

4 September 2013

Mr. Michael Owen, Inspector
Office of Climate, Licensing, Research and Resource Use
Environmental Protection Agency
PO Box 3000
Johnstown Castle Estate
Co. Wexford

Our Ref : 501.0004.00022
Your Ref : W0247-01/sm07df

Dear Mr Owen

**Re: Inert Soil Waste Recovery Facility Brownswood, Co. Wexford (Ref. No. 280-01)
Response to Article 12 Compliance Notice dated 5 July 2013**

This letter is submitted in response to the Compliance and Site Inspection Report dated 17 May 2013 which was issued by the Office of Environmental Enforcement (hereinafter 'the Agency') in respect of the inert waste recovery facility operated by at Blackhall, Naas, Co. Kildare (hereinafter 'the Licensee'). Responses to the issues raised are presented below, in the same order as presented in the cover letter.

RESPONSE TO ARTICLE 12 COMPLIANCE REQUIREMENTS

1. Newspaper Notice

Provide a copy of the relevant notice of the newspaper or newspapers in which the notice in accordance with Article 6 of the Regulations has been published. The copy included with the application refers to an application for planning permission.

A copy of the public notice published in the Wexford People, in its edition dated Wednesday 11 August 2011, is provided in Attachment A.

2. Waste Recovery Operations

Provide a brief description of any additional proposed waste recovery activities aside from soil recovery (e.g. is it proposed to operate a construction and demolition recovery plant at the facility?) Confirm whether any such additional proposed waste activities have been included in the EIS.

You should note that based on the information supplied with the application it is the Agency's current intention to authorise the importation of natural excavation materials only. Importation of other non-natural waste (whether inert or not) will not be permitted.

The Applicant, Roadstone Wood, confirms that its waste licence application provides for the establishment of an inert soils recovery facility at Brownswood, importing only natural excavation materials. The application does not provide for establishment of a construction and demolition recovery facility at the site.

3. Groundwater

Provide a figure displaying groundwater flow contours and general direction of groundwater flow.

Provide groundwater quality data for boreholes GW1 to GW4.

A copy of a figure displaying flow contours and the general direction of groundwater flow is provided in Attachment B. This information essentially mirrors that previously provided in the Water Chapter of the EIS which accompanied the waste licence application (Figure 6-1 of Chapter 6).

A copy of the groundwater quality data for the 4 No. groundwater monitoring wells GW1 to GW 4 installed in July 2010 is also provided in Attachment B. The groundwater samples were taken in December 2010 and were tested for a wider range of parameters than the samples taken from the flooded quarry void (results of which were previously provided in the Water Chapter of EIS).

The groundwater quality results for the well samples indicate them to be of generally of good quality, slightly to moderately hard water with neutral pH. Nitrate and sulphate levels are relatively low and do not indicate any significant pollution of the groundwater. Ammonia is elevated in GW4 compared to the other groundwater samples, although not in GW1 which is close by, immediately down-gradient of GW4. No hydrocarbons were detected in the groundwater samples.

The additional groundwater quality test results are broadly comparable to those previously provided for samples from the quarry void. The pH is slightly higher, at around 8, for a number of samples from the quarry, as are nitrate concentrations. As with well samples, no hydrocarbons were detected in samples from the quarry void.

4. Compliance with BAT

Provide a clear description as to how the proposed facility will comply with the relevant requirements of BAT. BAT for this activity is taken to be represented by the guidance given in the Agency's Draft BAT Guidance Note for the Waste Sector : Landfill Activities (April 2003), insofar as it relates to the waste recovery activities at this facility.

You should identify the key BAT which is to be applied to manage the relevant environmental aspect / emissions associated with operations at the facility.

A detailed outline of how the proposed waste recovery facility is deemed to comply with the relevant requirements of BAT is provided in Attachment C of this submission.

5. Compliance with Directives

Provide a clear description as to how the proposed facility will comply with the requirements of the following legislation (where applicable): Waste Framework Directive, Water Framework Directive, European Communities Environmental Objectives (Surface Water) Regulations (2009), European Communities Environmental Objectives (Groundwater) Regulations (2010), IPPC Directive and the Environmental Liabilities Directive.

A detailed outline of how the proposed waste recovery facility is deemed to comply with the requirements of the EU Directives and national regulations listed above is provided in Attachment D of this submission.

6. Liability, Closure and Financial Provision

In accordance with section 53(1) of the Waste Management Acts 1996 to 2013, please furnish particulars in respect of the ability of Roadstone Wood Ltd to meet the financial commitments. Specifically:

- (a) **Prepare a fully detailed and costed Closure, Restoration and Aftercare Management Plan (CRAMP) for the facility, to include as a minimum the following:**
- **A scope statement for the plan.**
 - **The criteria which define the successful closure and restoration of the facility or part thereof, and which ensure minimum impact to the environment.**
 - **A programme to achieve the stated criteria.**
 - **Where relevant, a test programme to demonstrate the successful implementation of the plan.**
 - **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.**

A Closure, Restoration and Aftercare Management Plan (CRAMP) for the proposed inert soil waste recovery facility at Brownswood is provided in Attachment E of this submission. The CRAMP addresses the criteria outlined above and the requirements of the EPA publication *Guidance on Environmental Liability Risk Assessment, Residuals Management Plans and Financial Provision (2006)*.

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

A copy of a fully detailed and costed Environmental Liabilities Risk Assessment (ELRA) for the proposed inert soil waste recovery facility at Brownswood is provided in Attachment F of this submission. The ELRA has been prepared in accordance with the EPA publication *Guidance on Environmental Liability Risk Assessment, Residuals Management Plans and Financial Provision (2006)*.

Costings for the closure and aftercare of the proposed waste recovery facility and remediation of uncontrolled or accidental environmental emissions have been independently assessed by SLR Consulting Ireland having regard to the availability of required plant and/or operators in-house within Roadstone Wood (or from local retained sub-contractors) and opportunities to undertake progressive restoration as infilling activities continue.

- (c) **Provide a proposal for financial provision to cover any liabilities associated with the operation and identified in the ELRA (including closure, restoration and aftercare and unanticipated accidents, incidents and liabilities). Provide evidence that Roadstone Wood Ltd will be in a position to put such financial provision in place in the event that a waste licence is granted and prior to development works commencing.**

Closure, Restoration and Aftercare

Subject to Agency approval, Roadstone Wood intends to make financial provision for the closure and restoration of the proposed waste 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 and adjusted as necessary each year thereafter to take account of ongoing review and revisions of the CRAMP.

Environmental Liabilities

In order to make provision for potential (unknown) environmental liabilities, Roadstone Wood will arrange to have the following insurances in place in respect of the proposed waste recovery activities at Brownswood;

- (i) Employers Liability Insurance – indemnified for at least €2 million.
- (ii) Public Liability Insurance – indemnified for at least €2 million.
- (iii) Environmental Liability / Contractors All Costs Insurance – indemnified for at least €2 million

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

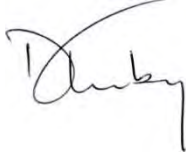
Failing this, the company will endeavour to agree alternative measures to address the Agency's concerns (such as making provision for deductibles in accounts etc.) and provide such reassurance may be required in respect of financial provision for unknown liabilities at this facility.

Close

We consider that our response to the Article 12 compliance notice does not impinge or significantly modify any information previously presented in the non-technical summary previously presented in the waste licence application or EIS. As requested, two copies of this submission are provided in hard copy format (original plus one copy), together with 16 No. electronic copies in searchable PDF format on CD-ROM.

We trust that we have adequately addressed the issues raised in your Article 12 compliance letter dated 3 July last. Should you wish to discuss any of the points raised in this response in more detail, please contact the undersigned.

Yours sincerely,
For SLR Consulting (Ireland) Ltd.



Derek Luby
Technical Director

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cc. Daniel Long Roadstone Wood Ltd.
Ronan Griffin Roadstone Wood Ltd.

ATTACHMENT A

WASTE LICENCE APPLICATION : NEWSPAPER NOTICE

*For inspection purposes only
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CLASSIFIEDS

ENNISCORTHY
053 9140100NEW ROSS
051 421184WEXFORD
053 9140100GOREY
053 9421423

PLANNING

WEXFORD COUNTY COUNCIL
We Robert and Mary Anne Young are applying to Wexford County Council for permission for retention of extension (Conservatory) and alterations to existing dwelling and permission for retention of site layout and site boundaries from plans approved under Pl. Reg. No. 27.204 at Horetown South, Foukssmills. This planning application may be inspected or purchased at the offices of the Planning Authority, County Hall, Wexford during the hours of 9.30am - 4.30pm, Monday - Friday (Bank Holidays and Public Holidays expected). A submission or observation in relation to the application may be made in writing to the Planning Authority on payment of a fee of €20 within the period of 5 weeks beginning on the date of receipt by the Authority of the application. Signed John J. Barron & Co. Limited, Glynn Village, Enniscorthy, Co. Wexford 053-9128105.

THE LETTER 'B' AT THE END OF ANY LINEAGE AD IN THE MOTORS SECTION IDENTIFIES THE ADVERTISER IS IN THE MOTORING TRADE.

PLANNING

WEXFORD COUNTY COUNCIL
Rowena Coady / John Brady are applying for planning permission for the demolition of an existing timber chalet and construction of a replacement timber chalet (160 sq. M). With a new connection to existing public sewer and all ancillary and associated works, at Glen Richards Ardamine. The planning application may be inspected or purchased at a fee not exceeding a reasonable cost of making a copy at the Offices of the planning authority during its public opening hours and a submission or observations in relation to the application may be made to the authority in writing, on payment of the prescribed fee within the period of five weeks beginning on the date of receipt by the authority of the application.

SITUATIONS VACANT

KIND RELIABLE CHILDMINDER to collect and mind 2 children (5 & 3) school terms only, Wexford town area. Apply to Box No 416C, People Newspaper, Channing House, Rowe Street, Wexford.

TO LET & WANTED

2 BED HOUSE to let in Wexford town, close to amenities, furnished. Phone 087-9602400.

3 BEDROOM HOUSE To rent in Mount Prospect, in excellent condition. All mod cons. Tel. 087-6492381

4 BEDROOM HOUSE detached to rent in Wexford Town with private parking, rent reasonable, phone 086-8557567

A ONE BEDROOM APARTMENT Available in Windmill Heights and a 2 bedroom house available shortly in Rocklands, also a 2 bedroom apartment coming up soon in Central Wexford town. References will be required. Tel. 087-2260305

BEAUTIFUL FORTH MOUNTAIN 4/5 bedroom house to let. Fantastic finish, oak/marble/granite, stunning views, walks and near by equestrian facilities. Must be viewed. Phone 087-9859859

GRANGE ROAD New Ross 3 bed house to rent. Completely redecorated and fully furnished. - Tel. 087 2783821.

TO LET & WANTED

ONE BEDROOM APARTMENT to rent, town centre, rent reasonable, recently refurbished. Contact 087-6500837

FOR SALE

FARM SHOP OPEN at Cusbrough Farm, Mayglass, every Wednesday, fresh veg from the garden, 2pm-7pm, signs from Kilmore Quay Road. Phone 087-4114481

FOR SALE Stock of bees in new hive ideal for beginners. Tel. 051-384226 or 051-384645

WANTED

AGA STANLEY & RAYBURN COOKERS WANTED Any condition, cash price paid. Also full range of oil and solid fuel cookers for sale. Phone 056-7724300 / 086-2508198.

GARDENING

ALLOTMENTS FOR RENT Clonard area, Wexford. - Phone Gerry 086-1771865.

POULTRY

POULTRY & SMALL ANIMAL & Country Market, bring and buy sale, Miranda's Garden Centre, Barntown Sunday 7th August at 9am - 1pm. €3 traders €2 buyers. Kids free. For more information - phone Dave 087-9635473 Farmers Market Stall Welcome.

FREE RANGE PULLETS For sale, brown egg layers starting to lay. Also light Sussex chicks 12 weeks old. Tel. 087-9503634

DOGS

DOG TRAINING & KENNELING Residential training in obedience and behaviour problems, ie pulling on lead, house training aggression, recall, chewing, jumping up etc, also personal protection training. Over 20 years experience having trained in the UK, USA and Germany. Qualified master dog trainer, veterinarian and dog shelter recommended. References available. Trained security dogs for sale. Watch our dogs in action at www.Topdog-Training.com or phone 087 0514467.

APPLICATION TO THE ENVIRONMENTAL PROTECTION AGENCY FOR A WASTE LICENCE

ROADSTONE WOOD LTD., Fortunestown, Tallaght, Dublin, intends to apply to the Environmental Protection Agency for a waste licence in respect of a waste recovery facility on its land, Brownswood, Enniscorthy, Co. Wexford (National Grid Reference 2978E 1373N). The waste licence application provides for:

- Use of approximately 1,330,000 tonnes of inert materials, principally excess soil, stones and/or broken rock backfill a large existing void created by rock extraction;
- Separation of any non-inert construction and demolition or unintentionally imported to site prior to removal off-site, authorised waste disposal or recovery facilities;
- Temporary stockpiling of topsoil and subsoil pending re-use/ restoration of the site;
- Restoration of the backfilled void (including placement cover soils and seeding) and return to use as agricultural grassland;
- Environmental monitoring of noise, dust, surface water/ groundwater for the duration of the site restoration works.

The principal activity is Class R5 of the Fourth Schedule of Waste Management Act 1996-2011 (recycling or reclamation of other inorganic materials, which includes soil cleaning resulting recovery of the soil and recycling of inorganic construction materials). Other activities include Class R3 of the Fourth Schedule (recycling or reclamation of organic substances which are not solvents) and Class R13 of the Fourth Schedule (allowing waste pending any of the operations numbered R1 to R12).

An Environmental Impact Statement will be submitted to the Agency with the Waste Licence Application.

A copy of the Waste Licence Application, the Environmental Impact Statement and further information relating to the Application that may be furnished to the Agency in the course of its consideration of the Application will, as soon as practicable, be available for inspection or purchase at the headquarters of the Agency.

IRELAND'S OWN AUGUST SPECIAL

ON SALE THIS WEEK

- OUR August Special issue is out this week and included are full details of the annual Ireland's Own Original Writing Competitions, with a prize fund of €2,200. It is also packed with lots of interesting articles and features, as well as all the popular regulars.
- COVER STORY: BARRY McGUIGAN won his world boxing title 25 years ago in the famous Loftus Road bout with Eusebio Pedroza. Barry, now a respected boxing analyst and TV personality, reflects on his life and career reveals that he was issued with a gun following a suspected terrorist kidnap threat.
- We have an article about the Irish chaplaincy in Britain which has been doing so much for our emigrants for over fifty years, and we write about the Belfast war hero who represented Ireland in two sports.
- Did you know the Mona Lisa was stolen 100 years ago and was missing for several years? It was an inside job and we have the whole story. Or did you know that Australia's first cardinal came from Leighlinbridge in Carlow?
- We have other stories on the Galway races, the building of the Berlin Wall 50 years ago, the Charlie Chaplin Comedy Film Festival in Waterville, his Irish Summer home; what it was like working in a menswear shop in the early 1960s, and we have profiles of reluctant film star Robert Mitchum, and Irish-American politician Tip O'Neill.
- You can win copies of Sean Farrell's book on the life of James Connolly, and €300 in cash
- PLUS: all our regulars, including Cassidy, Dan Conway, Patrick O'Sullivan, Miss Flanagan, Health and Lifestyles column, Place Names series, County Trivia, Penfriends, Bookshelf, Song Words, Stranger Than Fiction, Catch the Criminal, Nature Corner, Owen's Club for the kids, our monthly Classified Adverts section, Household Hints, Jokes, etc.



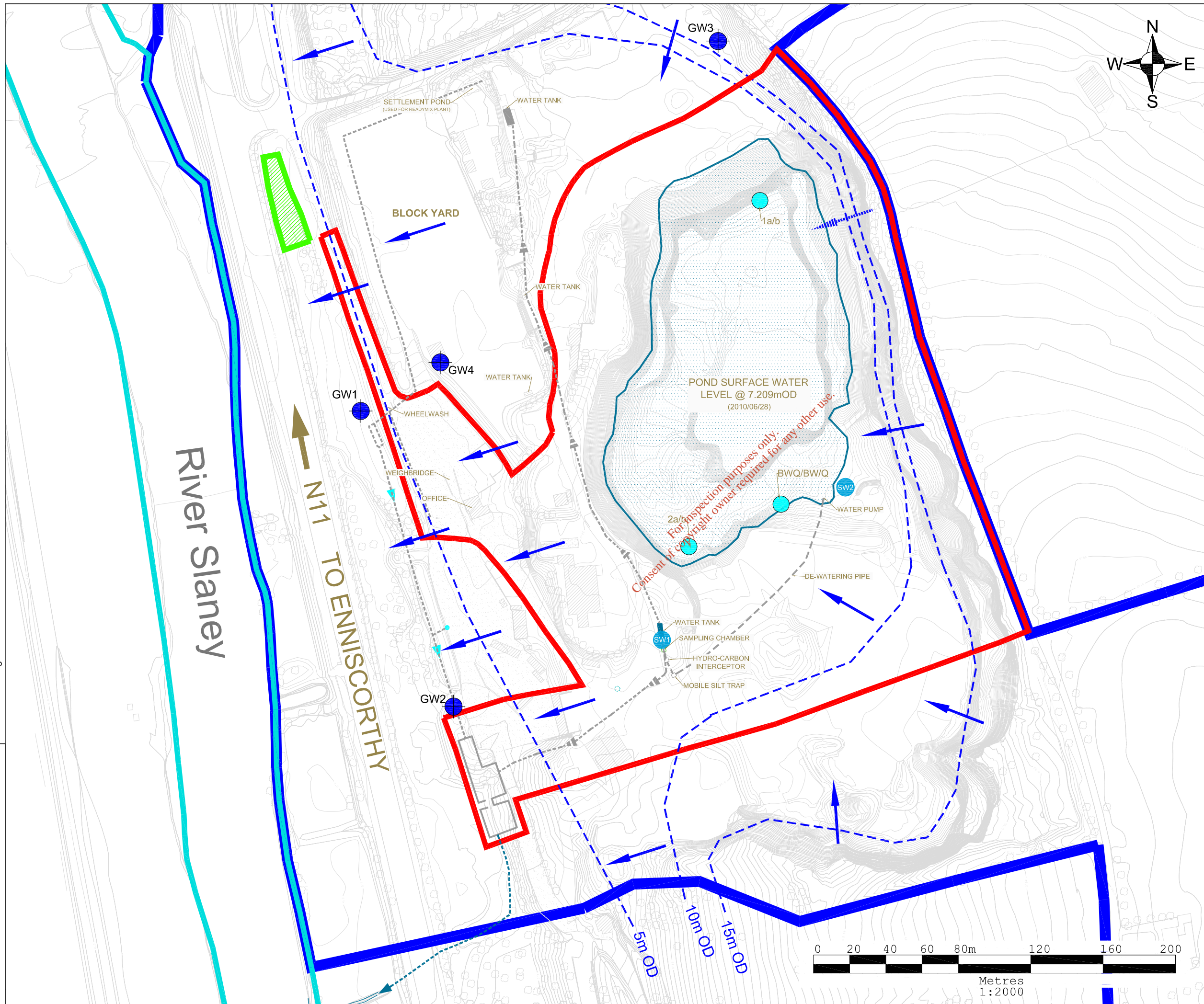
IRELAND'S OWN The Week Wouldn't Be The Same Without It!

