asphalt products around the Old Quarry, at areas immediately adjoining, but outside of, the licensed waste area.

Although the extent of the licensed waste site seeks to avoid conflict with other on-site activities (including concrete, asphalt and block production areas), it includes access roadways and all shared infrastructure used to operate the inert waste / soil recovery facility (including offices, wheelwash, weighbridge, maintenance sheds, hardstand areas etc.). The licensed area also extends up to the existing outfall pipe for treated surface water discharging to the River Slaney, in the south-western corner of the landholding.

When operational, the waste recovery activity will provide for

- Importation and acceptance of inert soil, stones and/or broken rock
- Placement and compaction of the imported materials in backfilling and restoring the quarry void;
- Separation of any non-inert construction and demolition waste (principally metal, timber, PVC pipes and plastic) unintentionally imported to site;
- Transfer of any separated waste streams to the waste inspection and quarantine facility for temporary storage pending inspection, testing and potential removal to off-site waste disposal or recovery facilities;
- Stockpiling and storage of imported topsoil and/or subsoil pending re-use as cover material in the final phase of restoration;
- Environmental monitoring of noise, dust, surface water and groundwater for the duration of the proposed site restoration works and for a short aftercare period.

## 2.4 Site Inventory / Infrastructure

The established site facilities, mobile plant and fixed infrastructure at the waste recovery facility at Brownswood 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 locations of the principal site facilities are shown on Figure 2.

- **Buildings:** site office, staff welfare facilities, canteen, plant maintenance shed; waste quarantine shed
- **Fixed Infrastructure:** paved / unpaved internal road network; paved employee and visitor parking areas, wheelwash; weighbridge, fuel / oil storage facilities
- **Services:** buried sewerage pipes and septic tanks, overhead / buried electricity cables, water supply pipes (connected to local authority watermain), dust suppression (sprinkler) system, flexible / rigid overground pipes (for process wastewater / pumped groundwater), silt trap and interceptor (to be provided).
- **Plant and Machinery:** re-fuelling plant; mechanical excavators; bulldozers, pumps.
- **Bunds :** There is one significant environmental bund at the licensed waste site, located beneath the 50,000 litre fuel storage tank to the rear (north) of the existing maintenance shed. Small bunded containers are provided for waste oils stored in the maintenance shed. Oils collected in tanks are emptied at intervals by a licensed waste contractor and disposed off-site at a suitably licensed waste facility

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

## 2.5 Inventory of Raw Materials, Product and Waste

Table 1 below provides an inventory of the raw materials, products and waste stored at the recovery facility. Most of the materials stored are oils, fuels and lubricants required for ongoing maintenance and repair of plant and equipment used in recovery activities as well as at Roadstone’s adjoining quarry sites.

**Table 1**  
**Inventory of Raw Materials, Products and Waste**

Type	Storage Area	Storage Type	Maximum Storage Capacity	Measurement Unit
Fuel	External Tank	Bunded Tank	50,000	Litres
Hydraulic 46	Side Workshop	Tank	Not in Use	Litres
Engine Oil	Side Workshop	Tank	Not in Use	Litres
SP150 Gear Oil	Side Workshop	Tank	Not in Use	Litres
Waste Oil	Side Workshop	Tank	26,000	Litres
Barrels of Oil	Workshop	In Drum over Spill Tray	2080 (10 No. barrels)	Litre
Grease Drums	Workshop	In Drum over Spill Tray	500 (25 No. drums)	Litre

### **3.0 FACILITY CLOSURE**

#### **3.1 Closure Considerations**

This closure plan envisages that the licensed waste facility will achieve a clean closure, such that, on cessation of waste recovery operations, plant and equipment are decommissioned, decontaminated and/or removed from the facility in order to ensure that the facility presents no risk of environmental pollution.

On suspension or unplanned cessation of waste recovery activities,

- the landform within the quarry void will be graded, rolled and compacted to create a uniform stable surface (flat or at shallow slope angle);
- any temporary settlement ponds at the base of the filling area will be dewatered and infilled with inert soil and stone;
- all mobile plant and equipment associated with the backfilling, placement and compaction of backfilled materials will be removed off-site;
- any dedicated water pumping and transmission infrastructure (flexible piping carrying surface water run-off and dewatered groundwater) will be removed;
- dedicated silt trap / hydrocarbon interceptor tanks will be emptied and decontaminated, with wastes transferred off-site to appropriately licensed waste disposal or recovery facilities;
- any materials which are stored on site and found to exceed inert waste acceptance criteria will be transferred off-site by licensed waste contractors to a suitably licensed waste disposal or recovery facility;
- environmental monitoring will continue over the closure period (assumed 3 months) and for a 12 month period thereafter.

As much of the storage and maintenance infrastructure within the recovery facility is shared with adjoining concrete and asphalt production activities, any storage tanks, drums, IBC's etc. holding fuel, oil or compounds (and related wastes) which are also required for the continued operation of those facilities will be retained and will not be decommissioned, decontaminated or removed off site.

#### **3.2 Criteria for Successful Closure**

The principal objective of the closure plan is to achieve clean closure of the site, with no residual risk of environmental pollution, particularly to soil or groundwater.

The principal criteria against which successful closure will be gauged are as follows:

- the existing landform within the quarry void will be uniformly graded and stable;
- all dedicated mobile plant and equipment associated with the recovery activity (specifically backfilling, soil placement and compaction) will have been decontaminated and/or removed off site;
- any potential pollutants and/or wastes associated with the recovery activity have been removed off site;

#### **3.3 Closure Plan Costing**

The expected costs (present-day values), associated with the future closure of the waste recovery facility at the Old Quarry at Brownswood, are outlined in Table 2 below.

**Table 2**  
**Estimated Waste Recovery Facility Closure Costs**

ACTIVITY	QUANTITY	UNITS	RATE (€)	COST (€)	SOURCE
Remove all mobile plant (excavator / bulldozer) off site	Item	Sum	3,000	3,000	Roadstone
Decommission waste recovery infrastructure					
Test sediments in settlement ponds / silt trap	8	No.	250	2,000	Chemtest
Excavate settlement pond sediments	200	m <sup>3</sup>	5	1,000	NRA Rates
Remove / transfer sediments to landfill facility (as cover)	200	m <sup>3</sup>	40	8,000	Greenstar
Backfill settlement ponds	1,000	m <sup>3</sup>	5	5,000	NRA Rates
Empty interceptor and tanker off-site	Item	sum	1,000	1,000	Enva
Remove pumping equipment and flexible pipelines	Item	sum	1,000	1,000	Roadstone
Re-profile and grade upper surface to create stable landform	15,000	m <sup>3</sup>	1	15,000	NRA Rates / Landscape Contractors*
Transfer off site of any non-inert material	50	m <sup>3</sup>	130	6,500	Greenstar
Environmental Monitoring of Noise, Dust, Water (Quarterly)	5	No.	1,500	7,500	SLR IE
Closure Validation Report	Item	sum	3,000	3,000	SLR IE
<b>Total Site Closure Cost (excl. VAT)</b>				<b>€53,000</b>	
15% Contingency (to address unforeseen issues / liabilities)				7,950	
<b>Total Site Closure Cost (excl. VAT)</b>				<b>€60,950</b>	
VAT (23%)				14,020	
<b>Total Site Closure Cost (incl. VAT)</b>				<b>€74,970</b>	

- O Brien Landscaping / Redlough Landscapes

### **3.4 Closure Plan Update and Review**

As required by the waste licence conditions, this Closure Plan will be reviewed annually and updated where necessary to take account of any facility or process changes, technology changes and costing changes (inflation). Details of the review will be included in the Annual Environmental Report (AER) submitted to the EPA.

### **3.5 Closure Plan Implementation**

Quarry backfilling activity at the Brownswood waste recovery facility is currently projected to be complete within the life of the existing planning permission (ie. 20 years). In reality, the timeline for backfilling the quarry void is very dependent on the availability of inert soil and stone generated by off-site construction activity locally and will be subject to ongoing review and change.

The EPA will be given 2 months notice of any proposed temporary closure and 6 months notice of the intended final closure date. Notice will be provided in accordance with prevailing guidance and it is anticipated that there will also be ongoing discussions with the EPA in respect of required closure procedures.

### **3.6 Closure Plan Validation**

A validation report (including a Certificate of Completion in respect of the Closure Plan) will be submitted to the Agency within 3 months of completion of the works provided for above.

The validation audit will be undertaken by an independent, external environmental Consultant. The final validation report will include:

- an assessment of how the objectives of the Closure Plan have been achieved;
- final 'as-closed' drawings and photographs of the facility;
- results of short-term environmental monitoring undertaken over the period of the closure works and for a 12 month period thereafter;
- a Certificate of Completion for the CRAMP.

## 4.0 FACILITY RESTORATION AND AFTERCARE

### 4.1 Facility Restoration

The waste recovery activities at Brownswood primarily provide for the backfilling of large voids created by previous extraction of bedrock at the site using imported inert soil and stone and some in-situ stockpiled soil. Backfilling of the quarry void will facilitate restoration of the former quarry area to natural grassland habitat (and recolonisation by local vegetation).

The operational life of the recovery facility is anticipated to be up to 20 years and is ultimately contingent on the availability of inert soil waste from local development projects. On planned completion of the final phase of backfilling, much of the work required to achieve the final closure and restoration of the waste facility will already have been completed. It is expected that the final restoration of the waste recovery areas to natural grassland habitat will be completed within a period of 12 months following closure.

In addition to the closure tasks identified previously, the following works will be undertaken during the restoration and aftercare phase

- Progressive decommissioning of any site infrastructure used solely for waste recovery activities;
- Break up of any dedicated hard standing or paved surfaces using a hydraulic breaker;
- Classification testing of construction and demolition wastes;
- Removal of construction and demolition wastes off-site to appropriate construction and demolition waste recovery facility;
- Final grading of the backfilled materials within the quarry void to create the approved restoration landform / slope;
- Topsoiling and seeding of the final landform / slope to facilitate development of natural grassland habitat;
- Additional planting along the western side of the quarry void to separate the restored area from ongoing concrete and asphalt production activities.

Further details on the proposed final earthworks and tree planting are provided below.

#### 4.1.1 *Backfilling / Earthworks / Grass Seeding*

The backfilling of the former quarry area will proceed upwards, either continually at varying rates or on an intermittent (campaign) basis, as waste material is generated by local development works. In addition to imported materials, small volumes of soil stockpiled in existing berms around the quarry void will also be used to backfill the former quarry.