ATTACHMENT B

GROUNDWATER CONTOURS AND WELL MONITORING DATA

*For inspection purposes only.
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0180.00065.18.Rev01.ATTACHMENT B.GROUNDWATER CONTOURS.dwg



NOTES

- EXTRACT FROM 1:2,500 ORDNANCE SURVEY DIGITAL SHEET NO. 5143 A-D
- ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000711 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

LEGEND

| | |
|--|--|
| | ROADSTONE WOOD LTD. LANDHOLDING (c. 86.2 ha) |
| | WASTE LICENCE APPLICATION AREA (c. 8.3 ha) |
| | AREA NOT OWNED BY ROADSTONE WOOD LTD. (c. 0.1 ha) - FOLIO WX53689F & WX20665 |
| | PAVED INTERNAL ROAD |
| | GROUNDWATER MONITORING WELL |
| | INTERPOLATED GROUNDWATER CONTOUR (2010/09/22) |
| | SURFACE WATER SAMPLING LOCATIONS |
| | PROPOSED SURFACE WATER MONITORING LOCATIONS |
| | PROPOSED DEWATERING PIPE INFRASTRUCTURE |



SLR

SLR CONSULTING IRELAND
7 DUNDRUM BUSINESS PARK
WINDY ARBOUR
DUBLIN 14
T: +353-1-2964667
F: +353-1-2964676
www.slrconsulting.com

ROADSTONE WOOD LTD.
ARTICLE 12 COMPLIANCE RESPONSE
WASTE RECOVERY FACILITY
BROWNSWOOD, CO. WEXFORD
SITE WATER MANAGEMENT
AND GROUNDWATER CONTOURS

ATTACHMENT B

| | | | |
|-------|---------|------|----------------|
| Scale | 1:2,000 | Date | SEPTEMBER 2013 |
|-------|---------|------|----------------|

TEST REPORT

Analysing
Testing
Consulting
Calibrating

**Client: Roadstone
Brownwood Quarry
Brownwood
Co. Wexford**

**BHP Ref. No.: 96236.1
Order No.:
Date Received: 20/12/10
Date Completed: 17/01/11
Test Specification: Nil
Item :See below**



BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

FTAO: Allen Geraghty

| Test | Client Reference | Units | Results | Standard Reference |
|---|-----------------------------------|--------------------|---------|--------------------------------|
| | GW1 Roadstone-Brownwood | | | |
| pH | | - | 6.37 | APHA-4500-H ⁺ -B |
| Electrical Conductivity | | µScm ⁻¹ | 401 | APHA - 2510 - B |
| Sodium | | mg/l | 7.12 | APHA - 3120 - B |
| Potassium | | mg/l | 1.39 | APHA - 3120 - B |
| BOD | | mg/l | 1 | APHA - 5210 - B |
| COD | | mg/l | 5 | APHA - 5220 - D |
| Ammoniacal Nitrogen (as NH ₃ -N) | | mg/l | 0.14 | APHA -4500- NH ₃ -D |
| Sulphate (as SO ₄) | | mg/l | 56.2 | APHA - 4110 - B |
| Total Alkalinity (as CaCO ₃) | | mg/l | 198 | APHA - 2320 -B |
| OrthoPhosphate (PO ₄ -P) | | mg/l | 0.43 | APHA - 4110 - B |
| Nitrate (as NO ₃) | | mg/l | 14.9 | APHA - 4110 - B |
| Nitrite (as NO ₂) | | mg/l | <0.05 | APHA - 4110 - B |
| Total Dissolved Solids | | mg/l | 368 | APHA - 2540 - C |
| Total Hardness (as CaCO ₃) | | mg/l | 200 | APHA - 3120 - B |
| Dissolved Oxygen | | % O ₂ | 99.4 | APHA - 4500 - O-G |

Additional information :

All methods are from Standard Methods for the Examination of Water and Wastewater 20th Edition.

For and on behalf of BHP laboratories :

**Pat O'Sullivan
Issue Date : 18/01/2011**

Test results relate only to this/these items. This test report shall not be duplicated in full without the permission of the test laboratory.

TEST REPORT

Analysing
Testing
Consulting
Calibrating



**Client: Roadstone
Brownswood Quarry
Brownswood
Co. Wexford**

**BHP Ref. No.: 96236.1
Order No.:
Date Received: 20/12/10
Date Completed: 17/01/11
Test Specification: Nil
Item :See below**

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

FTAO: Allen Geraghty

| Test | Client Reference | Units | Results | Standard Reference |
|-------------------------------------|------------------------------------|-------|---------|--------------------|
| | GW1 Roadstone-Brownswood | | | |
| Total Petroleum Hydrocarbons | | | | |
| >C ₆ -C ₄₀ | | mg/l | <0.001 | GC-FID |
| >C ₆ -C ₈ | | mg/l | <0.001 | GC-FID |
| >C ₈ -C ₁₀ | | mg/l | <0.001 | GC-FID |
| >C ₁₀ -C ₁₂ | | mg/l | <0.001 | GC-FID |
| >C ₁₂ -C ₁₆ | | mg/l | <0.001 | GC-FID |
| >C ₁₆ -C ₂₁ | | mg/l | <0.001 | GC-FID |
| >C ₂₁ -C ₄₀ | | mg/l | <0.001 | GC-FID |
| Petroleum Range Organics | | mg/l | <0.001 | GC-FID |
| Diesel Range Organics | | mg/l | <0.001 | GC-FID |
| Mineral Oils | | mg/l | <0.01 | GC-FID |

Additional information :

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For and on behalf of BHP laboratories :

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Issue Date : 18/01/2011**

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TEST REPORT

Analysing
Testing
Consulting
Calibrating



Client: Roadstone
Brownwood Quarry
Brownwood
Co. Wexford

BHP Ref. No.: 96236.1
Order No.:
Date Received: 20/12/10
Date Completed: 17/01/11
Test Specification: Nil
Item : See below

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

FTAO: Allen Geraghty

| Test | Client Reference | Units | Results | Standard Reference |
|-----------|----------------------------|-------|---------|--------------------|
| | GW1 Roadstone-Brownwood | | | |
| Arsenic | | ug/l | <1 | APHA - 3120 - B |
| Cadmium | | ug/l | <1 | APHA - 3120 - B |
| Chromium | | ug/l | 2 | APHA - 3120 - B |
| Copper | | ug/l | 11 | APHA - 3120 - B |
| Iron | | ug/l | 24 | APHA - 3120 - B |
| Magnesium | | mg/l | 2.12 | APHA - 3120 - B |
| Manganese | | ug/l | 6 | APHA - 3120 - B |
| Nickel | | ug/l | 3 | APHA - 3120 - B |
| Lead | | ug/l | 3 | APHA - 3120 - B |
| Zinc | | ug/l | 8 | APHA - 3120 - B |

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Additional information :

All methods are from Standard Methods for the Examination of Water and Wastewater 20th Edition.

For and on behalf of BHP laboratories :

Pat O'Sullivan
Issue Date : 18/01/2011

Test results relate only to this/these items. This test report shall not be duplicated in full without the permission of the test laboratory.

TEST REPORTAnalysing
Testing
Consulting
CalibratingClient: **Roadstone
Brownwood Quarry
Brownwood
Co. Wexford**BHP Ref. No.: 96236.1
Order No.:
Date Received: 20/12/10
Date Completed: 17/01/11
Test Specification: Nil
Item :See belowBHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

FTAO: Allen Geraghty

| Test | Client Reference | Units | Results | Standard Reference |
|-------------------------|-----------------------------------|-------|---------|--------------------|
| | GW1 Roadstone-Brownwood | | | |
| Acenaphthene | | ug/l | <0.01 | GC-MS |
| Acenaphthylene | | ug/l | <0.01 | GC-MS |
| Anthracene | | ug/l | <0.01 | GC-MS |
| Benzo(a)anthracene | | ug/l | <0.01 | GC-MS |
| Benzo(b)fluoranthene | | ug/l | <0.01 | GC-MS |
| Benzo(k)fluoranthene | | ug/l | <0.01 | GC-MS |
| Benzo(g,h,i)perylene | | ug/l | <0.01 | GC-MS |
| Chrysene | | ug/l | <0.01 | GC-MS |
| Dibenz(a,h)anthracene | | ug/l | <0.01 | GC-MS |
| Fluoranthene | | ug/l | <0.01 | GC-MS |
| Fluorene | | ug/l | <0.01 | GC-MS |
| Indeno(1,2,3,c,d)pyrene | | ug/l | <0.01 | GC-MS |
| Naphthalene | | ug/l | <0.01 | GC-MS |
| Phenanthrene | | ug/l | <0.01 | GC-MS |
| Pyrene | | ug/l | <0.01 | GC-MS |
| Benzo(a)pyrene | | ug/l | <0.01 | GC-MS |
| Total PAH's | | ug/l | <0.01 | GC-MS |

Additional information :

All methods are from Standard Methods for the Examination of Water and Wastewater 20th Edition.

For and on behalf of BHP laboratories :

Pat O'Sullivan

Issue Date : 18/01/2011

Test results relate only to this/these items. This test report shall not be duplicated in full without the permission of the test laboratory.

TEST REPORTAnalysing
Testing
Consulting
Calibrating**Client: Roadstone
Brownwood Quarry
Brownwood
Co. Wexford****BHP Ref. No.: 96236.2
Order No.:
Date Received: 20/12/10
Date Completed: 17/01/11
Test Specification: Nil
Item :See below**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie**FTAO: Allen Geraghty**

| Test | Client Reference | Units | Results | Standard Reference |
|---|-----------------------------------|----------------------|---------|--------------------------------|
| | GW2 Roadstone-Brownwood | | | |
| pH | | - | 7.10 | APHA-4500-H ⁺ -B |
| Electrical Conductivity | | μScm^{-1} | 428 | APHA - 2510 - B |
| Sodium | | mg/l | 6.88 | APHA - 3120 - B |
| Potassium | | mg/l | 1.45 | APHA - 3120 - B |
| BOD | | mg/l | 1 | APHA - 5210 - B |
| COD | | mg/l | 7 | APHA - 5220 - D |
| Ammoniacal Nitrogen (as NH ₃ -N) | | mg/l | 0.18 | APHA -4500- NH ₃ -D |
| Sulphate (as SO ₄) | | mg/l | 60.2 | APHA - 4110 - B |
| Total Alkalinity (as CaCO ₃) | | mg/l | 241 | APHA - 2320 -B |
| OrthoPhosphate (PO ₄ -P) | | mg/l | 0.6 | APHA - 4110 - B |
| Nitrate (as NO ₃) | | mg/l | 12.7 | APHA - 4110 - B |
| Nitrite (as NO ₂) | | mg/l | <0.05 | APHA - 4110 - B |
| Total Dissolved Solids | | mg/l | 319 | APHA - 2540 - C |
| Total Hardness (as CaCO ₃) | | mg/l | 220 | APHA - 3120 - B |
| Dissolved Oxygen | | % O ₂ | 98.6 | APHA - 4500 - O-G |

Additional information :

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For and on behalf of BHP laboratories :**Pat O'Sullivan
Issue Date : 18/01/2011**

Test results relate only to this/these items. This test report shall not be duplicated in full without the permission of the test laboratory.

TEST REPORT

Analysing
Testing
Consulting
Calibrating



Client: Roadstone
Brownwood Quarry
Brownwood
Co. Wexford

BHP Ref. No.: 96236.2
Order No.:
Date Received: 20/12/10
Date Completed: 17/01/11
Test Specification: Nil
Item : See below

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpce2@bhp.ie

FTAO: Allen Geraghty

| Test | Client Reference | Units | Results | Standard Reference |
|-------------------------------------|-----------------------------------|-------|---------|--------------------|
| | GW2 Roadstone-Brownwood | | | |
| Total Petroleum Hydrocarbons | | | | |
| >C ₆ -C ₄₀ | | mg/l | <0.001 | GC-FID |
| >C ₆ -C ₈ | | mg/l | <0.001 | GC-FID |
| >C ₈ -C ₁₀ | | mg/l | <0.001 | GC-FID |
| >C ₁₀ -C ₁₂ | | mg/l | <0.001 | GC-FID |
| >C ₁₂ -C ₁₆ | | mg/l | <0.001 | GC-FID |
| >C ₁₆ -C ₂₁ | | mg/l | <0.001 | GC-FID |
| >C ₂₁ -C ₄₀ | | mg/l | <0.001 | GC-FID |
| Petroleum Range Organics | | mg/l | <0.001 | GC-FID |
| Diesel Range Organics | | mg/l | <0.001 | GC-FID |
| Mineral Oils | | mg/l | <0.01 | GC-FID |

Additional information :

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For and on behalf of BHP laboratories :

Pat O'Sullivan
Issue Date : 18/01/2011

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TEST REPORT

Analysing
Testing
Consulting
Calibrating



**Client: Roadstone
Brownwood Quarry
Brownwood
Co. Wexford**

**BHP Ref. No.: 96236.2
Order No.:
Date Received: 20/12/10
Date Completed: 17/01/11
Test Specification: Nil
Item :See below**

BHP
New Road
Thomondgate
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Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

FTAO: Allen Geraghty

| Test | Client Reference | Units | Results | Standard Reference |
|-----------|-----------------------------------|-------|---------|--------------------|
| | GW2 Roadstone-Brownwood | | | |
| Arsenic | | ug/l | <1 | APHA - 3120 - B |
| Cadmium | | ug/l | <1 | APHA - 3120 - B |
| Chromium | | ug/l | 3 | APHA - 3120 - B |
| Copper | | ug/l | 10 | APHA - 3120 - B |
| Iron | | ug/l | 18 | APHA - 3120 - B |
| Magnesium | | mg/l | 1.86 | APHA - 3120 - B |
| Manganese | | ug/l | 5 | APHA - 3120 - B |
| Nickel | | ug/l | 2 | APHA - 3120 - B |
| Lead | | ug/l | 3 | APHA - 3120 - B |
| Zinc | | ug/l | 12 | APHA - 3120 - B |

Additional information :

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TEST REPORT

**Client: Roadstone
Brownswood Quarry
Brownswood
Co. Wexford**

FTAO: Allen Geraghty

**BHP Ref. No.: 96236.2
Order No.:
Date Received: 20/12/10
Date Completed: 17/01/11
Test Specification: Nil
Item :See below**

Analysing
Testing
Consulting
Calibrating



BHP
New Road
Thomondgate
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Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

| Test | Client Reference | Units | Results | Standard Reference |
|-------------------------|-----------------------------|-------|---------|--------------------|
| | GW2 Roadstone-Brownswood | | | |
| Acenaphthene | | ug/l | <0.01 | GC-MS |
| Acenaphthylene | | ug/l | <0.01 | GC-MS |
| Anthracene | | ug/l | <0.01 | GC-MS |
| Benzo(a)anthracene | | ug/l | <0.01 | GC-MS |
| Benzo(b)fluoranthene | | ug/l | <0.01 | GC-MS |
| Benzo(k)fluoranthene | | ug/l | <0.01 | GC-MS |
| Benzo(g,h,i)perylene | | ug/l | <0.01 | GC-MS |
| Chrysene | | ug/l | <0.01 | GC-MS |
| Dibenz(a,h)anthracene | | ug/l | <0.01 | GC-MS |
| Fluoranthene | | ug/l | <0.01 | GC-MS |
| Fluorene | | ug/l | <0.01 | GC-MS |
| Indeno(1,2,3,c,d)pyrene | | ug/l | <0.01 | GC-MS |
| Naphthalene | | ug/l | <0.01 | GC-MS |
| Phenanthrene | | ug/l | <0.01 | GC-MS |
| Pyrene | | ug/l | <0.01 | GC-MS |
| Benzo(a)pyrene | | ug/l | <0.01 | GC-MS |
| Total PAH's | | ug/l | <0.01 | GC-MS |

Additional information :

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For and on behalf of BHP laboratories :

**Pat O'Sullivan
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TEST REPORT

**Client: Roadstone
Brownwood Quarry
Brownwood
Co. Wexford**

FTAO: Allen Geraghty

**BHP Ref. No.: 96236.3
Order No.:
Date Received: 20/12/10
Date Completed: 17/01/11
Test Specification: Nil
Item :See below**

Analysing
Testing
Consulting
Calibrating



BHP
New Road
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Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

| Test | Client Reference | Units | Results | Standard Reference |
|---|-----------------------------------|--------------------|---------|--------------------------------|
| | GW3 Roadstone-Brownwood | | | |
| pH | | - | 7.12 | APHA-4500-H ⁺ -B |
| Electrical Conductivity | | μScm ⁻¹ | 200 | APHA - 2510 - B |
| Sodium | | mg/l | 4.52 | APHA - 3120 - B |
| Potassium | | mg/l | 1.16 | APHA - 3120 - B |
| BOD | | mg/l | <1 | APHA - 5210 - B |
| COD | | mg/l | 1 | APHA - 5220 - D |
| Ammoniacal Nitrogen (as NH ₃ -N) | | mg/l | 0.05 | APHA -4500- NH ₃ -D |
| Sulphate (as SO ₄) | | mg/l | 58.1 | APHA - 4110 - B |
| Total Alkalinity (as CaCO ₃) | | mg/l | 191 | APHA - 2320 -B |
| OrthoPhosphate (PO ₄ -P) | | mg/l | 0.3 | APHA - 4110 - B |
| Nitrate (as NO ₃) | | mg/l | 16.1 | APHA - 4110 - B |
| Nitrite (as NO ₂) | | mg/l | <0.05 | APHA - 4110 - B |
| Total Dissolved Solids | | mg/l | 171 | APHA - 2540 - C |
| Total Hardness (as CaCO ₃) | | mg/l | 160 | APHA - 3120 - B |
| Dissolved Oxygen | | % O ₂ | 97.1 | APHA - 4500 - O-G |

Additional information :

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For and on behalf of BHP laboratories :

**Pat O'Sullivan
Issue Date : 18/01/2011**

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TEST REPORT

Analysing
Testing
Consulting
Calibrating

**Client: Roadstone
Brownwood Quarry
Brownwood
Co. Wexford**

**BHP Ref. No.: 96236.3
Order No.:
Date Received: 20/12/10
Date Completed: 17/01/11
Test Specification: Nil
Item :See below**



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New Road
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Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

FTAO: Allen Geraghty

| Test | Client Reference | Units | Results | Standard Reference |
|-------------------------------------|-----------------------------------|-------|---------|--------------------|
| | GW3 Roadstone-Brownwood | | | |
| Total Petroleum Hydrocarbons | | | | |
| >C ₆ -C ₄₀ | | mg/l | <0.001 | GC-FID |
| >C ₆ -C ₈ | | mg/l | <0.001 | GC-FID |
| >C ₈ -C ₁₀ | | mg/l | <0.001 | GC-FID |
| >C ₁₀ -C ₁₂ | | mg/l | <0.001 | GC-FID |
| >C ₁₂ -C ₁₆ | | mg/l | <0.001 | GC-FID |
| >C ₁₆ -C ₂₁ | | mg/l | <0.001 | GC-FID |
| >C ₂₁ -C ₄₀ | | mg/l | <0.001 | GC-FID |
| Petroleum Range Organics | | mg/l | <0.001 | GC-FID |
| Diesel Range Organics | | mg/l | <0.001 | GC-FID |
| Mineral Oils | | mg/l | <0.01 | GC-FID |

Additional information :

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TEST REPORT

Analysing
Testing
Consulting
Calibrating



**Client: Roadstone
Brownwood Quarry
Brownwood
Co. Wexford**

**BHP Ref. No.: 96236.3
Order No.:
Date Received: 20/12/10
Date Completed: 17/01/11
Test Specification: Nil
Item :See below**

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Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

FTAO: Allen Geraghty

| Test | Client Reference | Units | Results | Standard Reference |
|-----------|--|-------|---------|--------------------|
| | GW3 Roadstone-Brownwood | | | |
| Arsenic | Consent of copyright owner required for any other use. | ug/l | <1 | APHA - 3120 - B |
| Cadmium | | ug/l | <1 | APHA - 3120 - B |
| Chromium | | ug/l | 1 | APHA - 3120 - B |
| Copper | | ug/l | 6 | APHA - 3120 - B |
| Iron | | ug/l | 5 | APHA - 3120 - B |
| Magnesium | | mg/l | 2.02 | APHA - 3120 - B |
| Manganese | | ug/l | 6 | APHA - 3120 - B |
| Nickel | | ug/l | <1 | APHA - 3120 - B |
| Lead | | ug/l | <1 | APHA - 3120 - B |
| Zinc | | ug/l | 5 | APHA - 3120 - B |

Additional information :

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**Pat O'Sullivan
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TEST REPORT

Analysing
Testing
Consulting
Calibrating



Client: Roadstone
Brownswood Quarry
Brownswood
Co. Wexford

BHP Ref. No.: 96236.3
Order No.:
Date Received: 20/12/10
Date Completed: 17/01/11
Test Specification: Nil
Item : See below

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New Road
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Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpce2@bhp.ie

FTAO: Allen Geraghty

| Test | Client Reference | Units | Results | Standard Reference |
|-------------------------|---|-------|---------|--------------------|
| | GW3 Roadstone-Brownswood | | | |
| Acenaphthene | <i>Consent of copyright owner required for any other use.</i> | ug/l | <0.01 | GC-MS |
| Acenaphthylene | | ug/l | <0.01 | GC-MS |
| Anthracene | | ug/l | <0.01 | GC-MS |
| Benzo(a)anthracene | | ug/l | <0.01 | GC-MS |
| Benzo(b)fluoranthene | | ug/l | <0.01 | GC-MS |
| Benzo(k)fluoranthene | | ug/l | <0.01 | GC-MS |
| Benzo(g,h,i)perylene | | ug/l | <0.01 | GC-MS |
| Chrysene | | ug/l | <0.01 | GC-MS |
| Dibenz(a,h)anthracene | | ug/l | <0.01 | GC-MS |
| Fluoranthene | | ug/l | <0.01 | GC-MS |
| Fluorene | | ug/l | <0.01 | GC-MS |
| Indeno(1,2,3,c,d)pyrene | | ug/l | <0.01 | GC-MS |
| Naphthalene | | ug/l | <0.01 | GC-MS |
| Phenanthrene | | ug/l | <0.01 | GC-MS |
| Pyrene | | ug/l | <0.01 | GC-MS |
| Benzo(a)pyrene | | ug/l | <0.01 | GC-MS |
| Total PAH's | | ug/l | <0.01 | GC-MS |

Additional information :

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Pat O'Sullivan
Issue Date : 18/01/2011

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TEST REPORT

Analysing
Testing
Consulting
Calibrating

**Client: Roadstone
Brownwood Quarry
Brownwood
Co. Wexford**

**BHP Ref. No.: 96236.4
Order No.:
Date Received: 20/12/10
Date Completed: 17/01/11
Test Specification: Nil
Item :See below**



BHP
New Road
Thomondgate
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Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

FTAO: Allen Geraghty

| Test | Client Reference | Units | Results | Standard Reference |
|---|-----------------------------------|--------------------|---------|--------------------------------|
| | GW4 Roadstone-Brownwood | | | |
| pH | | - | 7.01 | APHA-4500-H ⁺ -B |
| Electrical Conductivity | | µScm ⁻¹ | 292 | APHA - 2510 - B |
| Sodium | | mg/l | 4.46 | APHA - 3120 - B |
| Potassium | | mg/l | 1.24 | APHA - 3120 - B |
| BOD | | mg/l | 2 | APHA - 5210 - B |
| COD | | mg/l | 9 | APHA - 5220 - D |
| Ammoniacal Nitrogen (as NH ₃ -N) | | mg/l | 0.49 | APHA -4500- NH ₃ -D |
| Sulphate (as SO ₄) | | mg/l | 62.8 | APHA - 4110 - B |
| Total Alkalinity (as CaCO ₃) | | mg/l | 99 | APHA - 2320 -B |
| OrthoPhosphate (PO ₄ -P) | | mg/l | 0.23 | APHA - 4110 - B |
| Nitrate (as NO ₃) | | mg/l | 17.3 | APHA - 4110 - B |
| Nitrite (as NO ₂) | | mg/l | <0.05 | APHA - 4110 - B |
| Total Dissolved Solids | | mg/l | 247 | APHA - 2540 - C |
| Total Hardness (as CaCO ₃) | | mg/l | 120 | APHA - 3120 - B |
| Dissolved Oxygen | | % O ₂ | 99.4 | APHA - 4500 - O-G |

Additional information :

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TEST REPORT

**Client: Roadstone
Brownswood Quarry
Brownswood
Co. Wexford**

FTAO: Allen Geraghty

**BHP Ref. No.: 96236.4
Order No.:
Date Received: 20/12/10
Date Completed: 17/01/11
Test Specification: Nil
Item :See below**

Analysing
Testing
Consulting
Calibrating



BHP
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Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

| Test | Client Reference | Units | Results | Standard Reference |
|-------------------------------------|------------------------------------|-------|---------|--------------------|
| | GW4 Roadstone-Brownswood | | | |
| Total Petroleum Hydrocarbons | | | | |
| >C ₆ -C ₄₀ | | mg/l | <0.001 | GC-FID |
| >C ₆ -C ₈ | | mg/l | <0.001 | GC-FID |
| >C ₈ -C ₁₀ | | mg/l | <0.001 | GC-FID |
| >C ₁₀ -C ₁₂ | | mg/l | <0.001 | GC-FID |
| >C ₁₂ -C ₁₆ | | mg/l | <0.001 | GC-FID |
| >C ₁₆ -C ₂₁ | | mg/l | <0.001 | GC-FID |
| >C ₂₁ -C ₄₀ | | mg/l | <0.001 | GC-FID |
| Petroleum Range Organics | | mg/l | <0.001 | GC-FID |
| Diesel Range Organics | | mg/l | <0.001 | GC-FID |
| Mineral Oils | | mg/l | <0.01 | GC-FID |

Additional information :

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For and on behalf of BHP laboratories :

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Issue Date : 18/01/2011**

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TEST REPORTAnalysing
Testing
Consulting
Calibrating**Client: Roadstone
Brownwood Quarry
Brownwood
Co. Wexford****BHP Ref. No.: 96236.4
Order No.:
Date Received: 20/12/10
Date Completed: 17/01/11
Test Specification: Nil
Item :See below**BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie**FTAO: Allen Geraghty**

| Test | Client Reference | Units | Results | Standard Reference |
|-----------|-----------------------------------|-------|---------|--------------------|
| | GW4 Roadstone-Brownwood | | | |
| Arsenic | | ug/l | <1 | APHA - 3120 - B |
| Cadmium | | ug/l | <1 | APHA - 3120 - B |
| Chromium | | ug/l | 2 | APHA - 3120 - B |
| Copper | | ug/l | 9 | APHA - 3120 - B |
| Iron | | ug/l | 12 | APHA - 3120 - B |
| Magnesium | | mg/l | 1.86 | APHA - 3120 - B |
| Manganese | | ug/l | 7 | APHA - 3120 - B |
| Nickel | | ug/l | <1 | APHA - 3120 - B |
| Lead | | ug/l | 1 | APHA - 3120 - B |
| Zinc | | ug/l | 9 | APHA - 3120 - B |

Additional information :

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Issue Date : 18/01/2011**

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TEST REPORT

Analysing
Testing
Consulting
Calibrating



**Client: Roadstone
Brownwood Quarry
Brownwood
Co. Wexford**

**BHP Ref. No.: 96236.4
Order No.:
Date Received: 20/12/10
Date Completed: 17/01/11
Test Specification: Nil
Item :See below**

BHP
New Road
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Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpccm2@bhp.ie

FTAO: Allen Geraghty

| Test | Client Reference | Units | Results | Standard Reference |
|-------------------------|-----------------------------------|-------|---------|--------------------|
| | GW4 Roadstone-Brownwood | | | |
| Acenaphthene | | ug/l | <0.01 | GC-MS |
| Acenaphthylene | | ug/l | <0.01 | GC-MS |
| Anthracene | | ug/l | <0.01 | GC-MS |
| Benzo(a)anthracene | | ug/l | <0.01 | GC-MS |
| Benzo(b)fluoranthene | | ug/l | <0.01 | GC-MS |
| Benzo(k)fluoranthene | | ug/l | <0.01 | GC-MS |
| Benzo(g,h,i)perylene | | ug/l | <0.01 | GC-MS |
| Chrysene | | ug/l | <0.01 | GC-MS |
| Dibenz(a,h)anthracene | | ug/l | <0.01 | GC-MS |
| Fluoranthene | | ug/l | <0.01 | GC-MS |
| Fluorene | | ug/l | <0.01 | GC-MS |
| Indeno(1,2,3,c,d)pyrene | | ug/l | <0.01 | GC-MS |
| Naphthalene | | ug/l | <0.01 | GC-MS |
| Phenanthrene | | ug/l | <0.01 | GC-MS |
| Pyrene | | ug/l | <0.01 | GC-MS |
| Benzo(a)pyrene | | ug/l | <0.01 | GC-MS |
| Total PAH's | | ug/l | <0.01 | GC-MS |

Additional information :

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For and on behalf of BHP laboratories :

**Pat O'Sullivan
Issue Date : 18/01/2011**

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ATTACHMENT C
COMPLIANCE WITH BAT REQUIREMENTS

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BROWNSWOOD WASTE RECOVERY FACILITY COMPLIANCE WITH BEST AVAILABLE TECHNOLOGIES

INTRODUCTION

In its Article 12 compliance dated 5 July 2013, the Environmental Protection Agency requested that Roadstone Wood Ltd. provide it with a clear description as to how its proposed inert soil recovery facility at Brownswood will comply with the relevant requirements of BAT. It is considered that BAT for the proposed waste recovery activity is addressed by the guidance given in the Agency's *Draft BAT Guidance Note for the Waste Sector : Landfill Activities (April 2003)* and specifically guidance presented therein in respect of inert waste landfills.

The principal environment impacts associated with the proposed waste recovery activities comprise

- (i) Potential dust emissions arising from unloading, placement and compaction of imported soil and trafficking of HGV's over unpaved haul roads;
- (ii) Potential carbon dioxide (CO₂) emissions from plant and equipment working at the facility;
- (iii) Potential noise emissions / noise nuisance associated with working plant and HGVs;
- (iv) Potential contaminant emissions to land, surface waters and groundwater, specifically from placement of non-inert waste, presence of suspended solids in surface water run-off and spills / leaks of fuel and oil;
- (v) Potential nuisance associated with transport of mud onto the national and local road network;
- (vi) Inadequate planning and financial provision for potential environmental liabilities, closure, restoration and aftercare of the proposed facility;
- (vii) Poor environmental management and control of waste activities at the facility;

The waste materials imported to, managed and recovered at this facility are inert (physically, chemically and biologically unreactive) and will not alter or adversely affect any other matter in contact with it in a way which would give rise to environmental pollution or harm human health. As such, the waste will not generate leachate, landfill gas or odour emissions, nor will it give rise to litter nuisance or attract vermin or birds, which would also create further potential nuisance.

It is considered that each of the potential impacts of the proposed facility can be addressed through the application of the following best available techniques to minimise emissions or to manage / control them.

1.0 AIR (DUST) EMISSIONS

A number of measures are already in place to minimise and manage air (dust) emissions at the existing concrete production facility at Brownswood. The following BAT measures are proposed in respect of potential dust generation activities at the waste recovery facility in order to minimise and control dust emissions:

All Activities

- Extending the existing sprinkler system at Brownswood (around the existing concrete production facility) into active waste recovery areas and operating it as and when required;
- Using mobile water bowsers to damp down particulate materials in other areas (not covered by the sprinkler system), as and when required;

Soil Placement and Backfilling

- Damping down particulate materials as and when required;
- Restricting access to areas once they are restored;
- Avoiding soil handling during adverse (dry, windy) weather conditions and optimising timing of any site operations and/or development works;
- Placing and compacting imported soil in-situ immediately after being unloaded (to minimise windblown particulate matter);
- Seeding soil mounds immediately upon formation / completion;
- Minimising drop heights and soil mound heights at all times (to minimise emissions);

Stockpiling

- Minimising stockpiling of imported soils;
- Use of water sprays on soil stockpiles when necessary;
- Siting of stockpiles to take advantage of shelter from wind;
- Minimising drop heights and soil mound heights at all times (to minimise emissions);

Traffic Movements

- Requiring traffic to adhere to defined roads within the facility;
- Regularly maintaining unpaved road sections by grading hardcore to minimise particulate matter generation;
- Maximising travel over paved road sections within the facility;
- Maximising separation distances between haul roads and sensitive receptors;
- Implementing and enforcing speed controls on all paved and unpaved roads;
- Directing traffic through wheel cleaning equipment wherever practicable;
- Using road sweeper on paved roads sections as and when required;

Monitoring

- Continuation of dust deposition monitoring at established locations around the facility and undertaking reviews of ambient emissions at regular intervals to determine the effectiveness of dust management and control systems.

The *BAT Draft Guidance Note on Landfill Activities (2011)* and the *Environmental Management Guidelines for the Extractive Industry (2006)*, both published by the EPA, indicate that a total dust deposition limit of 350mg/m²/day is appropriate for the proposed waste recovery facility.

2.0 AIR (CO₂) EMISSIONS

The proposed backfilling and restoration of the quarry void at Brownswood will, for the most part, entail use of conventional diesel powered HGV trucks and earthmoving equipment (mechanical excavators and/or bulldozers). There is only minor scope to increase the efficiency of HGV's, plant and earthworking equipment and to reduce emissions arising from their use and deployment at this facility. The following BAT measures are proposed in order to increase efficiency and to limit, abate and/or reduce carbon dioxide emissions generated by HGVs and plant at the waste recovery facility:

- Ensuring all vehicles, plant and equipment based at the facility are regularly serviced and maintained and operating efficiently;
- Replacing plant and/or vehicles at the end of their operational life;
- Ensuring plant and equipment are switched off when not in use;
- Minimising, insofar as possible, vehicle movements across the facility
- Reviewing opportunities to increase the proportion of sustainable biofuel used by HGVs travelling to and from the facility, and incentivising its use wherever practicable.

3.0 NOISE EMISSIONS

A number of measures are already in place to minimise and manage noise emissions at the existing concrete production facility at Brownswood. The following BAT measures are proposed in respect of activities at the waste recovery facility in order to minimise and control noise emissions:

Facility Layout / Design

- Retaining existing boundary hedgerows around the proposed facility to provide acoustic as well as visual screening;
- Providing screening berms / banks along the appropriate property boundary (where practicable) to provide acoustic as well as visual screening;
- Ensuring plant and equipment at the facility work within the existing quarry void, below original ground level or the crest of any perimeter screening berm, in order that quarry faces can be used to provide additional acoustic screening;

Management and Working Practices

- Ensuring activities within the proposed facility are undertaken in locations where noise attenuation from existing natural landforms would minimise the potential noise related impact at nearby noise-sensitive properties;
- Ensuring that, wherever possible, internal haul roads are routed so as to maximise the separation distances to nearby noise-sensitive properties;
- Ensuring all haul roads are kept clean and maintained in a good state of repair (*i.e.* any potholes would be filled and large bumps removed, to avoid unwanted rattle and “body-slap” from heavy goods vehicles);
- Ensuring heavy goods vehicles entering and leaving the site have tailgates securely fastened;
- Ensuring all mobile plant and equipment used at the facility have noise emission levels that comply with the limiting levels defined in EC Directive 86/662/EEC and any subsequent amendments;
- Ensuring plant is operated in a proper manner with respect to minimising noise emissions (*e.g.* minimisation of drop heights, no unnecessary revving of engines, plant used intermittently not left idling);
- Ensuring all plant is subject to regular maintenance (*i.e.* all moving parts kept well lubricated, all cutting edges kept sharpened, the integrity of silencers and acoustic hoods maintained);
- Ensuring all plant and equipment at the facility is fitted with effective exhaust silencers which are maintained in good working order to meet manufacturers’ noise rating levels. Defective silencers to be replaced immediately.

Monitoring

- Continuation of noise monitoring at established locations around the facility (closest to sensitive receptors) and undertaking reviews of emissions at regular intervals to determine the effectiveness of noise management systems.

The *Guidance Note for Noise in Relation to Scheduled Activities (206)* and the *Environmental Management Guidelines for the Extractive Industry (2006)*, both published by the EPA, indicate that a rated noise emission limit of 55dB(A) L_{Ar} during daytime working hours and 45dB(A) L_{Ar} during night-time hours is appropriate for the proposed waste recovery facility.

Available baseline noise monitoring surveys and noise analyses in respect of future waste recovery activities indicate that exceedences in these threshold values do not (and will not) arise on account of existing (or proposed) site activities at Brownswood. The available noise monitoring data indicates that previously recorded exceedences of threshold noise limits at this location can be attributed solely to the high levels of traffic movement along the N11 National Primary Road immediately west of the Brownswood facility.