Final formation levels on completion of the backfilling and restoration works will vary on account of the sloped nature of the restored landform, from approximately 28mOD at the northern end to 6mOD at a proposed surface water pond in the south-eastern corner.

Temporary access ramps into and out of active backfilling areas will be at a gradient of approximately 1v:10h. Temporary side slopes in soil will be 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 relatively shallow, typically of the order of 1v:4v or less.

An indication of the planned final ground level contours around the backfilled quarry void is provided in Figure 4. Cross-sections through the final landform are shown in Figure 5.

Topsoil will be imported to the site on a continual basis and will not be used immediately in general backfilling of the worked-out quarry. The topsoil will be stockpiled separately pending re-use toward the latter stages of the quarry backfilling works, when the top surface of backfilled ground approaches the finished ground levels envisaged by the restoration scheme.

On attaining the planned final level, the final landform will be graded, rolled and compacted as provided for in the closure plan. Thereafter a cover layer of subsoil and topsoil will be placed and graded across the backfilled soil. It is likely that this cover will comprise 150-300mm of topsoil over subsoil. The restoration surface will then be seeded with grass in order to promote stability, minimise soil erosion and dust generation and restore the site to natural grassland habitat.

It is envisaged that the final restoration works across the waste recovery site will be completed within 6 months of facility closure and final cessation of waste recovery activities. Following seeding, the restored surface will be inspected at intervals in order to identify areas of bare soil or poorly established vegetation growth. In these areas, additional seeding will be undertaken as necessary to improve vegetation coverage.

In order to ensure that there is no long-term conflict with established / ongoing production activities following completion of restoration works, the restored area will be largely be left as managed grassland and/or natural habitat.

#### **4.1.2 Proposed Copse Planting**

When the quarry void has been filled close to original ground levels on its western side, it is intended to fortify existing planting around the western edge of the former quarry with some copse planting using locally sourced native and indigenous shrubs and small trees. The principal purpose of this planting will be to create a natural physical divide separating the restored area from any concrete production activities which are likely to be continuing at this time. Planting in this area will be in accordance with detailed landscape plans which are to be submitted and agreed with local authority planning officials in due course.

## **4.2 Aftercare Management**

On completion of facility closure and restoration works, provision will also be made for subsequent short-term (up to 1 year) environmental monitoring of air, surface water and groundwater. Assuming no evidence of contaminated soil or groundwater is encountered and that concrete and tar production activities continue at the adjacent sites, the in-situ groundwater monitoring wells will continue in service and will not be decommissioned.

It is expected that following the aftercare phase, there should be no constraints on future land use associated with soil or groundwater contamination or on future use of any structures remaining in-situ.

The process of surrendering the waste licence to the EPA will progress following the aftercare period in order to remove the legal encumbrance on title deeds to the restored lands and shared infrastructure areas.

### **4.2.1 Short-Term Aftercare Management**

The restoration aftercare management plan for the Brownswood waste recovery facility will comprise three principal short-term activities:



### *Environmental Monitoring*

As previously stated, short-term environmental monitoring of air, surface water and groundwater (for up to 1 year) will be undertaken by the Applicant to ensure that no surface / groundwater contamination is present / emerging following closure of the waste recovery facility and completion of the restoration works.

### *Maintenance of Copse Planting*

Following establishment of the copse planting along the western side of the backfilled void, it is envisaged that a programme of established maintenance will be required for a period of up to 24 months / 2 years after the initial planting. This will be undertaken by a landscaping contractor and will include activities such as weed control, formative pruning and/or removal of deadwood, watering (as and if required) and adjustment of ties and stakes.

### *Maintenance of Grass Sward*

The aftercare of the grass sward will be as per grass supplier's instructions, consistent with the intended creation of a natural grassland habitat within the restored area. Initial maintenance following restoration after each phase of backfilling (principally cutting) will be overseen by the waste facility manager at Brownswood or by other designated Roadstone staff nominated by him / her.

After final restoration works have been completed and the aftercare period has elapsed, the land will be left as a natural grassland habitat.

## **4.2.2 Long Term Aftercare Management**

Given the inert nature of the soil and stone material used to backfill the quarry area and the proposed return of the backfilled areas to natural grassland habitat, it is considered that no long-term aftercare monitoring and maintenance will be required for the waste recovery facility at Brownswood.

## **4.3 Final Restoration and Aftercare Management Costs**

The expected cost, associated with the site restoration and aftercare management, are outlined in Table 3 overleaf.

**Table 3**  
**Estimated Restoration and Aftercare Cost**  
**(Over 2 Year Aftercare Period)**

ACTIVITY	QUANTITY	UNITS	RATE (€)	COST (€)	SOURCE
Breaking up of pavement and hard-standing surfaces (using hydraulic breaker),	100	m <sup>3</sup>	15	1,500	Roadstone
Validation testing to classify C&D waste	10	sample	150	1,500	SLR IE
Transfer C&D waste to off-site recovery facility (incl. haulage)	200	tonne	10	2,000	Roadstone
Short-term (1 year) environmental monitoring (quarterly)	4	No.	1,500	6,000	SLR IE
Final topsoil placement (150-300mm)	5	ha	7,500	37,500	Landscape Contractors*
Surface preparation, grass seeding, ground repair and spraying	5	ha	4,000	20,000	Landscape Contractors*
Post and wire perimeter fencing (600m at €5/m)	600	m	5	3,000	Landscape Contractors*
Copse Planting (Ground preparation, supply of trees and planting works)	100	tree	30	3,000	Landscape Contractors*
24 months establishment maintenance for grassed area and hedge planting	2	years	5,000	10,000	Landscape Contractors*
Preparation of Waste Licence Surrender application	Item	Sum	4,000	4,000	SLR IE
Surrender of Waste Licence to EPA	Item	Sum	6,000	6,000	EPA
<b>Total Restoration and Aftercare Cost (excl. VAT)</b>				<b>€94,500</b>	
15% Contingency (to address unforeseen issues / liabilities)				14,175	
<b>Total Restoration and Aftercare Cost (excl. VAT)</b>				<b>€108,675</b>	
VAT (23%)				26,055	
<b>Total Restoration and Aftercare Cost (excl. VAT)</b>				<b>€133,670</b>	

- O'Brien Landscaping / Redlough Landscapes

#### **4.3.1 Closure Plan Costs**

The anticipated costs of the planned facility closure following completion of projected soil intake is **€74,970** (present day value, incl. 15% contingency and 23% VAT), as outlined in Table 2 of this plan. As previously indicated, the plan envisages that the proposed waste recovery facility will achieve a clean closure, such that, following cessation of inert soil waste intake and recovery activities and the subsequent decommissioning / removal of plant and waste infrastructure from the facility, no remaining environmental liabilities will attach to restored areas of the site and/or areas where the principal waste recovery activities are located.

#### **4.3.2 Site Restoration and Aftercare Management Costs**

The anticipated costs of the site restoration and aftercare management, outlined in Table 3 of this plan comes to a total of **€133,670** (present day value, incl. 15% contingency and 23% VAT). These costs are based on a projected 2 year aftercare management period, with no provision for long-term aftercare monitoring and maintenance thereafter.

#### **4.4 Financial Provision**

Subject to Agency approval and agreement, Roadstone Ltd. will make financial provision for the closure and restoration of the waste recovery facility at Brownswood by lodging an insurance company bond with the Agency, coupled with an agreement which will empower it to apply such security (or part thereof as may be required) to ensure the satisfactory completion of site restoration and aftercare works at Brownswood.

The initial amount of the bond will be agreed with the Agency on the basis of the assessments provided in this plan and will be adjusted as necessary each year thereafter to take account of ongoing review and revisions of the CRAMP.

## **5.0 REPORT CLOSURE**

This report has been prepared by SLR Consulting Ireland (SLR) 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 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**

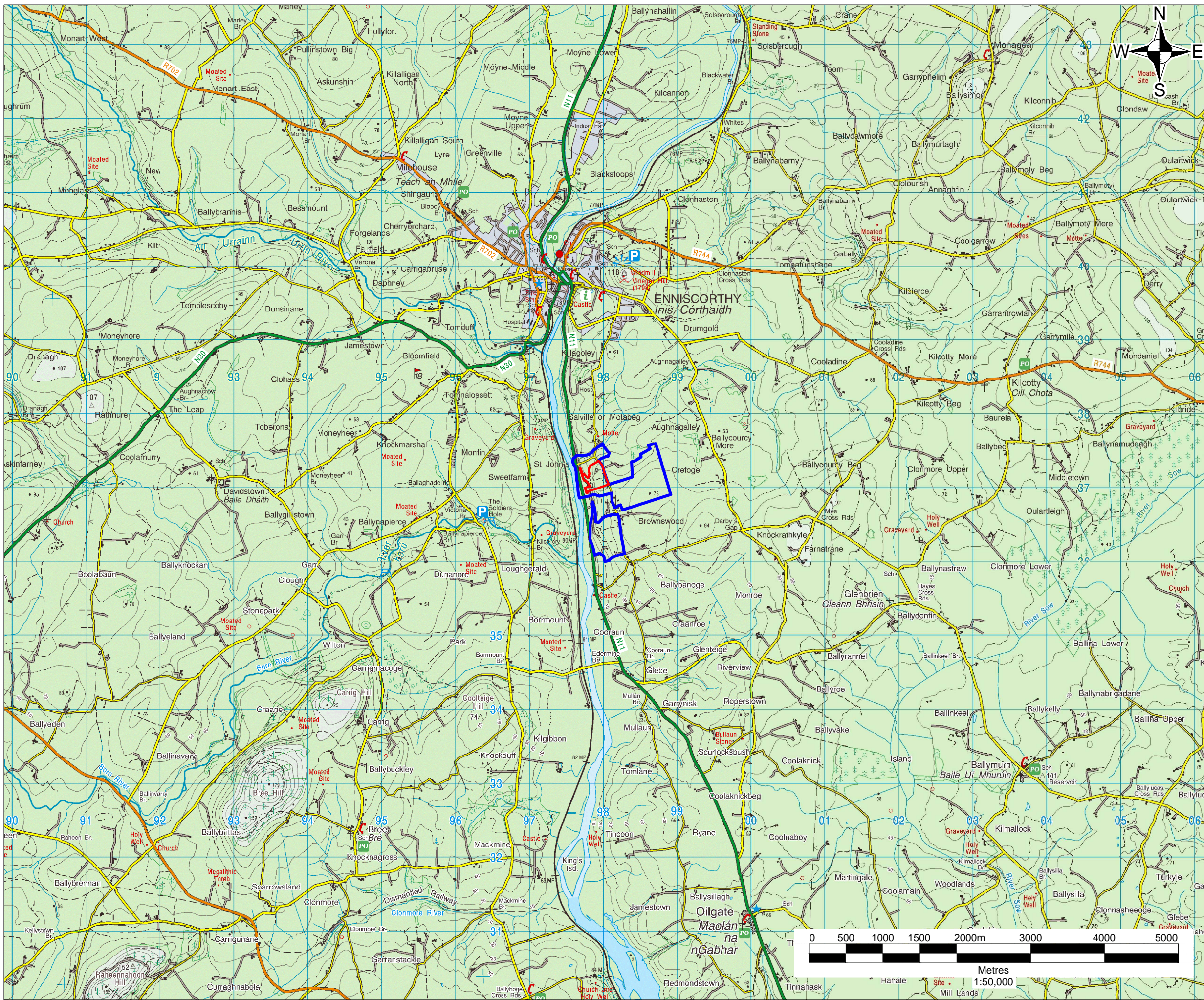
**Figure 2  
Existing Site Layout**

**Figure 3  
Environmental Monitoring Locations**

**Figure 4  
Restoration Proposals**

**Figure 5  
Restored Cross Sections**

0180.00110.18.FIG\_1.R0.SITE LOCATION MAP.dwg



**NOTES**

- EXTRACT FROM 1:50,000 O.S DISCOVERY MAP NO. 68 & 69
- ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000715 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