4.0 EMISSIONS TO LAND / WATER

There is currently little or no surface water run-off across the existing quarry site. Rain falling across the site currently either:

- percolates through unsealed ground into the underlying bedrock and ultimately intercepts groundwater (the upper surface of which currently lies at approximately the same level as the water in the worked out quarry void). Once it is part of the groundwater body, groundwater recharge follows regional groundwater flow toward the River Slaney which, at its closest point, flows approximately 100m west of the facility;
- runs over unsealed ground into the existing (groundwater) pond in the worked out quarry void or
- runs-off westwards over areas of paved (sealed) ground around the existing block yard, office building and asphalt plant to be collected by existing surface water drainage infrastructure which carries it to settlement ponds in the south-western corner of the site and from there, discharges it to the River Slaney.

A number of measures are already in place to minimise and manage emissions to land, surface water and groundwater at the existing concrete production facility at Brownswood. A trade

discharge licence (Ref. No. SS/WO24/81/99R1) in respect of surface water run-off from the existing paved areas around the established concrete and asphalt production facilities prescribes emission limits for defined contaminants and regular monitoring and reporting on the quality of the discharge to the nearby River Slaney.

Although the waste streams to be imported to the proposed recovery facility at Brownswood are inert and expected to be free from contamination, there is a minor risk that the proposed activities could result in contaminant emissions to land, surface waters and groundwater, specifically from placement of non-inert waste, presence of suspended solids in surface water run-off and spills / leaks of fuel and oil. The following BAT measures are proposed in respect of activities at the waste recovery facility in order to minimise uncontrolled release of polluting materials or liquids / liquors to land, surface waters and groundwater:

Land

- Establishing waste acceptance procedures and management systems to identify the source of imported waste materials in advance and to confirm that they are inert;
- Implementing a multi-level soil testing regime to test imported waste materials, comprising characterisation testing, compliance testing and on-site verification;
- Ensuring that any imported waste which is suspected to be non-inert is transferred to the proposed waste inspection and quarantine area (a covered shed constructed over a concrete slab) and held there pending receipt of testing results;
- Removing any quarantined materials that prove to be non-inert off-site, for disposal or recovery at an appropriately licensed waste facility;

Water

- Dewatering the flooded quarry void prior to placing inert soil material in order to minimise the mobilisation and migration of fines in groundwater;
- Constructing drainage channels around the edge of the existing quarry to capture any surface water run-off from unpaved areas and divert it to groundwater via temporary soakaways (infiltration areas) away from active waste recovery areas;
- Collecting surface water run-off from active recovery areas at sumps within the quarry void and pumping it through new settlement pond infrastructure, mobile silt traps and a hydrocarbon interceptor in order to reduce concentrations of suspended solids and remove any potential hydrocarbon contamination prior to discharging it via existing site infrastructure to the nearby River Slaney;
- Pumping any groundwater intercepted by initial or ongoing dewatering of the worked-out quarry void through the new settlement pond infrastructure, mobile silt traps and hydrocarbon interceptor prior to discharge to the River Slaney;
- Ensuring all fuels, oils, lubricants and other potentially hazardous chemicals held at the facility are stored in
 - (a) large tanks surrounded by protective concrete barriers in order to eliminate the potential for mobile plant to collide or impact with them;
 - (b) smaller drums or intermediate bulk containers (IBCs) on bunded pallets surrounded by protective barriers;
 - (c) double skinned containers and/or mobile bowzers.
- Regular visual inspection and testing of the integrity of tanks, drums, bunded pallets and double skinned containers;
- Diverting all domestic wastewater from staff welfare facilities via septic tanks or other wastewater treatment facilities prior to discharging final effluent to ground via effluent percolation areas;
- Ensuring all vehicle re-fuelling is undertaken on the sealed hardstand areas adjacent to the maintenance shed (or from a mobile double skinned fuel bowser)
- Maintaining and testing the integrity of the existing sub-surface drainage system beneath and downstream of the paved concrete fuelling slab, including drainage pipework, hydrocarbon interceptor and effluent percolation area;
- Undertaking maintenance of plant and machinery over paved surfaces in the existing covered workshops (or off-site, if appropriate);
- Ensuring all plant is regularly maintained and inspected daily for leaks of fuel, lubricating oil or other contaminating liquids / liquors

- Ensuring spill kits (with containment booms and absorbent materials) are available on-site to contain / stop the migration of any accidental spillages, should they occur;
- Establishing a traffic management system at the facility to reduce conflicts between vehicles, and the potential risk of collisions and associated fuel spills or oil leaks;
- Establishing and enforcing speed limits across the facility to further reduce the likelihood and significance of collisions;

Monitoring

- Establishing and implementing regular surface water discharge and groundwater monitoring (at 4 No. existing groundwater wells) across the facility and undertaking ongoing reviews of emissions at regular intervals to determine the effectiveness of water management systems.

It is expected that by implementing these measures, emissions to surface water will meet the quality threshold values for key indicator parameters (BOD, suspended solids, total ammonia, total nitrogen and total phosphorous set by the *BAT Draft Guidance Note on Landfill Activities (2011)* and/or existing discharge licence.

5.0 ENVIRONMENTAL LIABILITIES

Operation of the proposed waste recovery facility could give rise to both known and potentially unknown future liabilities, principally in respect of land, surface water and/or groundwater and also, to a lesser extent, to atmosphere. Some potential liabilities could also arise in respect of the future closure, restoration and aftercare of the facility. Failure to make adequate financial provision for these liabilities could give rise to adverse impacts on the environment.

In order to identify and quantify for these prospective liabilities, Roadstone Wood has prepared a preliminary Closure, Restoration and Aftercare Management Plan (CRAMP) and Environmental Liabilities Risk Assessment (ELRA), copies of which have also been provided in response to the EPA's Article 12 compliance request.

It is envisaged that, subject to the grant of a waste licence in respect of inert soil recovery activities at this site and Agency agreement, Roadstone Wood will arrange such financial provision as may be required in respect of these prospective environmental liabilities.

6.0 TRANSPORT OF MUD ONTO ROADS

The proposed backfilling and restoration of the quarry void at Brownswood will result in traffic movements of HGV's over areas of unpaved ground within the proposed waste recovery facility and as such, in unfavourable weather conditions, could result in mud being carried onto the local road network, giving rise to potential health and safety risks to other road users. The following BAT measures are proposed in order to limit, abate and/or minimise deposition of mud on local roads by HGV's and other vehicles exiting the waste recovery facility.

- Directing all traffic exiting the facility through the existing wheelwash facility;
- Regularly cleaning and maintaining the wheelwash facility;
- Using a road sweeper to ensure local public roads are cleaned as and when required
- Maximising travel over paved road sections within the facility;
- Regularly inspecting and maintaining unpaved road sections within the facility so as to minimise potential accumulation of mud on wheels of HGV lorries.

7.0 ENVIRONMENTAL MANAGEMENT SYSTEMS

Roadstone Wood Ltd. currently operates an Environmental Management System (EMS) in respect of the established concrete and asphalt production facilities at its 'Old Quarry' site in Brownswood.

It is proposed to modify and extend the existing EMS in due course to incorporate any additional mitigation measures and management procedures (outlined above) necessary to

- (i) mitigate specific impacts and emissions arising from the proposed waste recovery activities and
- (ii) implement best practice for environmental management and control of the waste activities.

There is an established programme of environmental monitoring at the Brownswood facility. Existing emission limit values are consistent with those set by planning permission, quarry registration conditions and discharge consents in respect of established activities issued by Wexford County Council. These will be reviewed and revised in light of any waste licence issued by the EPA for inert waste recovery activities at the proposed facility.

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ATTACHMENT D
COMPLIANCE WITH EUROPEAN DIRECTIVES

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BROWNSWOOD WASTE RECOVERY FACILITY COMPLIANCE WITH ENVIRONMENTAL DIRECTIVES

INTRODUCTION

In its Article 12 compliance dated 5 July 2013, the Environmental Protection Agency requested that Roadstone Wood Ltd. provide it with a clear description as to how its proposed inert soil recovery facility at Brownswood will comply with the requirements of several key pieces of environmental legislation, listed below:

- Waste Framework Directive
- Water Framework Directive
- EC Environmental Objectives (Surface Water) Regulations 2009
- EC Environmental Objectives (Groundwater) Regulations 2010
- IPPC Directive
- Environmental Liabilities Directive

It is considered that the operation of the proposed inert waste recovery facility at Brownswood will comply with each of the above-listed legislative enactments for reasons provided below.

1.0 WASTE FRAMEWORK DIRECTIVE (2008/98/EC)

1.1 Key Legislative Provisions

The Waste Framework Directive 2008/98/EC, establishes a legal framework for the management and treatment of waste within the EU. It seeks to protect the environment and human health by preventing harmful effects associated with waste generation and management. It applies to all waste excluding gaseous effluents, radioactive materials, decommissioned explosives, human or animal waste, wastewater, animal by-products / carcasses and waste from the extractive industries.

The Directive requires Member States to implement measures for the treatment of waste which do not endanger human health or harm the environment and which are in line with the waste hierarchy which requires waste to be managed in the following order of priority:

- (i) prevent;
- (ii) prepare for reuse;
- (iii) recycle;
- (iv) recover, including through energy recovery;
- (v) dispose.

The Directive requires producers or holders of waste to carry out waste treatment themselves or else organise to have it carried out by a broker, establishment or undertaking. It requires dangerous waste to be stored and treated in conditions that ensure the protection of health and the environment, prohibits mixing with other dangerous waste and requires packaging or labelling of waste in line with EU or international regulations.

Facilities carrying out waste treatment activities are required to obtain regulatory consent from national competent authorities who decide and condition the quantity and type of waste to be treated, the procedures and methods to be used, as well as monitoring and control requirements.

The Directive also requires Member States to prepare waste management plans to cover their national jurisdiction, outlining the types, quantities and sources of waste, existing collection and management systems and location criteria. Member States are also required to prepare prevention programmes to break the link between economic growth and the negative environmental impacts of waste management.

1.2 Compliance with Directive

Waste Hierarchy

The proposed restoration and backfilling of the worked out quarry void at Brownswood using imported waste soil and stone generated by construction and development works at off-site locations is classified as a waste recovery activity under national and EU waste management legislation. The proposed activity is classified as recovery as it permits waste to serve a useful purpose (in this instance facilitating the restoration of previously quarried lands) and conserves natural resources

which would otherwise have to be used to achieve the same result. As a recovery activity, it is to be preferred over the disposal option, which is least favoured under the Waste Framework Directive.

Ideally excess soil and stone generated by construction or development projects should be re-used on other development projects, this is very often not practical or viable on account of

- (i) the poor engineering properties of many soils which makes them unacceptable for re-use;
- (ii) the limited local demand for engineering grade soils when they become available at a particular point in time and
- (iii) the uneconomic (financial) and unsustainable (environmental) costs which would otherwise be incurred in transporting such bulky, low value material to more distant markets or buyers.

In such circumstances, the only feasible alternative to managing this particular waste stream is to recover it as close to source as possible.

Although the volume of construction activity in Ireland is significantly depressed at the current time, the most recently published EPA National Waste Report (for 2011) indicates that the volume of construction and demolition waste managed nationally in that year was 3,003,691 tonnes (a reduction of 83% since the peak of 17,800,000 tonnes in 2007). Of this, the vast bulk, 1,975,844 tonnes (or 66%) comprised soil and stone waste. A need clearly exists therefore for inert waste recovery facilities, including a number of relatively large facilities, across the State in order to divert excess soil and stone generated by construction and development activity away from disposal sites and toward more favoured recovery alternatives.

Regulatory Consent

As it is required to do so under national and EU legislation, Roadstone Wood applied to the EPA (the competent authority) for a waste licence in respect of the proposed inert waste recovery facility in August 2011. Any waste licence issued by the EPA in respect of the proposed facility will determine and condition

- (i) the quantities and types of waste to be treated;
- (ii) waste and materials handling procedures;
- (iii) measures to prevent environmental pollution;
- (iv) measures to control emissions;
- (v) scope and frequency of environmental monitoring and
- (vi) keeping of waste records.

Waste Management Planning

The development of an inert soil recovery facility at Brownswood is consistent with the objectives of the Waste Management Plan for the South East Region (2006-2011) published by the local authorities of Carlow, Kilkenny, South Tipperary, Waterford and Wexford. This plan still remains in force and will continue to do so until such time as it is revised and/or replaced.

Section 11.7 of the Waste Management Plan (2006-2011) identifies a number of objectives for management of construction and demolition waste in the South East. It states that in the exercise of their development functions, the local authorities will '*encourage the provision of recycling facilities in appropriate quarry developments...for the recycling/recovery of C&D waste.*' It further states that the Region as a whole will '*promote the reinstatement of historical sites with appropriate material subject to site suitability.*' The plan also states that the Region will '*promote the provision, by the private sector, of the necessary infrastructure for the recycling and recovery of C&D waste.*'

2.0 WATER FRAMEWORK DIRECTIVE (2000/60/EC)

2.1 Key Legislative Provisions

The Water Framework Directive 2000/60/EC, establishes an EU wide framework in the field of water policy. The Directive requires Member States to establish River Basin Districts (RBDs) to manage water resources within their national territories (and trans-frontier RBD's where river basins cross international borders). It also requires national competent authorities to prepare river basin management plans, establish environmental objectives and to establish programmes of measures to achieve these objectives. The key objectives of the Directive are

- (i) to expand the scope of water protection to all waters, surface waters and groundwater (rather than limit it to specifically designated waters);
- (ii) to achieve "good status" for all waters within a defined period;
- (iii) to ensure water resources are managed on a 'river basin' basis across the EU;
- (iv) to establish a "combined approach" of discharge emission limit values and water quality standards;
- (v) to encourage public participation in making of water management plans.

For surface waters, the Directive establishes a requirement for all surface waters to achieve both "good ecological status" and "good chemical status" by specified dates. Good ecological status is defined in terms of the quality of the biological community (its population, diversity and sensitivity to pollution), the hydrological characteristics of the water body and its chemical characteristics. Good chemical status is defined in terms of compliance with quality standards established for chemical substances.

For groundwater, a more precautionary approach is adopted by the Directive. It essentially prohibits direct discharges to groundwater and (for indirect discharges), introduces a requirement to monitor groundwater bodies in order to detect changes in chemical composition, and to reverse any upward pollution trend caused by human activity. For groundwater, the Directive also addresses quantitative issues and establishes sustainable groundwater management practices which limit the volume which may be abstracted from any particular groundwater body to that portion of its annual recharge which is not required to support connected ecosystems (be they surface water bodies or terrestrial systems such as wetlands).

The Directive requires Member States to establish registers of protected areas within each river basin district for habitats and species directly dependent on water (including protected Natura 2000 sites designated as Special Conservation Areas (SACs) or Special Protection Areas (SPAs) under 92/43/EEC and 2009/147/EC) and bodies of water used for the extraction of drinking water. These registers must also include designated sensitive areas under the Urban Wastewater Directive (91/271/EEC), vulnerable zones under the Nitrates Directive (91/676/EEC) and protected areas under the Bathing Water Directive (76/160/EEC).

2.2 Compliance with Directive

Many of the provisions of the Water Framework Directive (WFD) relate to public policy objectives and administrative functions / responsibilities. One of the principal responsibilities of local authorities and/or regulatory agencies is to ensure that existing pressures and future development is managed so as to ensure compliance with WFD objectives, particularly in respect of achieving set water quality standards within a defined period.

The proposed waste facility at Brownswood is located within the area covered by the Action Plan for the Slaney Lower Water Management Unit (WMU) prepared by the South-Eastern River Basin District (SERBD) Project. The action plan, published in March 2010, is intended to support the implementation of the Water Framework Directive across the lower freshwater reaches of the River Slaney, upstream of its estuary. The water quality in the River Slaney to the west of the proposed waste facility is currently rated by the plan as being of 'good' quality status. The principal stated objective of the plan is to protect existing water quality in the river. The plan also identifies 13 quarries within the WMU, but indicates that no waterbodies within it are at risk from these activities.

An assimilative capacity risk assessment was undertaken in respect of proposed discharges to the River Slaney (a designated nature site) as part of an Appropriate Assessment presented in the Ecology Chapter of the EIS submitted in support of the Waste Licence Application (refer to Chapter 4 / Appendix 4-1). The overall conclusion of the risk assessment is that, for key water quality chemical and physical parameters, the discharge of untreated water from the quarry void will have a negligible impact on the surface water quality (including the biological quality) of the River Slaney and will not adversely impact its ability to achieve 'good' quality status by 2015.

Legislation enacted to give effect to the WFD in Ireland, includes the EC Environmental Objectives (Surface Water) Regulations 2009 and the EC Environmental Objectives (Groundwater) Regulations 2010. The compliance of the proposed waste recovery facility with this legislation is discussed in more detail below.

3.0 EC ENVIRONMENTAL OBJECTIVES (SURFACE WATER) REGULATIONS 2009

3.1 Key Legislative Provisions

The EC Environmental Objectives (Surface Water) Regulations (S.I. 272 of 2009) have the effect of transposing key provisions of the Water Framework Directive (2000/60/EC), Dangerous Substances Directive (2006/11/EC) and Priority Substances Directives (2008/105/EC) into Irish national law. The Regulations also repeal the earlier Phosphorus and Dangerous Substances Regulations. The Regulations apply to all surface waters and provide for

- (i) the establishment of legally binding quality objectives for all surface waters;
- (ii) setting of environmental quality standards for specific pollutants;
- (iii) the examination, and where appropriate, review of existing discharge authorisations by public authorities to ensure that the emission limits laid down in authorisations support compliance with the new water quality objectives and standards;
- (iv) the classification of surface water bodies by the EPA for the purposes of the Water Framework Directive;
- (v) the establishment of inventories of priority substances by the EPA;
- (vi) the drawing up of pollution reduction plans by co-ordinating local authorities (in consultation with the EPA) to reduce pollution by priority substances and to cease and/or phase out discharges, emissions or losses of priority hazardous substances.

3.2 Compliance with Directive

The principal water feature at the proposed waste recovery facility is the flooded quarry void. The water within this void principally comprises groundwater flowing through the surrounding rock, with relatively minor components of rainfall and surface water run-off from surrounding land. Other than this, there are only a few temporary channels or sumps required for surface water management at the existing quarry.

Surface Water Quality

The key impact of dewatering the quarry void at Brownswood and backfilling it with inert soil and stone waste is the potential increase in the volume of suspended soil particles and/or other contaminants being discharged off-site to the River Slaney.

The mass balance results presented in the assimilative capacity risk assessment (undertaken as part of the Appropriate Assessment) indicate that the discharge of untreated water from the quarry void to the River Slaney would result in concentrations of key water quality parameters downstream of the discharge point which would be less than the relevant Environmental Quality Standard (EQS) limit for 'Good River Quality Status', except for orthophosphate. The results for orthophosphate indicate however that the untreated discharge would have a negligible impact on this parameter in the river. The mass balance for Suspended Solids indicates that the level in the river would remain effectively unchanged and below the suspended solids EQS of 25mg/l for Salmonid Rivers (S.I. No. 293/1988).

The overall conclusion of the risk assessment is that for key water quality chemical and physical parameters, the discharge of untreated water from the quarry void will have a negligible impact on the surface water quality (including the biological quality) of the River Slaney.

Surface Water Flows

In view of the large existing flows within the River Slaney downstream of Enniscorthy, discharges of surface water from the proposed waste recovery facility will have negligible impact on flow volumes in the river.

Discharge Licensing

The discharge licence (Ref. SS/W024/81/99R1) which is currently in place at Brownswood provides for the discharge of groundwater, treated process water from the concrete production facility and surface water runoff from paved yards to the River Slaney. The original discharge licence for the site was reviewed by Wexford County Council in 2007, at the time the planning application for new ready mix concrete and asphalt plants was under consideration.

The discharge licence addresses the requirements of the Water Framework Directive and incorporates new surface water treatment infrastructure and a revised surface water management plan. Although issued prior to enactment of the 2009 Regulations, the licence anticipated the key provisions of those regulations.

A number of measures are proposed in order to monitor any potential impact of the proposed waste recovery operations on surface water. Sampling will be undertaken on a regular basis at any temporary surface water features which may either be created or form naturally at low points within the recovery facility and at pre-designated discharge control points. Surface water samples will be tested for a range of physical and chemical parameters in order to assess water quality and detect any possible contamination at the site.

It is considered that discharges of groundwater and surface water run-off from the proposed waste recovery facility are addressed by the existing discharge licence, subject to such additional provisions in respect of surface water management as may be required being included amongst the waste licence conditions.

4.0 EC ENVIRONMENTAL OBJECTIVES (GROUNDWATER) REGULATIONS

4.1 Key Legislative Provisions

The EC Environmental Objectives (Groundwater) Regulations (S.I. No 9 of 2010) address and transpose certain requirements of the Water Framework Directive (2000/60/EC) and the Groundwater Directive (2006/118/EC) into Irish national law. They establish a new strengthened regime for the protection of groundwater in line with the requirements of both Directives. This is achieved by establishing clear Environmental Objectives, Groundwater Quality Standards and Threshold Values for the classification of groundwater and the protection against pollution and deterioration. The regulations also introduce the legal basis for a more flexible, proportionate and risk based approach to implementing the pre-existing legal obligation to prevent or limit inputs of pollutants into groundwater.

4.2 Compliance with Directive

There is currently little or no surface water run-off across the existing quarry site and most rain falling at the site currently percolates through unsealed ground into the underlying bedrock and ultimately intercepts groundwater (the upper surface of which currently lies at approximately the same level as the water in the worked out quarry void). Once it is part of the groundwater body, groundwater recharge follows regional groundwater flow toward the nearby River Slaney.

Groundwater Quality

The development and operation of the proposed waste recovery facility will not require discharge of effluent to groundwater, and as such does not require a groundwater discharge licence. Available water quality data indicates that the groundwater quality is generally good, and slightly alkaline. Elevated levels of total coliforms and nitrate indicate some contamination of the water (organic pollution), from human or agricultural sources. Mitigation measures have been incorporated in the design of existing and proposed infrastructure and into proposed waste management procedures at the facility to prevent potential contamination of the underlying groundwater body (refer to Chapters 5 and 6 of the EIS submitted in support of the waste licence application).

Groundwater Flow

The regional permeability of the aquifer at Brownswood is described as being moderate to high with flow along faults and fissures; however the local permeability of the rock occurring locally at the quarry is low, with little groundwater seepage through the quarry face. Dewatering the quarry void and infilling it with inert soil material will not alter the regional groundwater flow toward the River Slaney or alter the flow pattern around the site in the long-term. While there may be short to medium term localised impacts associated with groundwater abstraction, it should be recognised that up to recently the quarry had been dewatered (to a level of c. -22mOD) for a period in excess of 10 years without any significant adverse environmental impact (minor inflows collected in sumps were either recycled for concrete production or diverted via treatment works to the River Slaney).

Monitoring for Potential Adverse Impacts

A number of measures are proposed in order to monitor any potential impact of the proposed waste recovery operations on groundwater. Groundwater sampling will be undertaken on a regular basis at the 4 No. existing groundwater monitoring wells. Groundwater levels will also be recorded at the time of sampling. Groundwater samples will be tested for a range of physical and chemical parameters in order to assess water quality and detect any possible contamination at the site.

5.0 IPPC DIRECTIVE (2008/1//EC)

5.1 Key Legislative Provisions

The current Integrated Pollution Prevention and Control (IPPC) Directive (2008/1//EC) lays down measures designed to prevent or reduce air, water or soil pollution by emissions from prescribed industrial facilities. The Directive applies to a significant number of activities with a high pollution potential, such as the energy sector, the production and processing of metals, the mineral and chemical industries, waste management facilities, food production and non-industrial activities such as livestock farming. It establishes a requirement for competent national authorities to issue regulatory permits for existing and new installations, with requirements to ensure the protection of soil and groundwater and limit pollutant emissions.

The Directive sets out the main principles for permitting and control of installations based on:

- (i) an integrated approach (which takes account of the whole environmental performance of the facility, including emissions to air, water and land, generation of waste, use of raw materials, energy efficiency, noise, prevention of accidents, and restoration on closure) and
- (ii) the application of best available techniques (BAT), defined as the most effective techniques to achieve a high level of environmental protection, taking account of the costs and benefits.

The IPPC Directive is due to be replaced by the Industrial Emissions Directive (IED) (2010/75/EU) from January 2014 onwards. The Directive revises and merges seven separate existing Directives relating to industrial emissions into one Directive including:

- (i) the Integrated Pollution Prevention and Control (IPPC) Directive (2008/1/EC);
- (ii) 3 No. Titanium Dioxide Directives (78/176/EEC, 82/883/EEC and 92/112/EEC) on waste from the titanium dioxide industry;
- (iii) Volatile Organic Compounds (VOC) Solvents Directive (99/13/EC);
- (iv) Waste Incineration Directive (2000/76/EC) and
- (v) Large Combustion Plants (LCP) Directive (2001/80/EC).

As well as updating principles of integrated management and BAT, the IED provides a certain amount of flexibility in allowing competent national authorities to set less strict emission limit values in specific cases and introduces mandatory requirements on environmental inspections, requiring site visits to be undertaken at least every 1 to 3 years, using risk-based criteria.

5.2 Compliance with Directive

The inert waste recovery activities proposed at Roadstone Wood's Brownswood site are not amongst the list of prescribed industrial facilities, processes and/or activities to which the current Integrated Pollution Prevention and Control Directive and/or the Industrial Emissions Directive apply. As the proposed waste facility does not come under the scope of either Directive, it is immaterial (and unnecessary) to address compliance with the legislative provisions contained therein.

6.0 ENVIRONMENTAL LIABILITIES DIRECTIVE (2004/35/EC)

6.1 Key Legislative Provisions

The Environmental Liability Directive (ELD) 2004/35/EC is concerned with the prevention and remedying of environmental damage. For the purposes of the Directive, environmental damage is defined as :

- (i) damage which has significant adverse effects on reaching or maintaining favourable conservation status of species and natural habitats protected under EC legislation;

- (ii) damage that significantly adversely affects the ecological, chemical and/or quantitative status and/or ecological potential of waters falling within the scope of the Water Framework Directive;
- (iii) land contamination that creates a significant risk of human health being adversely affected as a result of direct or indirect introduction in, on or under land of substances, preparations, organisms and micro-organisms.

The Environmental Liability Directive provides for two distinct liability regimes. The first applies to operators who conduct potentially risky activities (listed in Annex III) including

- (i) industrial activities regulated under IPPC licenses;
- (ii) waste management operations;
- (iii) the release of pollutants into water or into the air;
- (iv) the production, storage, use and release of dangerous chemicals, and
- (v) the transport, use and release of genetically modified organisms (GMOs).

Under this regime, an operator can (with few exceptions) be held liable, even if he/she has not committed any fault.

The second liability regime applies to all activities (including those not listed in Annex III) where an operator can be held liable for damage if he/she is at fault or negligent and has caused damage to natural habitats or species protected by the Habitats and Birds Directives.

Under the ELD, public authorities are required to identify liable polluters and ensure that they undertake or finance the necessary preventive or remedial measures (detailed in the Directive). In addition, the Directive allows public interest groups (such as non-governmental organisations) to compel public authorities to act where necessary and to challenge their decisions before the courts, if these are considered to be illegal.

6.2 Compliance with Directive

As will be evident from

- (i) the environmental mitigation measures outlined in the Environmental Impact Statement submitted in support of the proposed Waste Licence Application and
- (ii) the description of how the proposed inert waste recovery facility at Brownswood complies with BAT requirements (refer to Attachment C of response to the EPA's Article 12 compliance request).

Roadstone Wood recognises its responsibility to minimise, avoid and prevent, insofar as possible, occurrence of any environmental pollution at the proposed waste facility. The company will achieve this by applying mitigation measures to reduce environmental impact and/or risk and by developing and implementing robust environmental management systems.

Notwithstanding this, it is recognised that operation of a waste recovery facility can give rise to potential environmental liabilities (some known and some potentially unknown). It is considered that in this instance, the principal liabilities are likely to arise in respect of land, surface water and/or groundwater and also, to a lesser extent, atmosphere. In order to identify and quantify liabilities, Roadstone Wood has prepared an Environmental Liabilities Risk Assessment (ELRA), a copy of which is provided in Attachment F of the response to the EPA's Article 12 compliance request.

It is envisaged that, subject to the grant of a waste licence in respect of inert soil recovery activities at Brownswood and Agency agreement, Roadstone Wood will make financial provision in respect of these prospective environmental liabilities putting the following insurances in place;

- (i) Employers Liability Insurance – indemnified for at least €2 million.
- (ii) Public Liability Insurance – indemnified for at least €2 million.
- (iii) Environmental Liability or Contractors All-Costs Insurance – indemnified for at least €2 million.

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

ATTACHMENT E

CLOSURE, RESTORATION AND AFTERCARE MANAGEMENT PLAN (CRAMP)

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global environmental solutions

Brownswood Inert Waste Recovery Facility
Brownswood
Enniscorthy
Co. Wexford

**Closure, Restoration and
Aftercare Management Plan (CRAMP)**

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August 2013
SLR Ref: 501.00180.00065 CRAMP Rev1

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1.0 INTRODUCTION

This Closure, Restoration and Aftercare Management Plan (CRAMP) is prepared in compliance with an Article 12 Compliance request dated 5 July 2013 from the Environmental Protection Agency in respect of a waste licence application (Ref. W0280-01) for a proposed inert soil waste recovery facility at a worked out quarry owned and previously operated by Roadstone Wood Ltd. in Brownswood, Enniscorthy, Co. Wexford.

The waste licence application provides for

- Use of imported natural materials, principally excess inert soil, stones and/or broken rock excavated on construction sites, to backfill and restore a large existing 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, prior to removal off-site to appropriately licensed waste disposal or recovery facilities;
- Temporary stockpiling of topsoil and subsoil pending re-use as cover material for final restoration of the site;
- Restoration of the backfilled void (including placement of cover soils and seeding) and return to use as agricultural grassland and
- Environmental monitoring of noise, dust, surface water and groundwater for the duration of the site restoration works and for a short aftercare period.

In preparing this plan, regard has been had to the requirements outlined in the EPA's Article 12 compliance request, specifically

- *A scope statement for the plan;*
- *The criteria which define the successful closure and restoration of the facility or part thereof, and which ensure minimum impact to the environment;*
- *A programme to achieve the stated criteria;*
- *Where relevant, a test programme to demonstrate the successful implementation of the plan;*
- *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.*

This CRAMP has also been prepared in accordance with the EPA guidance publication *Guidance on Environmental Liability Risk Assessment, Residuals Management Plans and Financial Provision (2006)*.

1.1 Scope of CRAMP

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 agricultural use, principally as grassland.

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.

2.0 SITE EVALUATION

2.1 Site Description

The site of the proposed inert waste facility to which this CRAMP refers is located entirely within the townland of Brownswood, Co. Wexford, approximately 2.5km south of the town of Enniscorthy. Its location is shown on an extract from the 1:50,000 scale Discovery Series map of the area, reproduced as Figure 1.

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

The extent of the proposed application area seeks to avoid conflict with established land-uses and other on-site activities (including concrete, asphalt and block production areas), but includes access roadways and all shared infrastructure necessary to operate the proposed inert waste / soil recovery facility (including offices, wheelwash, weighbridge, maintenance sheds, hardstand areas etc.) The application 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. The existing site layout is shown, together with additional infrastructure to be provided to support proposed waste recovery activities, in Figure 2.

Ground levels across the application site 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.

The former quarry void gradually filled with water once rock extraction activity ceased and dewatering pumps were turned off. The water level within the quarry void has risen from the former floor level of -22mOD to approximately 7.2mOD today and exhibits slight seasonal variation. The recorded groundwater level in the pond was slightly above that in the nearby River Slaney (approximately 5.5mOD) when levels were measured in June 2010.

No restoration works have been undertaken since rock extraction activities ceased at the quarry. Since extraction ceased at the Old Quarry, Roadstone Wood Ltd. has continued to excavate rock at another quarry immediately to the south of it, at a site known as 'Murphy's Quarry'. Rock excavated at this quarry is used to produce concrete, blocks and asphalt products within the Old Quarry, at areas immediately adjoining, but outside of, the proposed waste licence application area.

2.2 Planning History

2.2.1 Former / Existing Quarry 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 at the application site.

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 proposed quarry development will not be impacted by the proposed inert soil recovery activities at 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 2000. In accordance with powers granted to it under Section 261, the Council imposed conditions on activities at the Old Quarry in April 2007 (Ref. No. Q3). Condition 14 required Roadstone Wood Ltd. to restore the Old Quarry in accordance with a restoration plan to be 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). These planned plant replacements will not be impacted by the proposed inert soil recovery activities at the Old Quarry.

2.2.2 Recovery of Inert Soil and Stone

The proposal to backfill the worked out quarry with imported inert soil and stones is part of the proposed quarry restoration works 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 was finally granted by Wexford County Council in September 2012. The planning permission is valid for a 20 year period, up to 2032.

2.3 Site Inventory / Infrastructure

The established site facilities, mobile plant and fixed infrastructure at the proposed 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 principal site facilities are located on Figure 2 of this report.

- **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.

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.

2.4 Requirement for this Plan

The proposed inert soil waste recovery facility at Brownswood will result in significant landform changes and, if not properly managed, could introduce some potential long-term risks to the surrounding natural and human environments.

An initial screening and operational risk assessment was undertaken in respect of the waste recovery facility at Brownswood in accordance with an assessment methodology prescribed by the EPA in its publication *Guidance on Environmental Liability Risk Assessment, Residuals, Management Plans and Financial Provision (2006)*.

This screening exercise indicated that the proposed inert soil waste recovery facility at Brownswood could be classified as a Category 2 Risk Facility. As such, the principal requirement for management of long-term land use is to prepare a site closure / restoration plan, with such provision as may be required for longer-term (ie. post closure) site aftercare and management as may be required.

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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 recovery operations and decommissioning / removal of plant and infrastructure from the facility, no remaining environmental liabilities will attach to restored areas of the site and/or areas where the principal inert waste recovery activities are located.

The operation of the Waste Recovery Facility at Brownswood provides for backfilling of a large pre-existing void created by previous extraction of bedrock at the site. On completion of the final phase of backfilling, much of the work required to achieve final restoration and closure of the waste facility will already have been completed. It is expected that the final restoration of the waste recovery areas to agricultural use will be completed within a period of 20 years. The operational life of the facility however will be largely contingent on the availability of inert soil waste from local development projects. Details of the final restoration works are outlined in some detail in Section 4 of this CRAMP.

On completion of the quarry backfilling works and the subsequent final site restoration works, all mobile plant and equipment associated with the backfilling, placement and compaction of soil and stones will be removed off-site.

Any site infrastructure, hardstanding or paved areas used solely for waste recovery activities will be progressively decommissioned, recovered and where possible, re-used within the facility. Hard-standing or paved surfaces will be broken up using a hydraulic breaker and subjected to validation testing to confirm the materials are acceptable for re-use within the Applicant's landholding for construction of haul roads and/or other hard standing areas. Any materials which are 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.

Any dedicated service infrastructure (principally settlement ponds, groundwater dewatering pipes, silt trap and interceptor) will be decommissioned and removed. Any existing or shared plant, equipment or infrastructure required for continued operation of the adjoining concrete or asphalt production facilities will however remain in place.

Provision will be made for short-term (<1year) environmental monitoring of air, surface water and groundwater following cessation of recovery activities. Assuming no evidence of contaminated soil or groundwater is encountered, the in-situ groundwater monitoring wells will be decommissioned in accordance with guidance published by the UK Environmental Agency in its publication *Decommissioning Redundant Wells and Boreholes*.

3.2 Criteria for Successful Closure

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

- the principal objective is to achieve clean closure of the site following restoration and aftercare, with no residual liabilities or constraints.
- all mobile plant and equipment associated with the backfilling, placement and compaction of soil and stones and/or recovery of inert construction and demolition waste will have been removed off site;
- short-term (< 1year) environmental monitoring of air, surface water and groundwater will be carried out and no evidence of air or surface / groundwater contamination identified on site;
- the backfilled / restored areas will be returned to productive agricultural land use;

- there should be no constraints on future land use associated with soil or groundwater contamination or any structures remaining in-situ.
- the process of surrendering the waste licence to the EPA will be progressing or completed, removing the legal encumbrance on title deeds to the restored land areas and the shared infrastructure areas.

3.3 Closure Plan Costing

The expected costs (present-day values), associated with the future closure of the waste recovery facility at Brownswood, are outlined in Table 1 below.