**LEGEND**

- ROADSTONE LIMITED LANDHOLDING (c. 86.2 ha)
- WASTE LICENCE APPLICATION AREA (c. 8.3 ha)

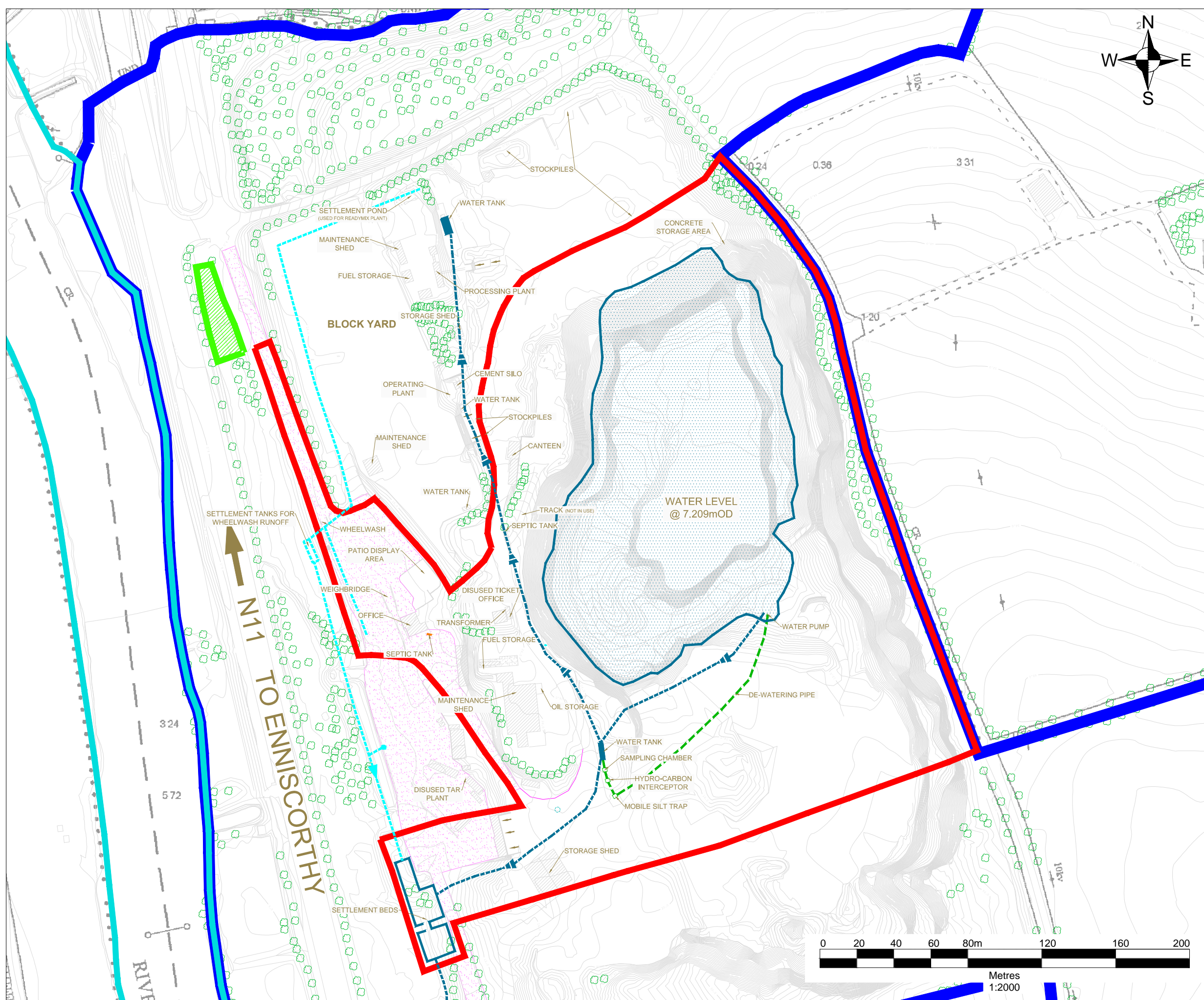
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**ROADSTONE LIMITED**  
 CLOSURE AFTERCARE MANAGEMENT PLAN  
 WASTE RECOVERY FACILITY,  
 BROWNSWOOD, CO. WEXFORD  
 SITE LOCATION MAP

**FIGURE 1**

Scale: 1:50,000 @ A3  
 Date: FEBRUARY 2015

0180.00110.18.FIG\_2.R0.SITE INFRASTRUCTURE LAYOUT.dwg



**NOTES**

- EXTRACT FROM 1:2,500 ORDNANCE SURVEY DIGITAL SHEET NO. 5143 A-D
- ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000715 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

**LEGEND**

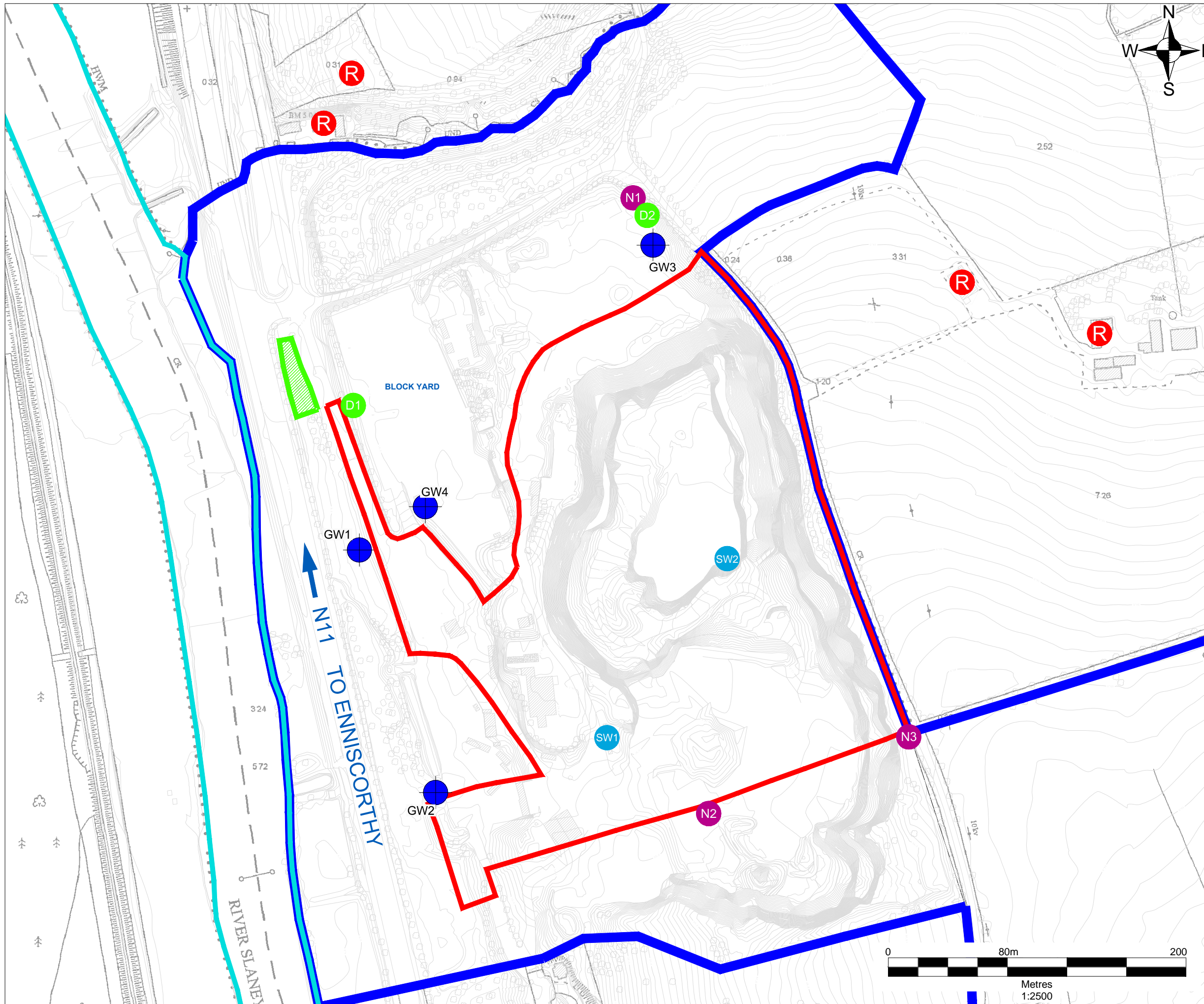
	ROADSTONE LIMITED LANDHOLDING (c. 86.2 ha)
	WASTE LICENCE APPLICATION AREA (c. 8.3 ha)
	AREA NOT OWNED BY ROADSTONE LTD. (c. 0.1 ha) - FOLIO WX53689F & WX20665
	PAVED CONCRETE AREA

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**ROADSTONE LIMITED**  
 CLOSURE AFTERCARE MANAGEMENT PLAN  
 WASTE RECOVERY FACILITY,  
 BROWNSWOOD, CO. WEXFORD  
 SITE INFRASTRUCTURE LAYOUT

**FIGURE 2**






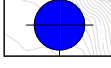


Scale: 1:2,000 @ A3 Date: FEBRUARY 2015



NOTES

1. BASED ON ORDNANCE SURVEY DIGITAL INCH MAP NO. WX019, WX020, WX025 & WX026
2. ORDNANCE SURVEY IRELAND LICENCE SU 0000715 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