Table 1
Waste Recovery Facility Closure Costs

| ITEM | COST € |
|--|-------------------|
| Removal of all mobile plant off site | 1,500.00 |
| Decommissioning of dedicated site infrastructure (excavation, testing and backfilling of settlement ponds, removal of interceptor / silt trap, pipelines and/or dedicated services) | 5,000.00 |
| Breaking up of pavement and hard-standing surfaces (using hydraulic breaker), validation testing to confirm materials may be re-used on-site, transfer materials across property holding | 3,000.00 |
| Transfer off site of any non-inert material (allow, say) | 2,500.00 |
| Final site restoration works (site levelling and contouring, re-seeding, spraying etc.) – part of aftercare (refer to Table 2) | |
| Short-term (< 1year) environmental monitoring of air, surface water and groundwater (excess over ongoing monitoring costs) | 5,000.00 |
| Decommissioning of groundwater monitoring wells (4 No.) | 3,000.00 |
| Closure Validation Report | 2,000.00 |
| Total Site Closure Cost (excl. VAT) | €22,000.00 |
| 10% Contingency (to address unforeseen issues / liabilities) | 2,200.00 |
| Total Site Closure Cost (excl. VAT) | €24,200.00 |

3.4 Closure Plan Update and Review

As required by the waste licence conditions, this Closure Plan will be reviewed and updated annually as part of the Annual Environmental Report (AER) submission to the EPA, The updated and reviewed Closure Plan will take account of any site or process changes, technology changes and costing changes.

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 final validation report (including a Certificate of Completion for the CRAMP) in respect of the licensed waste facility will be submitted to the Agency within 3 months of completion of the works outlined herein.

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-restored' drawings and photographs of the site;
- results of short-term environmental monitoring which follow Site Closure and Restoration and
- a Certificate of Completion for the CRAMP.

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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 agricultural grassland.

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. On completion, the final landform will merge into the surrounding undulating pastoral landscape. An indication of the final ground level contours around the backfilled void is provided in Figure 3. 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. Cross-sections through the final landform are shown in Figure 4.

Any temporary additional or replacement infrastructure which may be required to facilitate the proposed works (collector sumps etc.) will be constructed and/or installed at the outset of quarry backfilling.

The quarry void will be backfilled in several phases working upwards from the existing quarry floor level at c. -22mOD. Final formation levels on completion of the backfilling and restoration works vary on account of the sloped nature of the restored landform, from approximately 28mOD at the northern end to 6mOD below the surface water pond in the south-eastern corner (refer to Figure 3). On completion, final gradients across the restored ground surface will be relatively shallow, typically of the order of 1v:4v or less.

On attaining the required finished level, 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 such that total thickness of topsoil and subsoil is at least 1m. The restoration surface will then be seeded with grass in order to promote stability, minimise soil erosion and dust generation and restore the land to agricultural use.

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

Provided there is no potential for conflict with established / ongoing site activities, it is envisaged that the restored grassland will be set to a local farmer as soon as practicable following completion of site restoration works and establishment of the grass sward.

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 may still be continuing at the 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

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 (< 1 year) environmental monitoring of air, surface water and groundwater 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 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 use of the restored area as agricultural grassland. Initial maintenance following restoration after each phase of backfilling (principally cutting and possibly spraying), will be overseen by the waste facility manager at Brownswood or by other designated Roadstone Wood Ltd. staff nominated by him.

After final restoration works have been completed and the aftercare period has elapsed, the land will be set to a local farmer and he/she will then assume responsibility for the general upkeep and environmental management of the land.

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 agricultural use and management, 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 2 overleaf.

Table 2
Estimated Restoration Cost
(Based on a 2 Year Aftercare Period)

| ITEM | COSTS (€) |
|--|-------------------|
| Final site contouring (land raising / lowering as required) (€500 / ha) | 2,500.00 |
| Final capping (150-300mm) topsoil and (700-850mm) subsoil (€1,000 / ha) | 5,000.00 |
| Surface preparation, grass seeding, ground repair and spraying (€1,500 / ha) | 7,500.00 |
| Post and wire perimeter fencing (600m at €5/m) | 3,000.00 |
| Copse Planting (Ground preparation, supply of plants and planting works) | 8,000.00 |
| 24 months establishment maintenance for grassed area and hedge planting | 3,000.00 |
| Total Restoration and Aftercare Cost (excl. VAT) | €29,000.00 |
| 10% Contingency (to address unforeseen issues / liabilities) | 2,900.00 |
| Total Restoration and Aftercare Cost (excl. VAT) | €31,900.00 |

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5.0 REPORT CLOSURE

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

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

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FIGURES

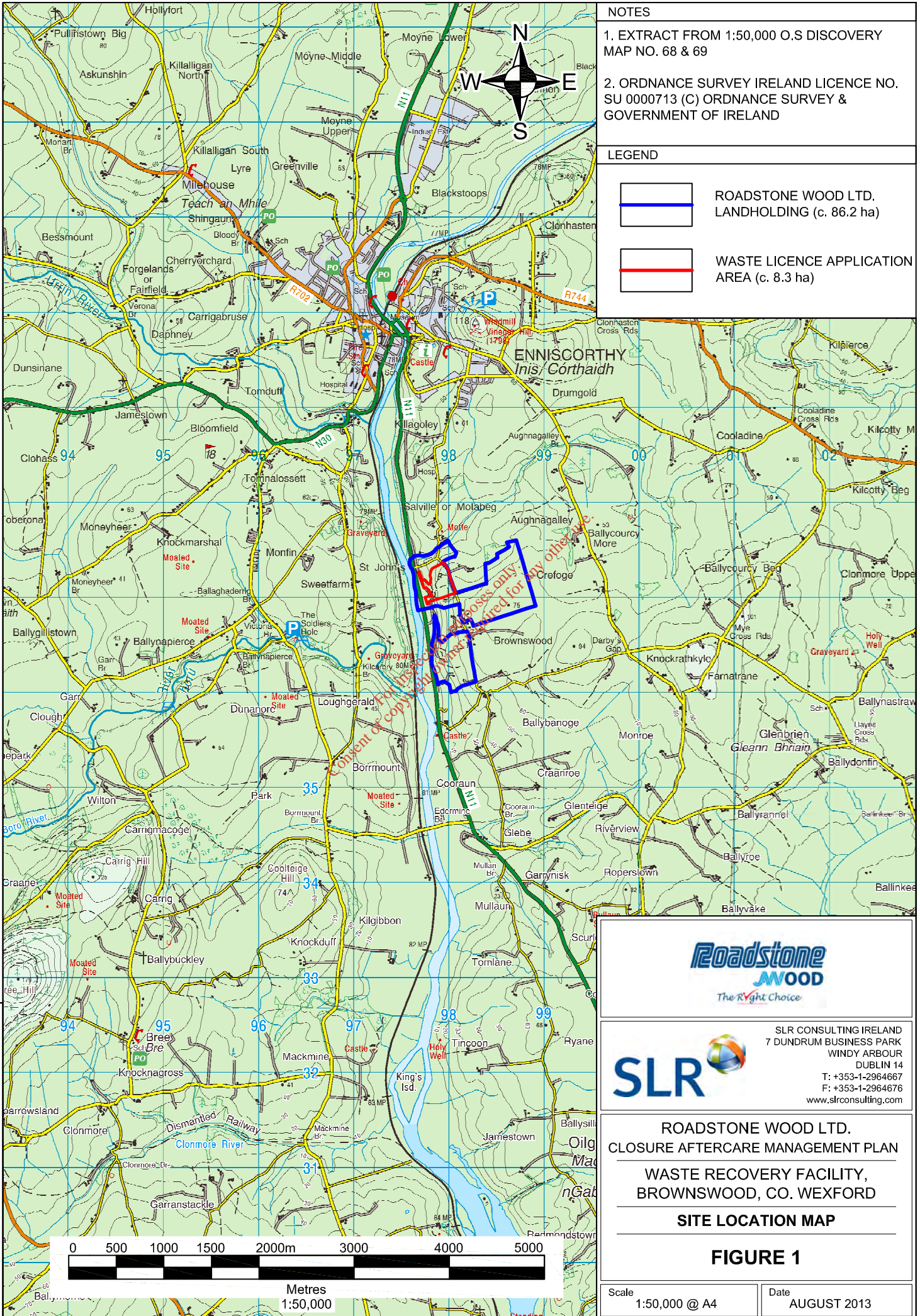
**Figure 1
Site Location Map**

**Figure 2
Existing Site Layout**

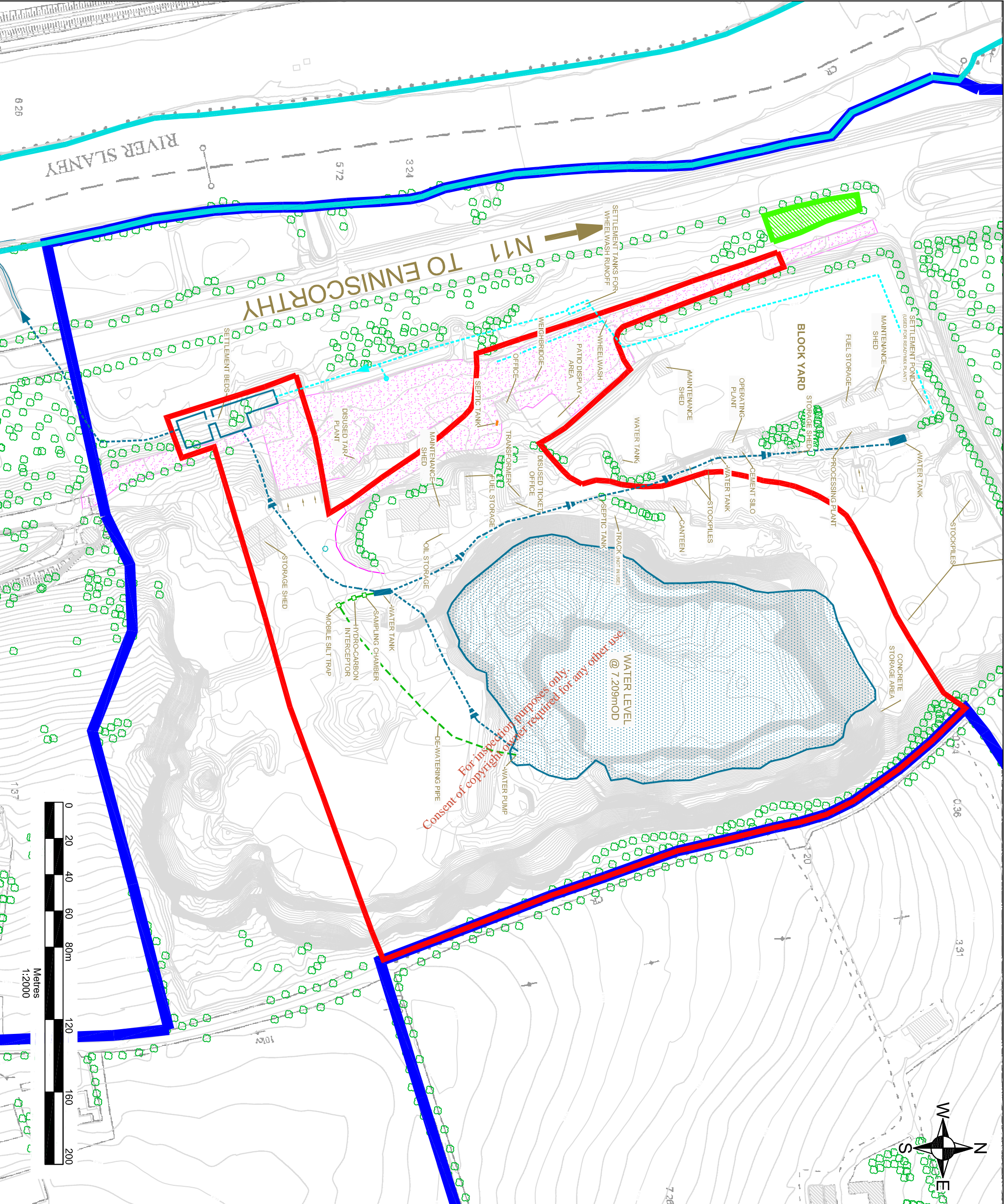
**Figure 3
Restoration Proposals**

**Figure 4
Restored Cross Sections**

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0180.00065.18.FIG1.R0.SITE LOCATION MAP.dwg



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- NOTES**
1. EXTRACT FROM 1:2,500 ORDNANCE SURVEY DIGITAL SHEET NO. 5143 A-D
 2. ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000713 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

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

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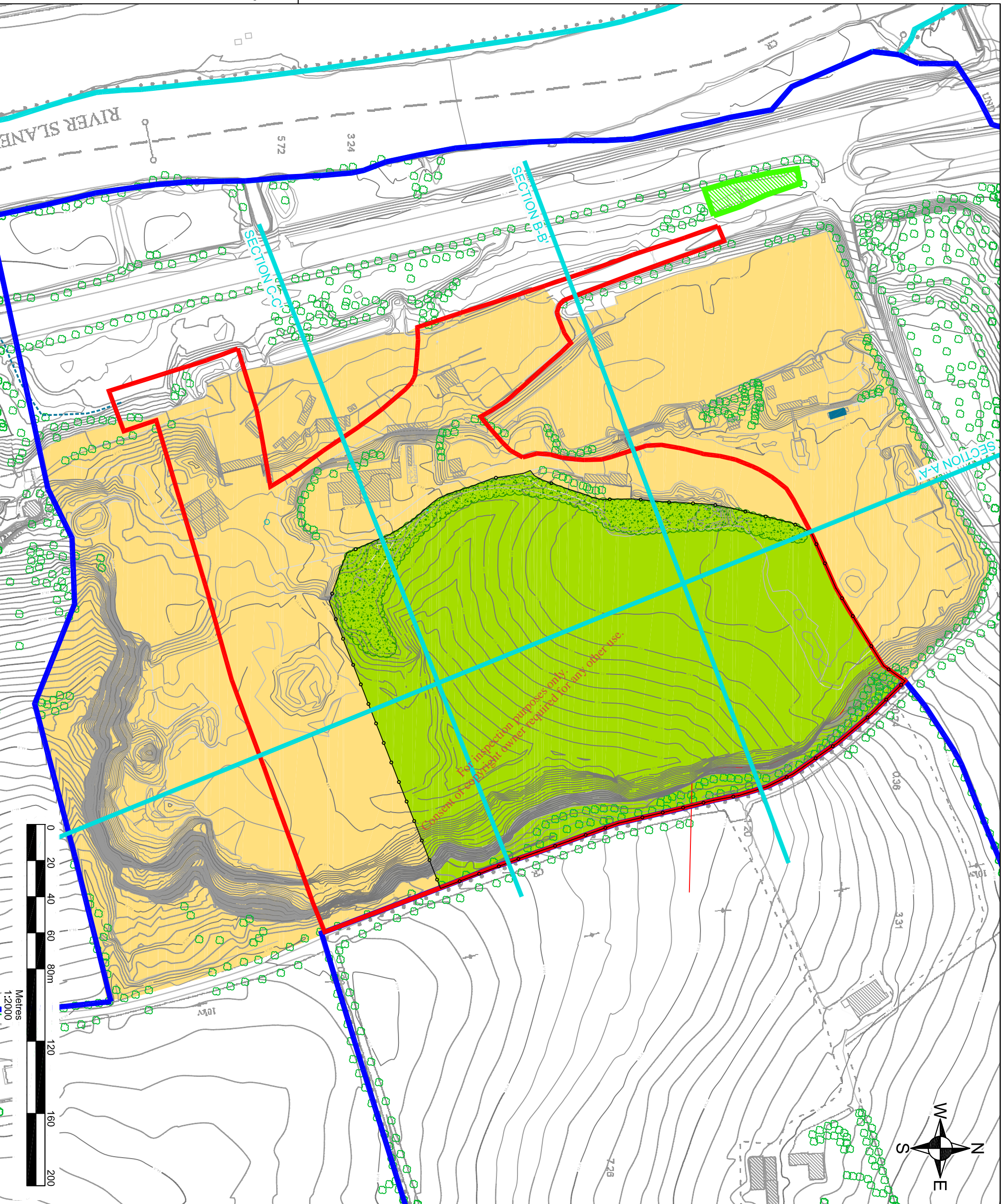
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ROADSTONE WOOD LTD.
 CLOSURE AFTERCARE MANAGEMENT PLAN
 WASTE RECOVERY FACILITY,
 BROWNSWOOD, CO. WEXFORD

SITE INFRASTRUCTURE LAYOUT

FIGURE 2

Scale 1:2,000 @ A3 Date AUGUST 2013



- NOTES**
1. EXTRACT FROM 1:2,500 ORDNANCE SURVEY DIGITAL SHEET NO. 5143 A-D
 2. ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000713 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

LEGEND

- BOUNDARIES**
- ROADSTONE WOOD LTD. LANDHOLDING (c. 86.2 ha)
 - WASTE LICENCE APPLICATION AREA (c. 8.3 ha)
 - AREA NOT OWNED BY ROADSTONE WOOD LTD. (c. 0.1 ha) - FOLIO WX53689F & WX20665
- EXISTING FEATURES TO BE RETAINED**
- HEDGEROWS/TREES (TO BE PROTECTED DURING INFILL & RESTORATION WORKS)
 - CONSTRUCTION MATERIAL PRODUCTION FACILITY
- PROPOSED RESTORATION FEATURES**
- 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)

roadstone WOOD
The Right Choice

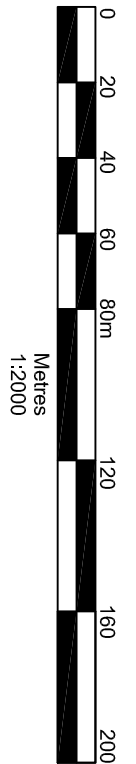
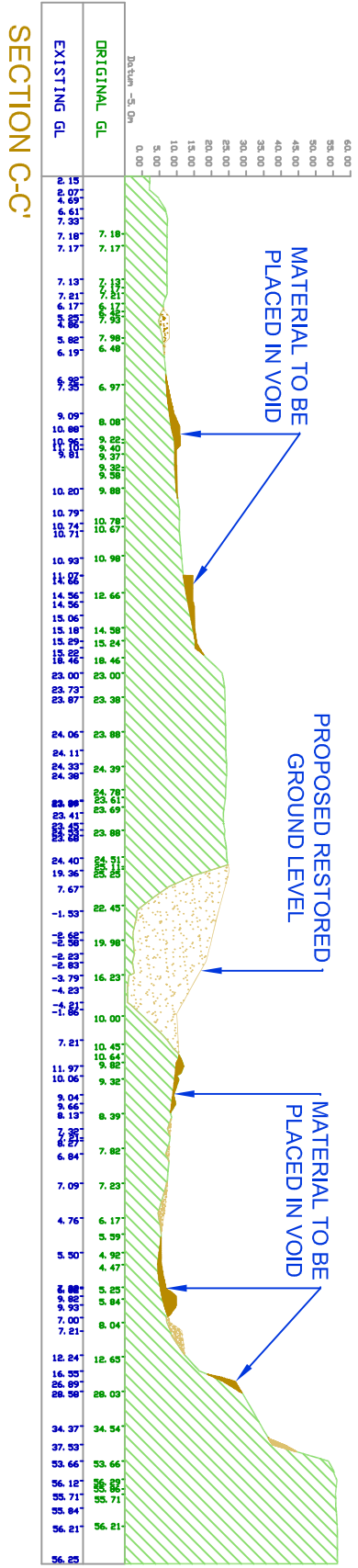
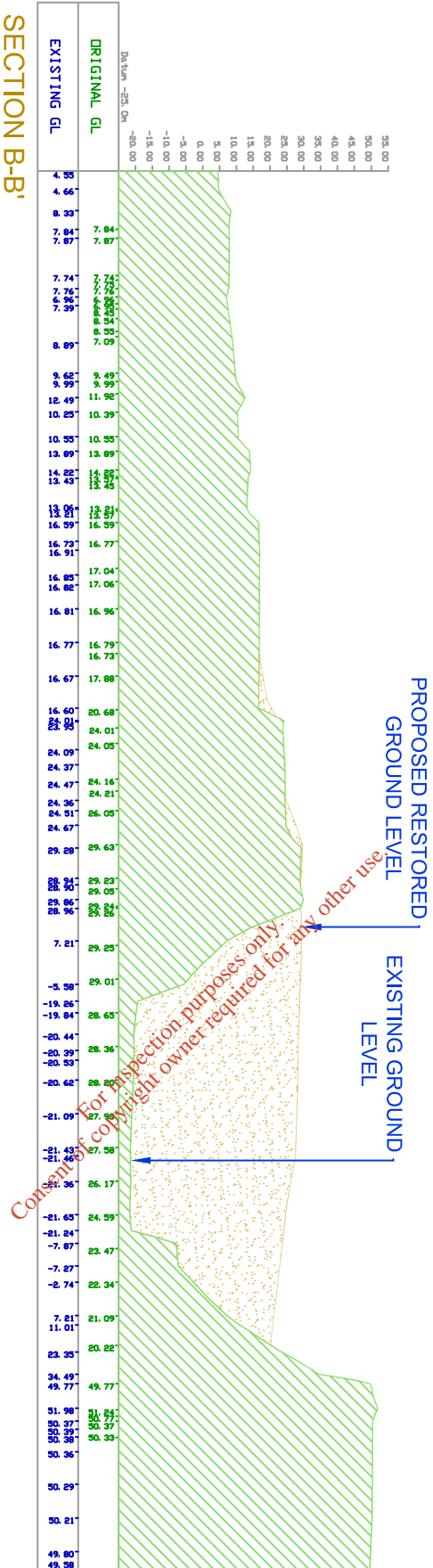
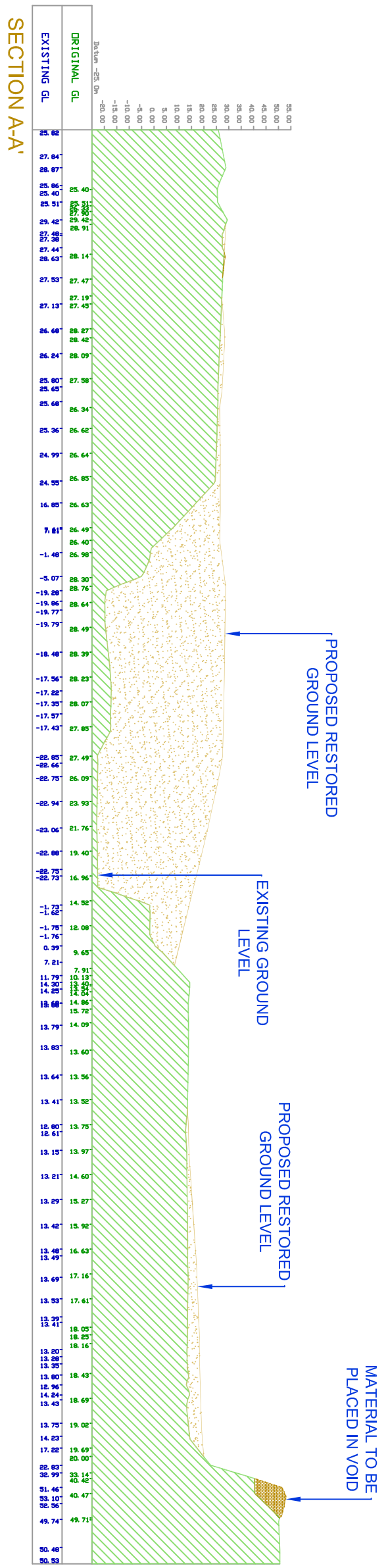
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ROADSTONE WOOD LTD.
CLOSURE AFTERCARE MANAGEMENT PLAN

WASTE RECOVERY FACILITY,
BROWNSWOOD, CO. WEXFORD
RESTORATION SURFACE

FIGURE 3

Scale 1:2,000 @ A3
Date AUGUST 2013



REFER TO FIGURE 2-4 FOR CROSS SECTION LOCATIONS



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ROADSTONE WOOD LTD.
 CLOSURE AFTERCARE MANAGEMENT PLAN
 WASTE RECOVERY FACILITY,
 BROWNSWOOD, CO. WEXFORD
 RESTORATION CROSS SECTIONS

FIGURE 4

Scale 1:2,000 @ A3 Date AUGUST 2013

ATTACHMENT F
ENVIRONMENTAL LIABILITIES RISK ASSESSMENT (ELRA)

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global environmental solutions

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

Environmental Liabilities Risk Assessment

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August 2013
SLR Ref: 501.00180.00065 ELRA Rev1

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1.0 INTRODUCTION AND BACKGROUND

1.1 Our Brief

SLR Consulting Ireland (SLR) was commissioned by Roadstone Wood to prepare an independent Environmental Liabilities Risk Assessment (ELRA) in relation to the company's proposed Inert Waste Recovery Facility to be established at its existing worked out quarry at Brownswood, Enniscorthy, Co. Wexford.

The ELRA has been requested, together with other information, by the Environmental Protection Agency (EPA) in order to ensure that the waste licence application for the proposed facility submitted in August 2011 (Ref. No. W0272-01) complies fully with the requirements of Article 12 of the Waste Management (Licensing) Regulations

1.2 About SLR Consulting

SLR Consulting is a major international multi-disciplinary environmental consultant, employing 900 staff in Ireland, the UK, North America, Australia and South Africa. In Ireland, the company trades as SLR Consulting Ireland, and employs around 30 environmental specialists, engineers and support staff at offices in Dublin and Hillsborough. Recent Clients of SLR include the European Union, national governments, government departments, international lending agencies, UK and Irish regional and local authorities / agencies, waste treatment technology providers and private sector waste management companies.

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

1.3 Site Description

The site of the proposed inert waste facility is located entirely within the townland of Brownswood, Co. Wexford, approximately 2.5km south of the town of Enniscorthy. Its location is shown on an extract from the 1:50,000 scale Discovery Series map of the area, reproduced as Figure 1 overleaf.

The application site lies entirely within a landholding identified as the 'Old Quarry'. It covers an area of approximately 8.3 hectares (20.0 acres) and comprises a worked out quarry largely developed in granodiorite rock, together with established site infrastructure.

The extent of the proposed application area seeks to avoid conflict with established land-uses and other on-site activities (including concrete, asphalt and block production areas), but includes access roadways and all shared infrastructure necessary to operate the proposed inert waste / soil recovery facility (including offices, wheelwash, weighbridge, maintenance sheds, hardstand areas etc.) The application 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.

A recent aerial view of the application 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 application area outlined in red.

Figure 1
Site Location

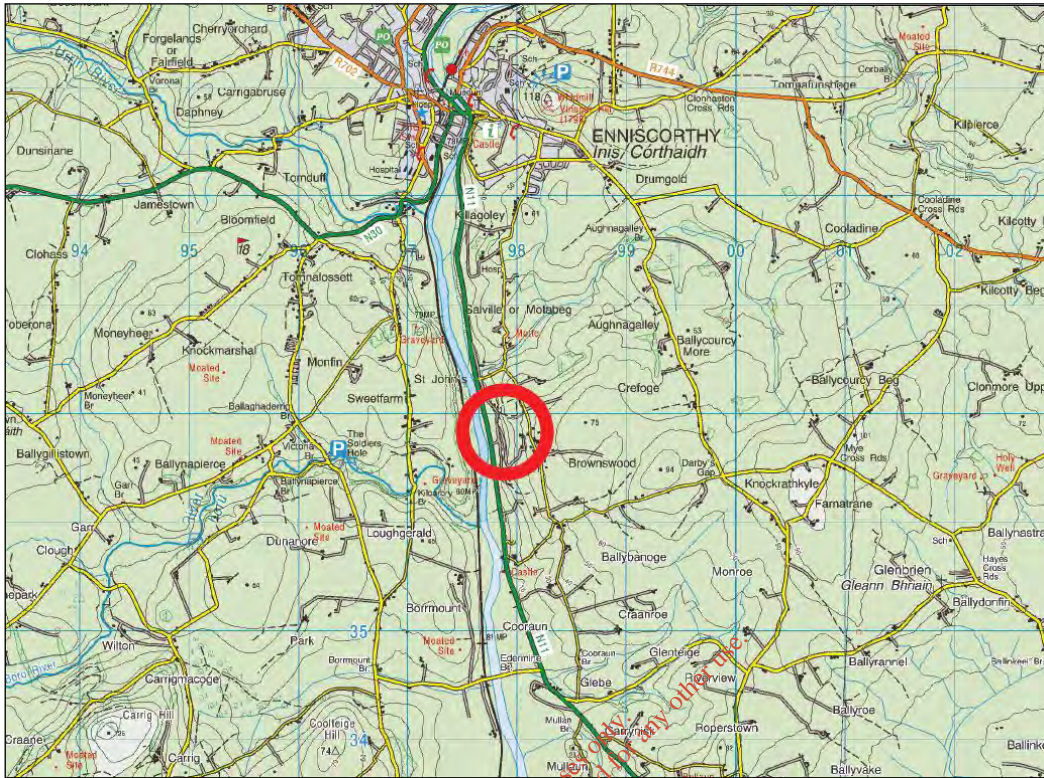


Figure 2
Aerial View of Application Site and Surrounding Land Use



Ground levels across the application site 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.

The former quarry void gradually filled with water once rock extraction activity ceased and dewatering pumps were turned off. The water level within the quarry void has risen from the former floor level of -22mOD to approximately 7.2mOD today and exhibits slight seasonal variation. The recorded groundwater level in the pond was slightly above that in the nearby River Slaney (approximately 5.5mOD) when levels were measured in June 2010.

No restoration works have been undertaken since rock extraction activities ceased at the quarry. Since extraction ceased at the Old Quarry, Roadstone Wood Ltd. has continued to excavate rock at another quarry immediately to the south of it, at a site known as 'Murphy's Quarry'. Rock excavated at this quarry is used to produce concrete, blocks and asphalt products within the Old Quarry, at areas immediately adjoining, but outside of, the proposed application area.

1.4 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 Wood Ltd. in 2003 for an eastward extension of the Old Quarry into these agricultural lands.

Existing land-use in the vicinity of the application site, including residential and commercial development, is shown 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 overleaf:

Figure 3
Oblique Aerial View of Existing Quarry



1.5 Waste Recovery Activities

The proposed inert waste recovery facility at the Old Quarry at Brownswood, Enniscorthy, Co. Wexford provides for the following:

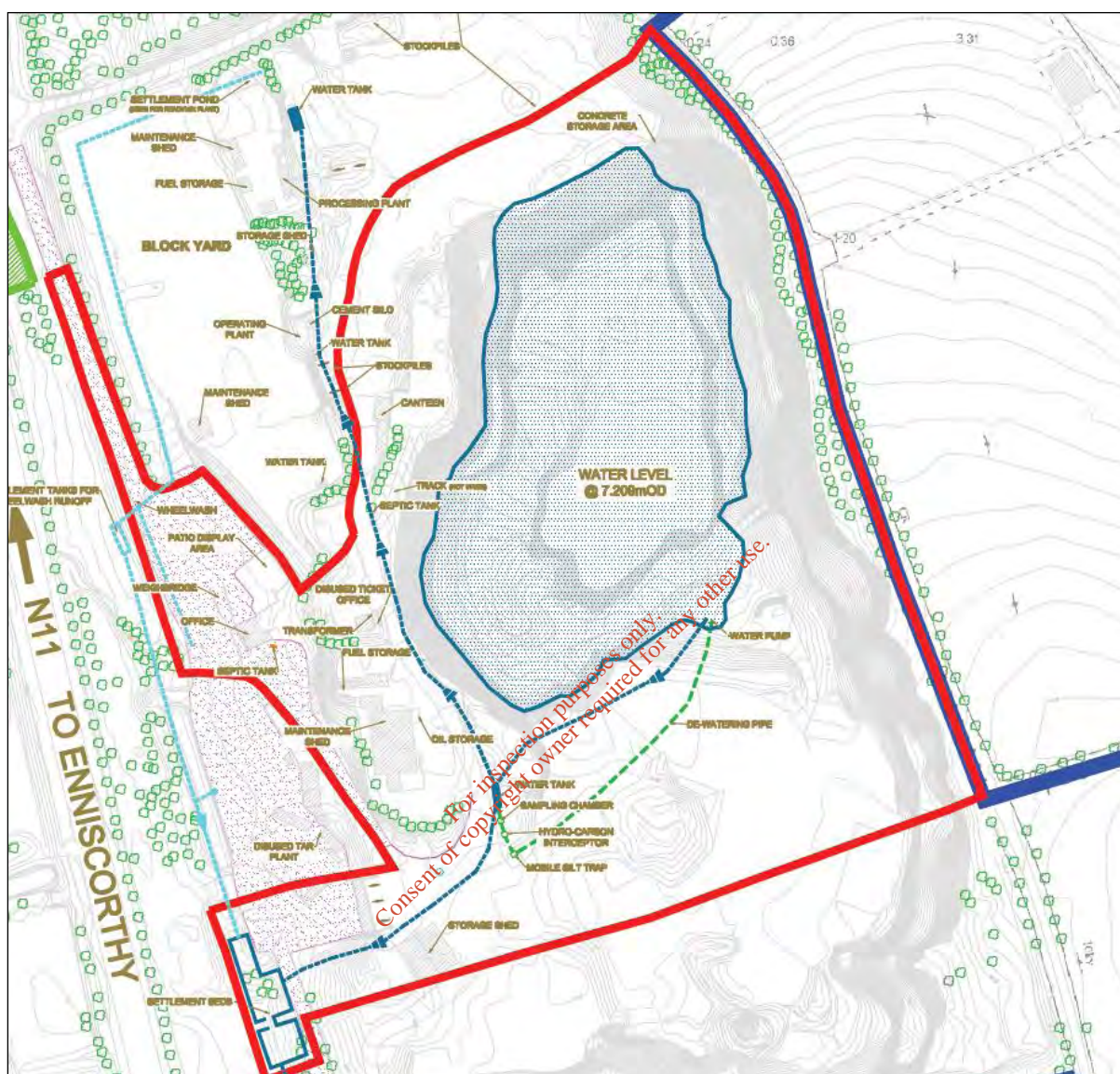
- Use of imported natural materials, principally excess inert soil, stones and/or broken rock excavated on construction sites, to backfill and restore a large existing void created by previous extraction of bedrock;
- Separation of any non-inert construction and demolition waste (principally metal, timber, PVC pipes and plastic) unintentionally imported to site, prior to removal off-site to appropriately licensed waste disposal or recovery facilities;
- Temporary stockpiling of topsoil and subsoil pending re-use as cover material for final restoration of the site;
- Restoration of the backfilled void (including placement of cover soils and seeding) and return to use as agricultural grassland; and
- Environmental monitoring of noise, dust, surface water and groundwater for the duration of the site restoration works and for a short aftercare period.

The proposed inert waste recovery facility at Brownswood is co-located with an existing concrete and asphalt production facility on the same land-holding. It is envisaged that the waste facility will share existing site infrastructure, including site offices, staff facilities, internal roads, weighbridge, environmental control / monitoring infrastructure and maintenance sheds.

The waste licence application envisages importation of up to 1,270,000 tonnes of soil and stones, 20,000 tonnes of topsoil and up to 10,000 tonnes of concrete, bricks, tiles and other inert construction and demolition wastes (for internal haul road construction). All wastes accepted at the proposed recovery facility will be subject to waste characterisation, compliance testing and verification testing to ensure that all wastes accepted at the facility are inert.

The layout of the proposed waste facility is shown on Figure 4 below.

Figure 4
Layout of Proposed Inert Waste Recovery Facility



The existing quarry void will only be backfilled using inert materials sourced from pre-approved external construction sites. Soil stockpiled in existing overburden mounds around the quarry will also be used to backfill the quarry void. No peat, contaminated soils or non-hazardous waste will be accepted at the proposed recovery facility.

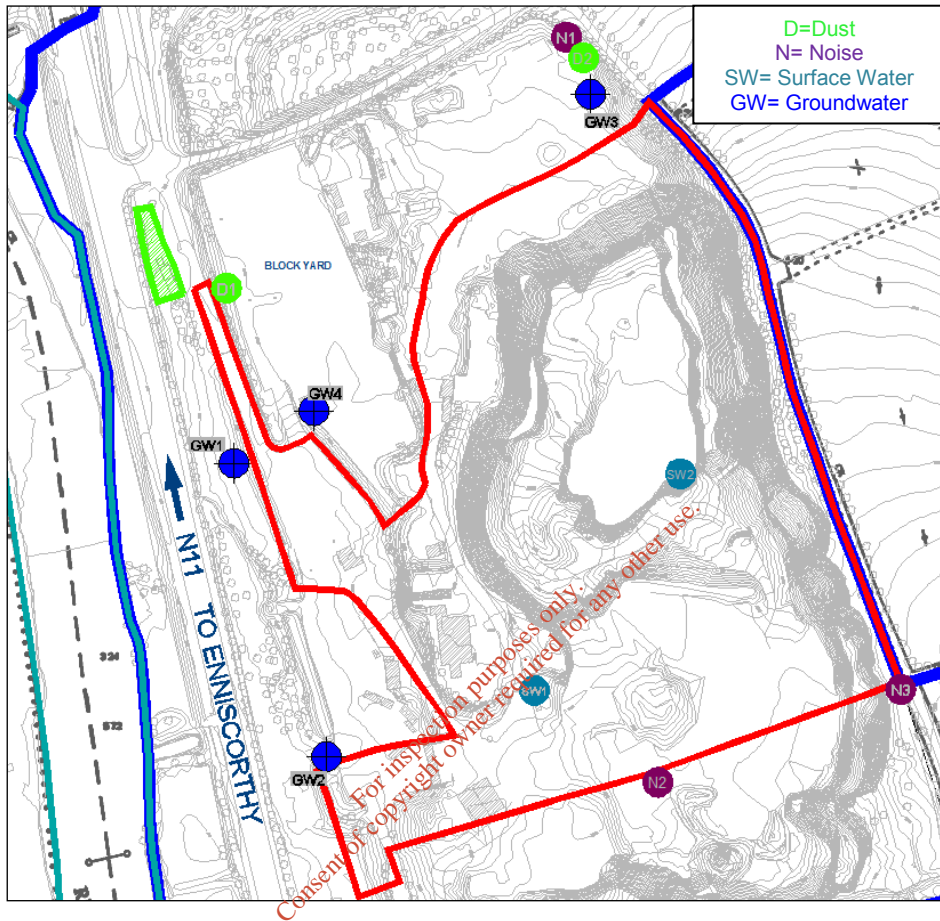
It is likely that relatively minor quantities of construction and demolition waste, principally oversize or recovered (ie. crushed and screened) concrete and bricks will be imported to the application site and used to construct temporary haul roads as and when required. Any non-inert construction and demolition waste will be removed off-site.