LEGEND

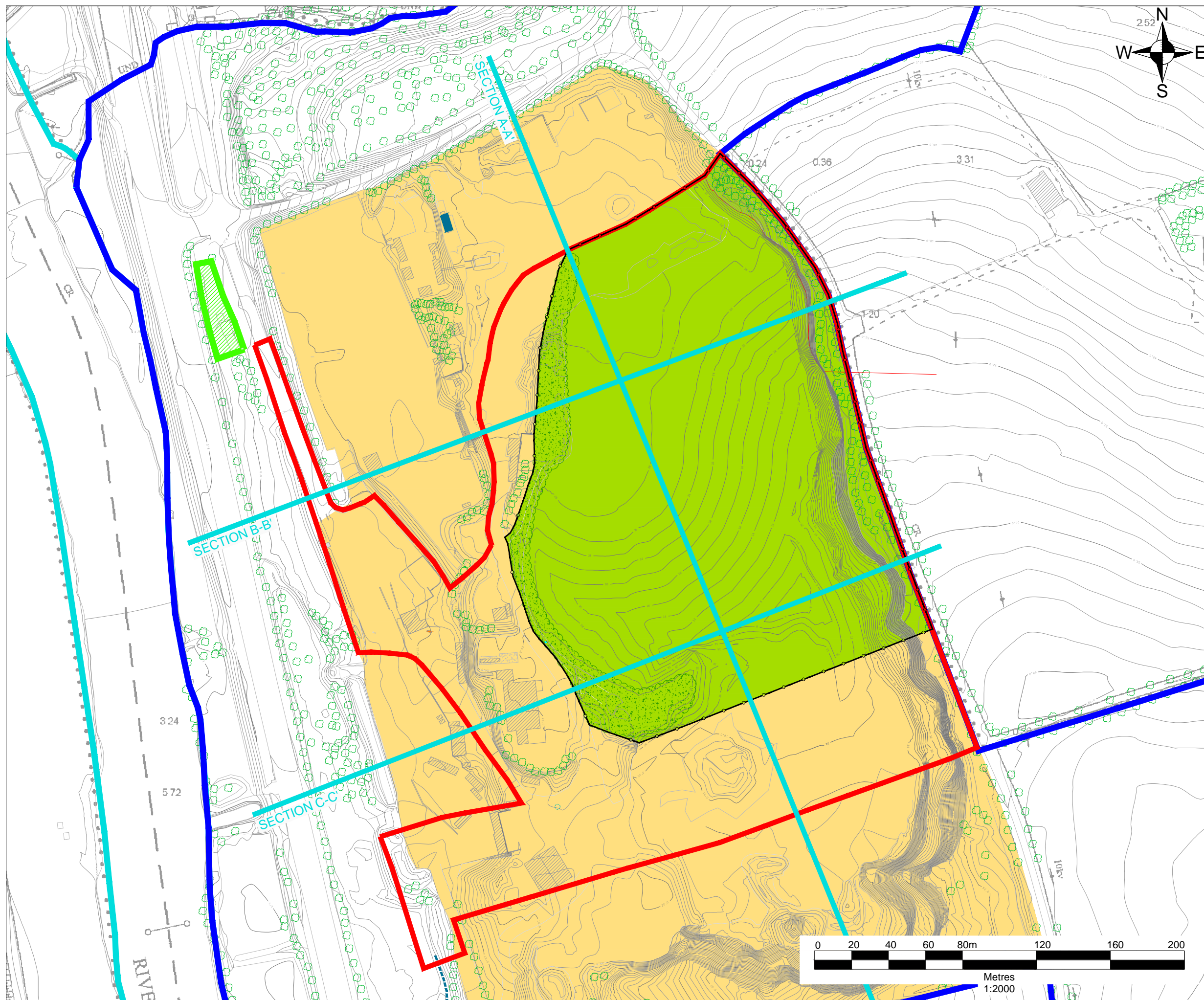
-  ROADSTONE LIMITED LANDHOLDING (c. 86.2 ha)
-  WASTE LICENCE APPLICATION AREA (c. 8.3 ha)
-  AREA NOT OWNED BY ROADSTONE LTD. (c. 0.1 ha) FOLIO WX53689F & WX206
-  N2 NOISE MONITORING LOCATION
-  D1 DUST MONITORING LOCATION
-  GROUNDWATER MONITORING WELL
-  SURFACE WATER MONITORING LOCATION
-  LOCATION OF NEAREST RESIDENCE


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**ROADSTONE LIMITED**  
**ENVIRONMENTAL IMPACT STATEMENT**  
**WASTE RECOVERY FACILITY,**  
**BROWNSWOOD, CO. WEXFORD**  
**ENVIRONMENTAL MONITORING**  
**LOCATIONS**

**FIGURE 3**





**NOTES**

1. EXTRACT FROM 1:2,500 ORDNANCE SURVEY DIGITAL SHEET NO. 5143 A-D
2. ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000715 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

**LEGEND**

<b>BOUNDARIES</b>	
	ROADSTONE LIMITED LANDHOLDING (c. 86.2 ha)
	WASTE LICENCE APPLICATION AREA (c. 8.3 ha)
	AREA NOT OWNED BY ROADSTONE LTD. (c. 0.1 ha) - FOLIO WX53689F & WX20665
<b>EXISTING FEATURES TO BE RETAINED</b>	
	HEDGEROWS/TREES (TO BE PROTECTED DURING INFILL & RESTORATION WORKS)
	CONSTRUCTION MATERIAL PRODUCTION FACILITY
<b>PROPOSED RESTORATION FEATURES</b>	
	NATIVE COPSE PLANTING TO SCREEN RESTORATION AREA FROM CONSTR. MATERIAL PRODUCTION FACILITY
	WASTE LICENCE AREA TO BE RESTORED TO AGRICULTURE
	PROPOSED FENCE
	CROSS SECTION LOCATIONS (REFER TO FIGURE 4 FOR CROSS SECTIONS)

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**ROADSTONE LIMITED**  
 CLOSURE AFTERCARE MANAGEMENT PLAN  
 WASTE RECOVERY FACILITY,  
 BROWNSWOOD, CO. WEXFORD  
 RESTORATION SURFACE

**FIGURE 4**

Scale: 1:2,000 @ A3      Date: FEBRUARY 2015

0180.00110.18.FIG\_4.R0.RESTORATION SURFACE.dwg



---

## **APPENDIX F**

### Environmental Liabilities Risk Assessment



global environmental solutions

**Brownswood Inert Waste Recovery Facility**  
**Brownswood**  
**Enniscorthy**  
**Co. Wexford**

**ENVIRONMENTAL LIABILITY  
RISK ASSESSMENT (ELRA)**

The logo for Roadstone, featuring the word 'Roadstone' in a bold, blue, italicized, sans-serif font. The letters are closely spaced and have a slight shadow effect, giving it a three-dimensional appearance. The logo is set against a white rectangular background.

**April 2015**  
**SLR Ref: 501.00180.00110 ELRA Rev 0**

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## EXECUTIVE SUMMARY

### **Activity Details**

Name	Brownswood Soil Recovery Facility
Address	Brownswood, Enniscorthy, Co. Wexford
Licence No.	W0280-01
Activities Licensed	<p><i>Class R5</i> : Recycling / reclamation of other materials, which includes soil cleaning resulting in recovery of soil and recycling of inorganic construction materials (Principal Activity)</p> <p><i>Class R3</i> : Recycling / reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes) which includes gasification and pyrolysis using the components as chemicals.</p> <p><i>Class R13</i> : Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage (being preliminary storage according to the definition of 'collection' in Section 5(1)), pending collection, on the site where the waste is produced).</p>

### **Report Preparation**

This Environmental Liability Risk Assessment has been independently prepared on behalf of Roadstone Ltd. by SLR Consulting Ireland, of 7 Dundrum Business Park, Wind Arbour, Dublin 14.

### **Comparison with Previous Plans**

This plan updates a draft Environmental Liability Risk Assessment previously submitted to the EPA by Roadstone Ltd. in September 2013 in support of the its waste licence application. However, no financial provision was formally agreed with the EPA on foot of the draft plan prepared at that time.

### **Overview of the Plan**

This Environmental Liability Risk Assessment has had regard to the requirements outlined in Condition 12 of the Waste Licence and was prepared in accordance with the EPA publication *Guidance on Assessing and Costing Environmental Liabilities (2014)*.

### **Cost Summary**

As a result of this assessment, and based on a plausible worst case scenario, a requirement for financial provision of **€499,885** (including 15% contingency and 23% VAT) has been calculated for the waste facility at Brownswood. This amount is deemed to be the maximum liability which could arise from the future operation of the facility.

### **Financial Provision**

Arising out of this assessment, Roadstone Ltd. has made the required financial provision in respect of closure and aftercare costs by means of a financial bond submitted under separate cover to the EPA.

### ***Review***

This Closure Plan will be reviewed annually and updated where necessary to take account of any facility or process changes, technology changes and costing changes (inflation). Details of the review shall be included in the Annual Environmental Report (AER) submitted to the EPA.

## 1.0 INTRODUCTION AND BACKGROUND

### 1.1 Brownswood Soil Recovery Facility

The Environmental Protection Agency (hereinafter '*the Agency*' or '*EPA*') issued a waste licence to Roadstone Ltd. (hereinafter '*Roadstone*') in respect of an inert soil waste recovery facility at Brownswood, Enniscorthy, Co. Wexford on 18<sup>th</sup> December 2014 (Ref. W0280-01). The waste licence essentially provides for the backfilling of a worked out quarry void on Roadstone's landholding at Brownswood. It is anticipated that waste activities will commence in the late spring / early summer of 2015.

The waste licence provides for

- Importation of up to 1,300,000 tonnes of naturally occurring waste materials, principally excess inert soil, stones and/or broken rock excavated on construction and development sites, to re-use in backfilling and restoring a large quarry void created by previous extraction of bedrock;
- Separation of any non-inert construction and demolition waste (principally metal, timber, PVC pipes and plastic) unintentionally imported to site and its temporary storage a dedicated inspection and quarantine facility, prior to removal off-site to appropriately licensed waste disposal or recovery facilities;
- Restoration of the backfilled void (including placement of cover soils and seeding) and return to natural grassland habitat and
- Environmental monitoring of noise, dust, surface water and groundwater for the duration of the proposed site restoration works and for a short aftercare period.

### 1.2 Site Description

The licensed inert soil waste recovery facility is located entirely within the townland of Brownswood, Co. Wexford, approximately 2.5km south of the town of Enniscorthy, at the location shown on an extract from the Discovery Series Map of the area in Figure 1.

The waste licence site is located within an existing construction materials production facility operated by Roadstone Ltd., within a landholding identified as the 'Old Quarry'. The licensed waste facility covers an area of approximately 8.3 hectares (20.0 acres) and comprises a worked-out quarry largely developed in granodiorite rock, together with adjoining, established site infrastructure.

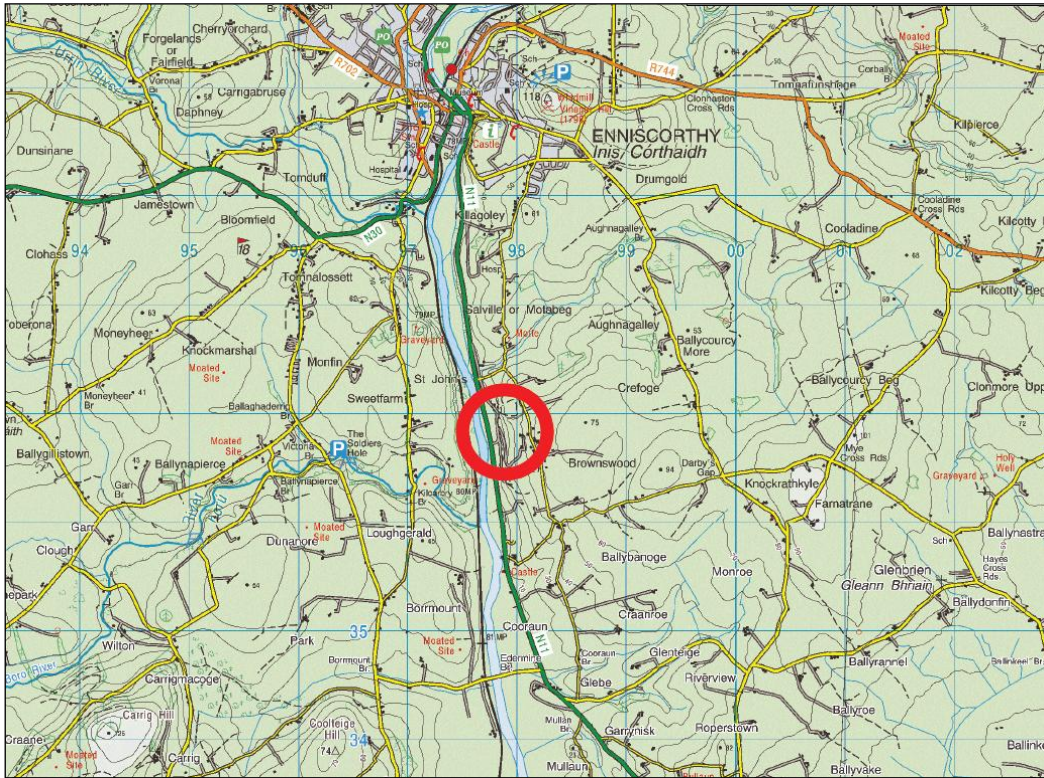
Ground levels across the waste recovery facility generally fall south and westwards, from a maximum of approximately 55mOD (Malin) on the eastern side to 8mOD on the western side and from approximately 28mOD on the northern side to 12m to 14mOD on the southern side. The worked out quarry void covers an area of approximately 3.4 hectares (8.2 acres).

Floor level at the base of the worked out quarry lies at -22mOD approximately and its depth from existing ground level typically varies from 50m to 36m at its northern and southern faces, and from 30m on its western side to over 70m along its eastern faces.

Although the footprint of the licensed waste facility seeks to avoid conflict with other established activities around the quarry void including concrete, asphalt and block production areas, it includes access roadways and all shared infrastructure required to operate the inert waste / soil recovery facility. The licensed facility also extends up to the existing outfall pipe for treated surface water discharging to the River Slaney, in the south-western corner of Roadstone's landholding. A recent aerial view of the licensed site is provided in Figure 2 overleaf, with the extent of the Applicant's landholding in the area outlined in blue and that of waste licence area outlined in red.



**Figure 1**  
**Site Location**



**Figure 2**  
**Aerial View of Licensed Site and Surrounding Land Use**



### 1.3 Surrounding Land Uses

The site of the proposed inert waste recovery facility, is located within a largely agricultural area. There are approximately 10 No. residential properties clustered amongst agricultural land immediately north of the Old Quarry. The existing N11 National Primary Road and the River Slaney are located immediately beyond the western boundary, while Murphy's Quarry and approximately 7 No. residential properties are located beyond the southern boundary.

A local (county) road is located immediately beyond the eastern site boundary. Land on the eastern side of this road largely is used for agricultural purposes and includes occasional interspersed residential property. Planning permission was granted to Roadstone Ltd. in 2003 for an eastward extension of the Old Quarry into these agricultural lands.

Land-use in the vicinity of the facility, including residential and commercial development, is shown on the aerial photograph in Figure 2. An oblique aerial photograph of the existing quarry (taken in 2011), showing its position and setting relative to the Dublin-Wexford rail line, the River Slaney, the N11 National Primary Road is reproduced as Figure 3 below.

**Figure 3**  
**Oblique Aerial View of Existing Quarry**



### 1.4 Classes of Licensed Waste Activities

The waste licence issued to Roadstone by the Environmental Protection Agency (EPA) provides for the following licensed activities (as per the Fourth Schedule of the Waste Management Acts 1996-2014)

- Class No. R5 - recycling and reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials (Principal Activity)
- Class No. R3 – recycling / reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes), which includes gasification and pyrolysis using the components as chemicals and
- Class No. R13 (storage of waste pending any of the operations R1 to R12).

## 1.5 Licence Requirements

This Environmental Liability Risk Assessment (ELRA) is prepared in compliance with Condition 12 of the waste licence for an inert soil waste recovery facility at Brownswood, Enniscorthy, Co. Wexford (Ref. W0280-01).

### 12.2 Environmental Liabilities

- 12.2.1 *The Licensee shall, as part of the AER, provide an annual statement as to the measures taken or adopted at the site in relation to the prevention of environmental damage, and the financial provisions in relation to the underwriting of costs for remedial actions following anticipated events (including closure) or accidents / incidents, as may be associated with the carrying on of the activity.*
- 12.2.2 *The licensee shall arrange for the revision, by an independent and appropriately qualified consultant, of a comprehensive and fully costed Environmental Liabilities Risk Assessment (ELRA) which addresses the liabilities from past and present activities. The assessment shall include those liabilities and costs identified in Condition 10 for execution of the CRAMP. A report on this assessment plan shall be agreed by the Agency in advance of the commencement of the activity. The ELRA shall be reviewed and updated as necessary to reflect any significant change on site, and in any case, every three years following initial agreement. Review results are to be notified as part of the AER.*
- 12.2.3 *In advance of the commencement of the activity, the licensee shall, to the satisfaction of the Agency, make financial provision to cover any liabilities associated with the operation (including closure, restoration and aftercare). The amount of indemnity held shall be reviewed and revised as necessary, but at least annually. Proof of renewal or revision of such financial indemnity shall be included in the annual 'Statement of Measures' report identified in Condition 12.2.1.*
- 12.2.4 *The licensee shall revise the cost of closure, restoration and aftercare annually and any adjustments shall be reflected in the financial provision made under Condition 12.2.3.*
- 12.2.5 *The licensee shall have regard to the Environmental Protection Agency's Guidance on Assessing and Costing Environmental Liabilities (2014) and, as appropriate, Guidance on Environmental Liability Risk Assessment, Residuals Management Plans and Financial Provision (2006) when implementing Conditions 12.2.2, 12.2.3 and 12.2.4 above.*

## 1.6 Scope of this ELRA

In preparing this plan, regard has been had to requirements outlined in Condition 12.2 of the Waste Licence. This plan identifies and addresses any potential risks to the environment and associated liabilities arising from past and planned future activities at the waste recovery facility at Brownswood.

Planned liabilities associated with the closure of the facility are not considered in this Environmental Liabilities Risk Assessment (ELRA) and have been identified and costed separately in the Closure, Restoration and Aftercare Management Plan (CRAMP) prepared in accordance with the requirements of Condition 10.2 and 10.3 of the waste licence.

## **2.0 CHARACTERISATION OF LOCAL ENVIRONMENT**

### **2.1 Site Operation**

As previously noted, the soil waste recovery facility at Brownswood is located entirely within an existing construction materials production facility operated by Roadstone Ltd. The facility covers an area of approximately 8.3 hectares and comprises a worked-out rock quarry of approximately 3.4 hectares, with existing site infrastructure on surrounding land.

As of the date of this report, no waste materials have been imported to the waste recovery facility, nor has any material or waste been deposited within the quarry void. There is some Made Ground beneath the shared access roads and shared infrastructure areas, much of which comprises crushed rock and/or glacial till sourced from the quarry and/or surrounding land.

Although the footprint of the licensed waste facility seeks to avoid conflict with other established activities around the quarry void including concrete, asphalt and block production areas, it includes access roadways and all shared infrastructure required to operate the inert waste / soil recovery facility (including offices, wheelwash, weighbridge, maintenance sheds, hardstand areas etc.)

### **2.2 Operator Performance**

No formal planning permission was ever issued (or required) for historical quarrying activities at the Old Quarry. In 2005, Roadstone registered the quarry as required by Section 261 of the Planning and Development Acts 2000-2014. Since that time, it has broadly complied with the conditions subsequently imposed on quarry activities by Wexford County Council (Quarry Registration Ref. Q/03) and no planning compliance or enforcement actions have ever been initiated.

On foot of a direction issued by Wexford County Council under Section 55 of the Waste Management Acts, a ground investigation was undertaken by Geotech Specialists in 2008 to examine the extent of alleged fly tipping / dumping of waste and potential soil contamination arising from oil spillages at a number of locations surrounding the former quarry. The scope of the investigation was agreed with officials of Wexford County Council and comprised 10 No. trial pits and 6 boreholes.

The trial pit excavations inspection of trial pit excavations identified no evidence of waste (other than inert waste) at a location immediately beyond the north-eastern boundary of the licensed site. Evidence of localised soil contamination by hydrocarbons was however identified locally around an oil bund at the rear (south) of the existing maintenance shed / garage and at the former site of the primary crusher. On foot of these findings, Wexford County Council directed that four groundwater monitoring boreholes be installed around the Old Quarry in 2010 to establish the potential for contamination of groundwater by historical activities at the site, specifically relating to oil and/or fuel leakage from quarry related plant and equipment. Monitoring of these wells did not identify any evidence of ground contamination and the issue was subsequently resolved and closed out to satisfaction of officials from Wexford County Council.

Roadstone implements an Environmental Management System (EMS) at all its facilities in respect of its core quarrying and construction material production activities. In recent years it has extended the scope of the EMS to encompass inert soil / C&D waste recovery activities. As part of its EMS, Roadstone has developed standard procedures to address waste acceptance and handling activities, as well as an emergency response plan.

## **2.3 Environmental Sensitivity**

### **2.3.1 Geology**

The Teagasc subsoil map of the Brownswood area indicates that little no subsoil is present at the licensed facility, with bedrock outcropping at or close to the ground surface. Where it does occur, subsoil comprises alluvium along the valley floor and the banks of the River Slaney and glacial till derived from Lower Palaeozoic sandstone and shale on higher ground. The soils and subsoil material which previously occurred across the licensed site were previously striped and stockpiled for use in future restoration.

The most recent geological map of the Enniscorthy area published by the Geological Survey of Ireland (GSI) indicates that the area around the Old Quarry is underlain by rocks of the Campile formation. The Campile formation comprises rhyolites and rhyolitic tuffs in grey and brown slaty mudstones, with occasional andesites and andesitic tuffs.

The rocks within the Old Quarry are described as a granodiorite and therefore are generally untypical of those of the Campile formation. In the quarry, the quality of the rock is variable, being quite fresh in places and heavily weathered elsewhere. Within the quarry, other rock types occur also, and these are generally identified as greywackes.

### **2.3.2 Hydrology**

The River Slaney is the major surface water feature in the vicinity of the licensed site and flows approximately 100m west of it. The estuary of the River Slaney reaches as far north as Oilgate which is approximately 5km south of Brownswood. Tidal effects on flow are however detected as far upstream as Enniscorthy town. The water level of the river opposite the Old Quarry is of the order of 1mOD to 2mOD, depending on river flow and tidal conditions.

Aside from the River Slaney, there are also two small south westerly flowing streams, to the north and south of the Old Quarry, that drain the general area. The northerly stream flows into the River Slaney, close to the northern property boundary. The southerly stream flows into the Slaney at Edermine Bridge, approximately 1.5km south of Brownswood.

The River Slaney is a designated Salmonid Water under the Freshwater Fish Directive (78/659/EEC) and the River Slaney Valley is a designated candidate Special Area of Conservation (cSAC) under the Habitats Directive (92/43/EC). The upper River Slaney estuary water quality was assessed as good for the period 2010-2012. Current river water quality data for the River Slaney at the site indicates that is rated as being of moderate status, with a Q Value of 3-4.

### **2.3.3 Hydrogeology**

The Campile formation is classified by the GSI as a regionally important aquifer in the Wexford-South Kilkenny-East Waterford region with numerous records of large well yields (up to 1,000m<sup>3</sup> / day), particularly from rhyolites.

While there is groundwater seepage into the worked out void at the 'Old Quarry', volumes are relatively small. The granodiorite is considered to be an aquitard (a poor aquifer) and most groundwater movement is confined to fractures or weathered zones in the rock

Groundwater vulnerability maps published by the EPA on its website ([www.epa.ie](http://www.epa.ie)) indicate that the site is located in an area with high to extreme groundwater vulnerability status where rock is close to the surface. The groundwater vulnerability reflects the potential for rapid groundwater movement through subsoil deposits into the underlying bedrock aquifer and is generally high or extreme where subsoil deposits are thin or absent and therefore provide little or no attenuation for potential pollutants or contaminants.

### **2.3.4 Sensitive Receptors**

The principal sensitive receptors in the vicinity of the licensed facility comprise 19 private residences within 500m of the perimeter and Brownswood Country House (a protected structure). The nearest occupied residential properties to the waste recovery facility are located approximately 200m and 250m beyond the existing eastern site boundary.

The receptor locations considered for ecological exposure are those which might be adversely affected by any form of environmental emission. For the purposes of assessment, the most sensitive ecological receptor is deemed to be the nearby River Slaney which is included in two designated European Natura 2000 sites, the River Slaney Valley Special Area of Conservation (SAC) (Site Code 000781) and the Wexford Harbour and Slobs Special Protection Area (SPA) (Site Code 004076).

The River Slaney is designated an SAC as it contains a number of designated habitats listed in Annex I of the EU Habitats Directive, including alluvial wet woodlands, estuaries, mudflats and old oak woodlands. It also supports populations of several species listed on Annex II of the EU Habitats Directive. It is designated and SPA as it is one of the most important sites in the State for numbers and diversity of waterbirds and over wintering birds.

### **2.3.5 Pathways**

The only surface water emission / monitoring point at the licensed facility is the discharge point downstream of the settlement ponds and hydrocarbon interceptor located beyond the south-western corner of the quarry void. The treated surface water flows off-site through existing buried drainage infrastructure and is ultimately discharged to the River Slaney, approximately 100m west of and beyond the waste license boundary. Water quality is a key indicator of conservation value for the nearby River Slaney Valley SAC and Wexford Harbour and Slobs SPA and as such, the surface water infrastructure is a critical environmental pathway for the licensed facility.

Potential noise and dust emissions from the waste recovery facility may be generated by HGV truck movements and by earthworks equipment (bulldozer) engaged in haulage and backfilling activities. There are no fixed (point) noise or dust emission sources at the facility. Air borne emissions of dust and noise transmission from the waste recovery facility have the potential to impact on the occupants of the nearest residential properties.

### **3.0 RISK ASSESSMENT**

#### **3.1 Introduction**

The methodology for undertaking the Environmental Liability Risk Assessment (ELRA) in respect of the soil recovery facility at Brownswood comprises a number of discrete elements as outlined below :

- (i) Risk Identification : A list of plausible risks for the waste activity is identified, including all potential impacts on surface water, groundwater, atmosphere, land, human health, natural habitats and protected species;
- (ii) Risk Analysis : The risk analysis stage comprises establishment of risk classification criteria, followed by a risk analysis based on the selected criteria. Risk classification tables are used in order to evaluate and rank the risks relative to each other.
- (iii) Risk Evaluation : The risk evaluation stage is used to assist in making decisions, using the outcomes of the risk analysis, in identifying and prioritising the identified risks for development of measures to minimise potential environmental impacts.
- (iv) Risk Treatment: The risk treatment stage comprises identification and prioritisation of management and mitigation measures to reduce the risks identified in the risk evaluation process.

#### **3.2 Risk Identification**

Risks associated with the operation of the waste recovery facility were identified on foot of site visits and inspections by personnel from SLR Consulting Ireland undertaken in July 2010 and more recently in November 2014. On these occasions, personnel met site management to review the potential environmental hazards and related environmental management issues arising at the site.

The waste handling processes to be undertaken at the licensed site will inevitably generate noise and dust at and across the licensed facility.

Normal site operations, undertaken in accordance with procedures contained in the established on-site Environmental Management System (EMS), are not expected to generate any leachate or effluent, as all wastes imported, handles and placed and recovered at the facility will be inert. The Licensee is required to actively monitor and manage incoming wastes to confirm that only inert materials are accepted at the facility. Notwithstanding this, there is potential for discovery of non-inert or potentially hazardous materials, hidden within incoming loads of inert compliant waste.

On-site storage of fuels / hydrocarbons in mobile and/or static tanks, principally the existing 50,000 litre fuel tank, located to the rear (north) of the maintenance shed, is a potential hazard. The on-site storage of hazardous substances used in the operation and maintenance of plant and equipment (including gas-oil, hydraulic oil, engine oil, transmission oil, waste oil, oil filters etc.) principally over a paved concrete slab within the maintenance shed and in a lean-to along the eastern side of the maintenance shed, is another potential hazard.

There is a requirement for various hydrocarbons to be stored in tanks and drums on site for use in the operation and maintenance of plant and equipment used for established site activities. These include gas oil, engine oil, transmission oil and hydraulic oil, in addition to waste oil and oil filters.

A leak from fuel tanks or pipelines, or spillage of hazardous substances, were they to arise, would most likely run-off over ground and if unimpeded, would either discharge to ground or flow downslope and be picked up by surface water drainage infrastructure. Failure to contain such leaks and spills would result in contamination of the groundwater beneath the site and possibly some off-site discharge of contamination, with the Licensee responsible for clean-up costs in this scenario.

All potential risks of environmental incidents or accidents are summarised in Table 3-1 below.

**Table 3-1  
Potential Risks Identified for Recovery Activity**

Risk ID	Process	Potential Risk
1	Importing , Handling and Placement of Imported Soil	Dust generation from stockpiles or placed materials.
2	Importing , Handling and Placement of Imported Soil	Noise generation by moving plant and equipment.
3	Importing , Handling and Placement of Imported Soil	Stockpiling or placement of non-inert non-compliant waste, contamination of ground and/or groundwater
4		Stockpiling or placement of non-inert non-compliant waste, discharge to surface water
5	Leakages from Mobile Plant and Equipment	Spillage or leakage of fuel from HGVs, tipper trucks, bulldozers and other mobile site equipment , discharge to ground or groundwater
6		Spillage or leakage of fuel from HGVs, tipper trucks, bulldozers and other mobile site equipment , discharge to surface water
7	Fuel Storage and Handling	Spill of hydrocarbons stored on site at static and mobile fuel tanks or leaks from pipelines; discharge to ground or groundwater
8		Spill of hydrocarbons stored on site at static and mobile fuel tanks or leaks from pipelines; discharge to surface water
9	Storage and Handling of Hazardous Materials	Spill or leak of hazardous materials stored on site (gas-oil, hydraulic oil, engine oil, transmission oil, waste oil etc.), discharge to ground or groundwater
10		Spill or leak of hazardous materials stored on site (gas-oil, hydraulic oil, engine oil, transmission oil, waste oil etc.), discharge to surface water
11	Weather	Flooding on site causing uncontrolled discharge



### 3.3 Risk Analysis

A list of plausible risks has been identified, which include abnormal but possible and plausible incidents occurring that could give rise to environmental liabilities. The risk analysis is based on the following likelihood and consequence risk classification tables, as outlined in Table 3.2 and Table 3.3 below. The risks identified are tabulated in Table 3-4 and assessed in terms of likelihood and consequence using the risk classification tables.

**Table 3-2**  
**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 3-3**  
**Risk Classification Table – Consequence**

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

**Table 3-4  
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	Importing , handling and placement of imported soil	Dust generation from stockpiles or placed materials.	Reduction in air quality; inhalation of dust particles Potential health or nuisance impact	3	Slight increase in dust inhalation, principally by site users. Prolonged increase potentially damaging to health	2	Impact attenuated by separation distance, dust suppression, intervening vegetation and frequent seasonal rainfall.	6
2	Importing , handling and placement of imported soil	Noise generation by moving plant and equipment.	Increase in ambient noise on site and at nearby properties Potential health or nuisance impact	3	Existing raised ambient noise level. Slight increase in noise exposure, principally for site users. Prolonged increase potentially damaging to health	2	Noise impact attenuated by separation distance and measures to limit emissions at source or screen over intervening distance.	6
3	Importing , handling and placement of imported soil	Contamination from non-inert non-compliant waste	Potential contamination of ground or regionally important aquifer.	3	Local aquitard beneath facility. Finite volume of contaminated materials. Placed materials surrounded by low permeability clay	2	Licensee applies measures to ensure all waste accepted at facility is inert, including establishing origin of incoming wastes	6
4	Importing , handling and placement of imported soil	Contamination from non-inert non-compliant waste	Potential contamination of major watercourse and damage to sensitive ecological habitat	3	Finite volume of contaminated materials.	2	Licensee applies measures to ensure all waste accepted at facility is inert, including establishing origin of incoming wastes. Interceptor and silt trap installed	6

Risk ID	Process	Potential Risks	Environmental Effect	Consequence Rating	Basis of Consequence	Likelihood Rating	Basis of Likelihood	Risk Score (Consequence x Likelihood)
5	Fuel Storage and Handling	Leakages from mobile plant and equipment	Potential contamination of ground or regionally important aquifer.	3	Local aquitard beneath facility. Losses finite (low volume) and dispersed	2	Plant and equipment regularly maintained and inspected.	6
6	Fuel Storage and Handling	Leakages from mobile plant and equipment	Potential contamination of major watercourse and damage to sensitive ecological habitat	3	Finite (minor) volume of leakage. Losses finite (low volume) and dispersed	2	Plant and equipment regularly maintained and inspected. Interceptor and silt trap installed	6
7	Fuel Storage and Handling	Leak or spillage from fuel tank / pipeline	Potential contamination of ground or regionally important aquifer.	3	Local aquitard beneath facility. Loss of large volume loss of hazardous and persistent material. Absence of paved ground in places across site	2	Tanks is fully bunded Tank, bund and pipelines regularly inspected and tested	6
8	Fuel Storage and Handling	Leak or spillage from fuel tank / pipeline	Potential contamination of major watercourse and damage to sensitive ecological habitat	5	Major sensitive watercourse immediately downstream of facility. Loss of large volume loss of hazardous and persistent material. Absence of paved ground / drainage infrastructure in places across site	2	Tank is fully bunded Tank, bund and pipelines regularly inspected and tested Interceptor and silt trap installed	10

Risk ID	Process	Potential Risks	Environmental Effect	Consequence Rating	Basis of Consequence	Likelihood Rating	Basis of Likelihood	Risk Score (Consequence x Likelihood)
9	Storage and Handling of Hazardous Materials	Leak or spillage of hazardous materials stored on site (hydraulic soils, waste oils etc)	Potential contamination of ground or regionally important aquifer.	3	Local aquitarad beneath facility. Finite (minor) volumes stored.	2	Materials stored and used over concrete surfaces. Drums / containers fully banded.	6
10	Storage and Handling of Hazardous Materials	Leak or spillage of hazardous materials stored on site (hydraulic soils, waste oils etc)	Potential contamination of major watercourse and damage to sensitive ecological habitat	4	Major sensitive watercourse immediately downstream of facility. Finite (minor) volumes stored.	2	Materials stored and used over concrete surfaces. Drums / containers fully banded. Interceptor and silt trap installed	8
11	Weather	Flooding on site causing uncontrolled discharge	Potential contamination of ground , regionally important aquifer, major watercourse or sensitive ecological habitat	3	Potential for large volume loss and impact due to elevated suspended solids	1	No history of flooding at facility.	3

### 3.4 Risk Evaluation

The environmental risks identified above are re-tabulated below in Table 3-5 to assist in the prioritisation for risk treatment purposes

**Table 3-5  
Risk Evaluation Table**

Risk ID	Process	Potential Risks	Consequence Rating	Likelihood Rating	Risk Score (Consequence x Likelihood)
8	Fuel Storage and Handling	Potential contamination of major watercourse and ecological habitat by leak or spillage from fuel tank / pipeline	5	2	10
10	Storage and Handling of Hazardous Materials	Potential contamination of major watercourse and sensitive ecological habitat by leak or spillage of hazardous materials stored on site	4	2	8
1	Importing , handling and placement of imported soil	Dust generation from stockpiles or placed materials.	3	2	6
2	Importing , handling and placement of imported soil	Noise generation by moving plant and equipment.	3	2	6
3	Importing , handling and placement of imported soil	Contamination of ground / groundwater from non-inert non-compliant waste	3	2	6
4	Importing , handling and placement of imported soil	Contamination of surface waters by non-inert non-compliant waste	3	2	6
5	Fuel Storage and Handling	Contamination of ground / groundwater by leakages from mobile plant and equipment	3	2	6
6	Fuel Storage and Handling	Contamination of surface waters by leakages from mobile plant and equipment	3	2	6
7	Fuel Storage and Handling	Potential contamination of ground or regionally important aquifer by leak or spillage from fuel tank / pipeline	3	2	6

Risk ID	Process	Potential Risks	Consequence Rating	Likelihood Rating	Risk Score (Consequence x Likelihood)
9	Storage and Handling of Hazardous Materials	Potential contamination of ground or regionally important aquifer by leak or spillage of hazardous materials stored on site	3	2	6
12	Weather	Potential contamination due to flooding on site causing uncontrolled discharge	3	1	3

The risk matrix is displayed in Table 3-6 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 to facilitate prioritisation of risks for treatment. The matrix allows risks to be easily displayed and prioritised.

**Table 3-6  
Risk Matrix**

<b>Likelihood</b>	<b>Very High</b>	<b>5</b>					
	<b>High</b>	<b>4</b>					
	<b>Medium</b>	<b>3</b>					
	<b>Low</b>	<b>2</b>			1,2,3,4 5 6,7,9	8	10
	<b>Very Low</b>	<b>1</b>			11		
			<b>Trivial</b>	<b>Minor</b>	<b>Moderate</b>	<b>Major</b>	<b>Massive</b>
			<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Consequence</b>							

The risk matrix indicates that the bulk of the identified risks lie in the green zone, indicating the need for continuing awareness and regular ongoing monitoring. One of the risks (Risk ID10 – risk to surface water presented by storage and handling of hazardous materials) lies in the amber zone, requiring treatment through mitigation or management action, while another (Risk ID8 - risk to surface water presented by fuel storage) lies in the red zone indicating it requires priority treatment.

### **3.5 Risk Treatment**

The output of the risk treatment process is the development of a statement of measures to be taken to minimise the environmental risk of the activity. The risk reduction due to existing mitigation measures is outlined in Table 3.7.

Table 3.7 allocates identified mitigation measures to a 'risk owner'. Roadstone will maintain and update a version of this table to inform its Risk Reduction Programme for the recovery facility. The responsibility may differ from that indicated below, depending on the staffing complement and activities / outputs from the adjoining quarry operations.

The Risk Reduction Programme is a dynamic process that will be regularly reviewed and updated to reflect changes that occur at the facility. New risks may emerge with new processes or new methods of working. Additional hazards can arise from the use of new materials for maintenance or fuelling at the facility. Additional mitigation measures can become available or better techniques developed. The staff structure can change and new responsibilities allocated to the site management team

**Table 3-7**  
**Risk Reduction due to Existing Mitigation Measures**

Risk ID	Potential Risk	Risk Score	Mitigation Measures to be Taken	Outcome	Action	Date for Completion	Owner / Contact Person
10 (9)	Leak or spillage from fuel tank / pipelines	10 (6)	<p>The 50,000 litre fuel storage tank rests above a concrete bunded containment facility which has been sized to retain 110% of the total fuel volume. Regular tank and bund integrity assessment, to be undertaken. Tank and bund to be visually inspected annually. Bund integrity test to be undertaken every three years.</p> <p>Level alarm installed in storage tank.</p> <p>Fuel storage drums and containers to be inspected at least quarterly</p> <p>Spill kits available in workshop for the purpose of containing minor leaks or spills</p> <p>Emergency Response Procedures and Plans are in place detailing the actions should a major leak or spillage event occur.</p>	Reduced likelihood of spills.	Ongoing inspection and monitoring	Ongoing	Location Manager / Waste Facility Manager
8 (7)	Leak or spill from storage and handling of hazardous materials	8 (6)	<p>All hazardous fluids and materials are stored at the on-site workshop in accordance with regulations until they are either recovered (treated) or disposed of at an appropriate off site waste management facility.</p> <p>All tanks, drums and containers will be subject to routine inspection and maintenance as part of scheduled site Inspections (at least quarterly).</p> <p>Hydraulic oils, engine oils, anti-freeze, ad-blue, etc. to be stored on bunded pallets in workshop which has concrete floor to prevent infiltration to ground if materials spill.</p> <p>Material Safety Data Sheets are held for all hazardous liquids stored on site.</p> <p>Spill kits available in workshop for the purpose of containing minor spills</p>	Reduced likelihood of spills.	Ongoing inspection and monitoring	Ongoing	Location Manager / Waste Facility Manager



Risk ID	Potential Risk	Risk Score	Mitigation Measures to be Taken	Outcome	Action	Date for Completion	Owner / Contact Person
			<p>Emergency Response Procedures and Plans are in place detailing the actions should a spillage event occur.</p> <p>Emergency Response Training is carried out as part of Environmental Awareness Training for all members of staff.</p> <p>Material storage procedure in place and integrated into Environmental Awareness Training outlines how hazardous materials should be stored to prevent environmental pollution.</p> <p>A site inspection checklist in place calls up checks on spill containment measures, content of spill kits, hazardous materials storage, bunds, spill trays, surface water infrastructure, hydrocarbon interceptor, etc.</p>				
1	Bulk storage and handling of imported soil (dust impact)	6	<p>Employees and visitors are issued with dust masks, if warranted.</p> <p>Surfaces damped down during prolonged dry spells to keep yards and roads dust free.</p> <p>Wheelwash / vehicle wash provided at exit from facility maintained in working order.</p> <p>All traffic movements after the wheelwash will be over paved surfaces to minimise mud pick-up.</p>	Reduced likelihood of excessive emissions	Ongoing inspection and monitoring	Ongoing	Location Manager / Waste Facility Manager
2	Bulk storage and handling of imported soil (noise impact)	6	<p>Employees and visitors are issued with ear protectors, if warranted.</p> <p>Where monitoring indicates that noise emissions from the facility are excessive, the Licensee will employ further mitigation in the form of improved working practices, noise screening and/or reduced sound output from (or improved performance of) plant and machinery.</p>	Reduced likelihood of excessive emissions.	Ongoing inspection and monitoring	Ongoing	Location Manager / Waste Facility Manager

Risk ID	Potential Risk	Risk Score	Mitigation Measures to be Taken	Outcome	Action	Date for Completion	Owner / Contact Person
3,4	Contamination from non-inert non-compliant waste	6	Licensee designs and implements robust waste acceptance procedures which ensure that all wastes accepted at the recovery facility are inert. Licensee confirms customer's business activities and credentials prior to issuing authorisation to deliver waste to facility Licensee will also establish site of origin and its development history for each waste consignment accepted at the facility.	Reduced likelihood of contaminated waste import	Ongoing inspection and monitoring	Ongoing	Location Manager / Waste Facility Manager
5,6	Leakages from mobile plant and equipment	6	Re-fuelling to take place over concrete paved surfaces (including adjacent to fuel storage tank) Sub-surface drainage at these areas and existing downstream treatment infrastructure (interceptor) reduce the scale and impact of a potential fuel leak or spill Concrete barriers to be placed around large fuel tank to prevent mobile plant from colliding into / impacting with it. Spill kits comprising containment booms and absorbent materials readily accessible on site. Regular visual inspection and integrity testing of mobile plant and equipment undertaken to identify small or undetected leaks	Reduced likelihood of leaks	Ongoing inspection and monitoring	Ongoing	Location Manager / Waste Facility Manager

#### **4.0 IDENTIFICATION OF PLAUSIBLE WORST CASE SCENARIO**

The ELRA for the waste recovery activity at Brownswood has identified a small number of risks with a major consequence and these formed the basis of further assessment to identify the plausible worst case scenario.

This assessment determined that the most plausible worst-case environmental scenario relates to leakage / spillage of fuels that could potentially contaminate the underlying regionally important bedrock aquifer and/or the River Slaney (Risk ID 9, 10). Under the worst case scenario, it is assumed that existing / proposed mitigation measures are either

- (a) not in place, or
- (b) in place, but are either not implemented or fail to function as intended.

If this scenario was to transpire, it is considered that it would not precipitate any other environmental incidents, nor would it increase the likelihood that any other identifiable environmental risks would occur.

It is considered that any potential injuries or illnesses caused to site employees or the public by dust or noise emissions would be covered under Employer's Liability and Public Liability insurance cover. The risk of occurrence of these problems is considered low to very low, provided mitigation measures outlined above are fully implemented.

Given the nature of the wastes being handled and the location and configuration of office and existing storage facilities on site, the risks associated with a fire outbreak are considered to be minimal. Risk of injury or death to employees or the public as a result of a fire would be covered by Employer's Liability and Public Liability insurance cover. Any fire affecting plant / equipment or the office would be covered by general insurance.

## 5.0 QUANTIFICATION AND COSTING

The plausible worst case scenario (Risk ID 9,10) is quantified and costed in this Section and in particular, in Table 5-1 below. For the purposes of this exercise, it is assumed (allowing for site topography and geology) that in the event of a leak from the 50,000litre fuel tank, 80% of any fuel release will run-off over the ground surface (toward the River Slaney) and that 20% will percolate to ground, to the underlying regionally important aquifer.

It is further assumed, for costing purposes that under this scenario, the spilled hydrocarbons were retained on-site at the settlement ponds immediately upstream of the hydrocarbon interceptor and were prevented from discharging to the River Slaney.

In the event that the worst case scenario was to transpire, the associated land and groundwater remediation costs which are likely to be incurred are identified, quantified and costed in Table 5-1 in order to establish an appropriate level of financial provisioning to be made in respect of the recovery facility.

The remediation response to a large fuel spill is likely to comprise the following:

- (i) mobilisation of emergency response contractor to site for immediate spill containment and site clean-up;
- (ii) collection and removal off-site (as contaminated waste) of up of captured fuels, absorbent materials, soil and contaminate surface waters (from settlement lagoons);
- (iii) the cost of ground investigation to delineate the extent of the area affected by the spill;
- (iv) the cost of constructing and commissioning any abstraction well(s) into the bedrock;
- (v) installation and commissioning of an on-site treatment system to pump contaminated groundwater out of ground and pass it through oil interceptor and carbon filter and discharge back to ground;
- (vi) maintenance costs for product recovery system, to include consultancy costs, regular daily visits, laboratory analyses, emptying and disposal of recovered products, changing and disposal of carbon filter material.

The cost of excavating and removing / remediating contaminated soil or groundwater material is very much dependent on the volume and degree / nature of any contamination which might occur or be unearthed.

As a worst-case scenario, we have accordingly recommended provision of €499,885 for remediation / evacuation of contaminated groundwater in the event of a large scale fuel spillage (inclusive of 15% contingency and 23% VAT). It should however be recognised that following implementation of all mitigation (principally provision of concrete bund area), the probability of such an occurrence materialising is considered low.

**Table 5-1**  
**Quantification and Costing of Plausible Worst Case Scenario**

Task	Description	Quantity (No.)	Measurement Unit	Unit Rate (€)	Cost (€)	Source of Unit Rates
Response to: Risk ID 9, 10 Leak or spillage from fuel tank / pipelines	Mobilising emergency response contractor to site for spill containment and site clean-up	2	Days	3,750	7,500	Enva / Verde / Rilta
	Trial pits	10	No.	150	1,500	SLR Consulting Ireland
	Soil quality testing (incl. leachate tests)	20	Sample	150	3,000	Jones Environmental Laboratory
	Drill and install groundwater monitoring wells around affected area to average depth of 30m	8	No.	1000	8,000	Causeway Geotech Ltd
	Purging and sampling of wells at two-monthly intervals (over 12 month period)	6	Visit	1,000	6,000	SLR Consulting Ireland
	Testing of groundwater samples (8 No.) wells from wells at two-monthly intervals over 12 month period)	48	Sample	150	7,200	Jones Environmental Laboratory
	Excavation of contaminated soil and removal off site (as hazardous waste) of up to 200 tonnes of contaminated soil, captured fuel and absorbent materials (100km haul)	200	Tonne	40	8,000	Rilta Environmental
	Treatment of hazardous soils / materials at authorised off-site recovery or disposal facilities	200	Tonne	120	24,000	Median rate advised by Rilta Environmental for disposal of solid hazardous waste
	Excavation of contaminated soil and removal off-site (as non-hazardous) of up to 400 tonnes of contaminated soil, captured fuel and absorbent materials (50km haul)	400	Tonne	20	8,000	Rilta Environmental
Treatment of non-hazardous soils / materials at authorised off-site recovery or disposal facilities	400	Tonne	60	24,000	Rate advised by Rilta Environmental for disposal of solid hazardous waste	
	Importation and placement of uncontaminated soil to backfill excavated voids	600	Tonne	2	1,200	No soil import cost. Plant / operator cost only

<b>Task</b>	<b>Description</b>	<b>Quantity (No.)</b>	<b>Measurement Unit</b>	<b>Unit Rate (€)</b>	<b>Cost (€)</b>	<b>Source of Unit Rates</b>
	Removal and treatment of captured fuel / waters at settlement ponds upstream of discharge point	250	m <sup>3</sup>	120	30,000	Rilta Environmental
	Drain Jetting	500	m	2	1,000	USA
	Installation, operation and maintenance of pump and treat system for groundwater contamination	1	Year	200,000	200,000	Regenesis Remediation
	Environmental Consultancy Costs (reporting, supervision)	40	Days	600	24,000	SLR Consulting Ireland
Total (€)					<b>€353,400</b>	
Plus contingency at 15% (€)					<b>€406,410</b>	
Plus VAT at 23%					<b>€499,885</b>	

## 6.0 CONCLUSIONS

### 6.1 Environmental Liabilities

An Environmental Liabilities Risk Assessment has been carried out for the planned soil waste recovery facility at Brownswood Quarry, near Enniscorthy, Co. Wexford. The ELRA has been prepared in accordance with the EPA publication *Guidance on Assessing and Costing Environmental Liabilities (2014)*.

Fuel storage and handling (Risk ID 9, 10) has been identified as the highest environmental risk with potentially major consequences for surface water quality in the adjoining River Slaney and underlying groundwater aquifer. It is assumed for the purposes of assessing potential environmental liability at the Brownswood recovery facility that the worst case scenario would involve a leak or spill occurred from the existing 50,000litre fuel storage tank and/or associated pipework. It is considered that if this risk did ultimately materialise, it would not precipitate any other environmental incidents, nor would it increase the likelihood that any other identifiable environmental risks would occur.

The environmental liability has been assessed on the basis of the worst case scenario outlined above. Were it to materialise, the maximum environmental liability which could be incurred is estimated to be of the order of **€499,885** (inclusive of 15% contingency and 23% VAT).

### 6.2 Financial Provision for Environmental Liabilities

Roadstone Ltd. has the following insurance cover in place by way of provisioning for potential environmental liabilities in respect of the planned waste recovery facility at Brownswood;

- (i) Employers Liability Insurance – indemnified for up to €22.7 million.
- (ii) Public Liability Insurance – indemnified for up to €13 million.
- (iii) Environmental Liability / Contractors All Costs Insurance – indemnified for at least €2 million (with the initial €1m self-insured by Roadstone's parent, CRH plc.)

Details of Roadstone's current employers liability insurance and public liability insurance are provided in Appendix A.

Should the Agency raise any concerns in respect of any clauses or provisions of these insurances (such as limits on cover, policy exclusions or deductibles), Roadstone will endeavour to modify the policy terms to satisfy the Agency's specific requirements in respect of provision for potential environmental liabilities (provided it is practicable and cost effective to do so).

**Roadstone will make the financial provision necessary to cover the amount of the assessed environmental liability by lodging an insurance company bond with the Agency, coupled with an agreement which will empower it to apply such security (or part thereof as may be required) in the event that a liability event materialises at the waste recovery facility at Huntstown.**

The initial amount of the bond will be agreed with the Agency and adjusted as necessary each year thereafter to take account of ongoing review and revisions of the ELRA.

## **7.0 CLOSURE**

This report has been prepared by SLR Consulting Ireland (SLR) 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 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.