1.6 Site Monitoring

It is expected that any waste licence granted in respect of waste recovery activities at the application site will require monitoring for dust deposition, noise, surface water and groundwater at designated monitoring points strategically located on and around the site.

The proposed environmental monitoring locations, many of which are already extant and used for environmental management of concrete and asphalt production activities at the site are shown in Figure 5 below.

Figure 5
Site Detail and Monitoring Locations



2.0 INITIAL SCREENING AND OPERATIONAL RISK ASSESSMENT

2.1 Introduction

In order to determine the requirements for an Environmental Liability Risk Assessment (ELRA), a relatively simple risk assessment decision matrix is employed to classify the site into one of three risk categories. The specific requirements for an ELRA are dependent on the resultant risk classification.

The decision matrix used to determine the risk classification for the Brownswood waste recovery facility is that set out in Chapter 2 of EPA publication *Guidelines on Environmental Liability, Risk Assessment, Residuals Management Plans and Financial Provision*.¹ This decision matrix essentially looks at three key factors

- (i) Complexity : a factor which takes account of the extent and magnitude of potential hazards due to the operation of the waste facility. A complexity band is assigned to the waste facility on the basis of look-up table in Appendix B of the EPA guidance document. Complexity ratings range from G1 for the least complex site to G5 for the most complex.
- (ii) Environmental Sensitivity : a factor which takes account of the receiving environment in the immediate vicinity of the waste facility, with more sensitive locations given a higher score (due to proximity of aquifers, high quality surface water features or human receptors). Environmental sensitivity is assessed on a site specific basis using a matrix presented in Table 2.2 of the EPA guidance document.
- (iii) Compliance Record : a factor which takes account of the compliance history of the waste facility and whether activities carried on are in compliance with licence requirements and emission limits.

Each of the three factors assessed above is multiplied to give the total score for the waste facility and this is used to place it into an appropriate risk category (identified as Category 1 to Category 3), as outlined in Table 2.1 below.

Table 2-1
Risk Category

| Risk Category | Total Score |
|---------------|-------------|
| Category 1 | < 5 |
| Category 2 | 5 – 23 |
| Category 3 | > 23 |

Having determined the facility category, it is then possible to establish specific requirements for the ELRA and associated financial provisions.

¹ Guidance on Environmental Liability Risk Assessment, Residuals Management Plans and Financial Provision, EPA (OEE), 2006.

2.2 Complexity

The complexity band assigned to the Brownswood waste recovery facility is obtained from the look-up table in Appendix B of the EPA publication *Guidelines on Environmental Liability, Risk Assessment, Residuals Management Plans and Financial Provision*.

In this look-up table, Activity R4, recycling or reclamation of other inorganic materials, is classified as a Band G2 activity. This activity is equivalent to Activity R5 in the Fourth Schedule of the *Waste Management Acts 1996-2011*, recycling / reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials.²

A Band G2 activity is assigned a complexity factor of 2 by the EPA guidance document.

| |
|------------------------------|
| Complexity Factor = 2 |
|------------------------------|

2.3 Environmental Sensitivity

The environmental sensitivity of the waste recovery facility at Brownswood is assessed using a matrix presented in Table 2.2 of the EPA guidance document. This matrix assigns an environmental attribute score to the facility under six separate headings

- (i) Human occupation
- (ii) Groundwater protection
- (iii) Sensitivity of receiving waters
- (iv) Air quality and topography
- (v) Protected ecological sites and species
- (vi) Sensitive agricultural receptors

Applying the criteria set out in Table 2.2 of the EPA guidance document, the environmental attribute scores for the Brownswood facility for each of the six headings listed above are as shown underlined and bold in Table 2-2 below:

² The Third and Fourth Schedule of the Waste Management Act were amended in 2011 by S.I. No. 126/2011 - European Communities (Waste Directive) Regulations 2011. The EPA guidance on ELRA and the Waste Licence for the Brownswood facility were both based on the previous list of Recovery and Disposal Activities contained in the Third and Fourth Schedules to the Waste Management Act, rather than the recently amended list. For consistency with the EPA Guidance, the amended codes are not used in this report.

**Table 2-2
Environmental Sensitivity of the Brownswood Site**

| Environmental Attribute | Environmental Attribute Score |
|---|-------------------------------|
| Human Occupation¹ | |
| < 50m | 5 |
| 50m - 250m | 3 |
| 250m - 1000m | 1 |
| > 1km | 0 |
| Groundwater Protection^{2,3} | |
| Regionally Important Aquifer | 2 |
| Locally Important Aquifer | 1 |
| Poor Aquifer | 0 |
| Vulnerability Rating - Extreme | 3 |
| Vulnerability Rating - High | 2 |
| Vulnerability Rating - Moderate | 1 |
| Vulnerability Rating - Low | 0 |
| Sensitivity of Receiving Waters⁴ | |
| Class A | 3 |
| Class B | 2 |
| Class C | 1 |
| Class D | 0 |
| Designated Coastal & Estuarine Waters⁵ | 2 |
| Potentially Eutrophic Coastal & Estuarine Waters ⁶ | 1 |
| Air Quality & Topography | |
| Complex terrain ⁷ | 2 |
| Intermediate terrain⁸ | 1 |
| Simple terrain ⁹ | 0 |
| Protected Ecological Sites and Species¹⁰ | |
| Within or directly bordering species protected site | 2 |
| < 1km to protected site | 1 |
| > 1km from protected site | 0 |
| Sensitive Agricultural Receptors¹¹ | |
| Fruit, vegetable or dairy farming < 50m from the activity footprint | 2 |
| Fruit, vegetable or dairy farming 50m - 150m from the activity footprint | 1 |
| Fruit, vegetable or dairy farming > 150m from the activity footprint | 0 |
| Total Environmental Sensitivity Score for Brownswood Site = | 17 |

Notes *

1. Measured from activity/footprint to public or private occupied building
2. Groundwater Classifications according to DoELG, EPA, GSI Groundwater Protection Schemes (1999)
3. Aquifer Classification Score to be added to Groundwater Vulnerability Score
4. Site located within catchment of EPA Surface Water Classification (1996) or adjacent to transitional water body
5. Designated as Sensitive Areas UWWT Regulations (2001)
6. EPA (2002) Water Quality in Ireland 1998-2000
7. Generally elevated terrain such as a mountain or the side of a valley, where receptors are at elevations above the stack tip elevation, US EPA (2000) Meteorological Monitoring Guidance for Regulatory Modelling Applications
8. Intermediate terrain where the elevations of receptors lie between the stack tip elevation and the plume rise elevation, US EPA (2000) Meteorological Monitoring Guidance for Regulatory Modelling Applications
9. Relatively flat terrain, where receptor elevations are between stack base and the stack tip elevations, US EPA (2000) Meteorological Monitoring Guidance for Regulatory Modelling Applications
10. Distance from activity/footprint to protected areas designated as pNHA (Irish Wildlife Acts 1976, 2000), cSAC (Habitats Directive 1992) and/or SPA (Birds Directive 1979).
11. Distances derived from UK Department for Environment, Food and Rural Affairs (2003), Local Air Quality Management - Technical Guidance LAQM.TG(3)

** or more recent equivalent reference material*

Drawings and information supporting each of these assessments are available within the Environmental Impact Statement provided to the Agency in support of the waste licence application.

Adding the attribute scores identified above gives a total environmental attribute score of 17.

Applying the environmental sensitivity classification matrix set out in Table 2.3 of the EPA guidance document for a cumulative attribute score of 17, indicates that the overall environmental sensitivity of the site is 'high' (total score > 12) and that the corresponding environmental sensitivity factor is 3.

Environmental Sensitivity Factor = 3

2.4 Compliance Record of the Facility

The EPA guidance document indicates that the compliance factor for a newly licensed facility and those operating without non-compliance of emission limits (such as that at Brownswood) may be classified as a Compliant / New Facility and have a compliance factor of 1.

Compliance Factor = 1

2.5 Risk Category

We multiply the scores for Complexity (2), Environmental Sensitivity (3) and Compliance Record (1) and reach a total score of 6. This falls within Category 2 in the EPA guidance Table 2.1, reproduced on Table 2-3 below:

**Table 2-3
Risk Category for Brownswood Site**

| Risk Category | Total Score |
|-------------------|-------------|
| Category 1 | ≤ 5 |
| Category 2 | 5 – 23 |
| Category 3 | > 23 |

Risk Category = Category 2

Figure 1.1 of the EPA guidance document indicates that sites categorised under Risk Category 2 requires generic ELRA to be prepared to address potential unknown liabilities.

3.0 SITE SPECIFIC ELRA

3.1 Objectives and Scope

According to the EPA guidance document, the objectives of a site-specific ELRA are as follows:

- To identify and quantify environmental liabilities at the facility focusing on: unplanned, but possible and plausible events occurring during the operational phase;
- To calculate the value of financial provisions required to cover unknown liabilities;
- To identify suitable financial instruments to cover each of the financial provisions and
- To provide a mechanism to encourage continuous environmental improvement through the management of potential environmental risks.

The EPA advises that the ELRA should cover environmental risks which could lead to a potential or anticipated liability. Environmental risks will be deemed to cover all risks to: surface water, groundwater, atmosphere and land. Potential risks to the health of the general public are also included, but occupational risks to employees working at the site are excluded, these being addressed separately by occupational health, safety and welfare at work legislation.

3.2 Risk Classification and Identification

The EPA guidance recommends that risks are identified and classified following a 'Risk Management Workshop' involving the facility management, environmental manager and independent environmental consultant. SLR Consulting visited the site in August 2010 and on both occasions met with site staff to review the potential environmental management issues and potential environmental hazards arising at the site.

SLR is familiar with the established site activities at Brownswood and with the proposed restoration scheme and inert waste recovery activities to be undertaken at this site, having prepared the planning application and waste licence application (and accompanying EIS) in 2010.

3.2.1 Identification of Processes / Hazards

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

Normal site operations should not produce leachate or effluent as all waste materials to be imported and recovered (through disposal in the ground) at Brownswood will be inert. The Applicant fully recognises that its waste licence obligations will likely require it to regularly characterise and test the incoming wastes to confirm that only inert materials are accepted to the facility. Notwithstanding this, there is potential for discovery of non-inert or potentially hazardous materials, hidden within incoming loads of inert compliant waste.

Storage of hydrocarbons in tanks and drums on site is also identified as a potential hazard.

Each of these potential hazards is addressed individually below.

Noise

The planning permission for established activities at Roadstone Wood's Brownswood site (Ref. Q3) specifies a noise emission limit value of 55dB(A) at and beyond the quarry boundary during day-time, with a reduced limit of 45dB(A) during night-time. 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.

Any prospective waste licence issued in respect of waste activities at the proposed recovery facility is also likely to require the Applicant to undertake regular ambient noise monitoring at nominated locations and to present the results as part of an Annual Environmental Report (AER) to be prepared and submitted to the EPA.

The available noise monitoring data (presented in the Environmental Impact Statement accompanying the waste licence application) indicates that the average ambient noise levels in the immediate vicinity of the existing quarry vary from 43.4 dB(A) to 59.5 dB(A). 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.

Noise analyses presented in the EIS accompanying the waste licence application indicate that the proposed waste recovery activities, even under a worst-case scenario (with several activities being undertaken simultaneously), will not result in any increase in noise levels at nearby noise sensitive receptors (private residential properties to the east and south).

Dust

The planning permission for established site activities at Brownswood specifies an emission limit value for dust deposition (at off-site locations) of 350 mg/m²/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. A number of mitigation measures to control dust emissions are also prescribed by the planning permission (Condition 21).

Any prospective waste licence issued in respect of waste activities at the proposed recovery facility is also likely to require the Applicant to undertake regular monitoring of dust deposition at nominated locations and to present the results as part of an Annual Environmental Report (AER) to be prepared and submitted to the EPA.

The available dust monitoring records (presented in the Environmental Impact Statement accompanying the waste licence application) indicates that the average measured dust deposition levels around the perimeter of the existing quarry vary from <5 mg/m²/day (recorded in winter months) to a maximum of 184 mg/m²/day, comfortably within the prescribed emission limit value.

Analyses presented in the Environmental Impact Statement indicate that on account of the fact that the prevailing wind is from the south-west, only one residential property within 500m of the proposed waste recovery facility could potentially be affected by dust emissions for more than 10% of annual hours and when allowance is made for precipitation, this is further reduced by 60%. This limited unmitigated impact is currently reduced by implementation of dust suppression measures on an ongoing basis at the quarry.

The EIS concludes on the basis of existing monitoring data that continuation of existing site activities, including traffic movements will not give rise to dust emissions in excess of the threshold limit of 350 mg/m²/day.

Leachate

Although inert wastes will not cause contamination, there is a minor risk that not all soil waste imported to the site will be completely inert. The planning permission in respect of established activities at the Brownswood site requires monitoring of groundwater quality at the site.

There is currently little or no surface water run-off across the existing quarry site. Rain falling across the site currently either:

- percolates through unsealed ground into the underlying bedrock and ultimately intercepts groundwater, the upper surface of which lies at approximately the same level as the water in the worked out quarry void (once it is part of the groundwater body, the groundwater recharge follows regional groundwater flow toward the River Slaney);
- runs over unsealed ground into the existing (groundwater) pond in the worked out quarry void or
- runs-off westwards over areas of paved (sealed) ground around the existing block yard, office building and tar plant to be collected by existing surface water drainage infrastructure which carries it to settlement ponds in the south-western corner of the site and from there, discharges it to the River Slaney.

A trade discharge licence (Ref. No. SS/WO24/81/99R1) in respect of surface water run-off from the paved areas around the concrete and asphalt production facilities prescribes emission limits for defined contaminants and regular monitoring and reporting on the quality of the discharge to the nearby River Slaney.

Any prospective waste licence issued in respect of waste activities at the proposed recovery facility is also likely to require the Applicant to undertake regular monitoring of groundwater and surface water discharges at nominated locations and to present the results as part of an Annual Environmental Report (AER) to be prepared and submitted to the EPA.

The available groundwater quality data (presented in the Environmental Impact Statement accompanying the waste licence application) indicates that that its quality is generally good, and slightly alkaline. Elevated total coliforms and nitrate indicate some contamination of the water (organic pollution), from a human or agricultural source. There is no hydrocarbon pollution of the groundwater within the flooded quarry void.

Fuel Tank

The existing 50,000 litre fuel tank, located to the rear (north) of the maintenance shed, is a potential source of contamination to be considered in environmental risk assessment of this facility.

Minor spillages of diesel are usually addressed by treatment with absorbent material contained in spill-kits that are held on site as part of Roadstone Wood's existing Environment Management System (EMS). Larger spills of diesel, were they to arise, would most likely run-off over ground and if unimpeded, would generally discharged to ground, with possibly a minor proportion running downslope over existing paved areas and being collected by existing surface water drainage infrastructure.

Failure to contain a large diesel spill from the existing tank would result in contamination of the groundwater beneath the site and possibly some off-site discharge of hydrocarbon contamination, with the site owner liable for the clean-up costs in this scenario. The risk of such an occurrence will be assessed later in this report.

Tank and Drum Storage

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. These materials are stored over a paved concrete slab within the maintenance shed and in a lean-to along the eastern side of the maintenance shed.

Minor spills of these materials can be contained locally and cleaned using spill-kits held on site. Major spills are unlikely as the volumes are relatively small (generally ranging from 300 litre to 600 litre drums). However, if a volume is spilled and cannot be contained, it will percolate into the ground and could potentially contaminate the groundwater beneath the site.

3.2.2 Identification of Environmental Receptors

The processes and hazards described above have the potential to impact on environmental receptors such as those described below.

Employees or Other Site Users

Waste management facilities pose hazards to site operatives such as the risk of hearing injury from noise sources, respiratory issues associated with dust inhalation, exposure to hazardous chemicals or injuries from contact with vehicles, plant or machinery.

Residential Properties

The nearest occupied residential properties to the proposed waste recovery site are located approximately 200m and 250m beyond the existing eastern site boundary. Emissions of dust and noise from site processes have the potential to impact on the occupants of these houses.

Local Business

Other than agricultural (farm) enterprises immediately beyond the northern, eastern and southern boundaries of the existing quarry, there are no other known businesses operating in the immediate vicinity of the proposed waste recovery facility which would be considered sensitive to operational activities.

Groundwater

The Brownswood site is located on a locally important bedrock aquifer where flow is principally through fissures and fracture zones (classified as Rf). Groundwater at and around the site is classified as extremely vulnerable as rock is located at or close to the ground surface and in the absence of any significant clay overburden, there is potential for rapid movement of water (and potential contaminants) through the ground.

The bedrock underlying the proposed waste recovery site at Brownswood generally comprises granodiorite (with some greywacke mudstone / siltstones) which is untypical of the geology of the Campile Formation which generally consists of rhyolites and rhyolitic tuffs in slaty mudstones and occasional andesites and andesitic tuffs. The granodiorite at Brownswood Quarry is not as productive as other rocks within the Campile Formation and it is therefore considered to be an aquitard.

Groundwater levels recorded in the flooded quarry void and in a number of groundwater monitoring wells around the site between June and August 2010 indicate that the water table beneath the Old Quarry landholding falls from c.16mOD on its eastern side to c.2.5mOD, on its western side, close to the River Slaney.

The available groundwater quality data (presented in the Environmental Impact Statement accompanying the waste licence application) indicates that its quality is generally good, with some elevated total coliforms and nitrate indicating some contamination (organic pollution) from a human or agricultural source, with established extractive and/or added value activities at the site shown to have no significant impact on groundwater quality.

Surface Water

The nearest water body to the proposed waste recovery facility at Brownswood is the River Slaney, located immediately west and downslope of it and separated from it by the N11 National Primary Road.

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 intermediate quality for the period 2001-2005. Current river / transitional water quality data for the River Slaney adjacent to the site, published by the EPA, indicates that is of moderate status, with a Q Value of 3-4.

The latest results for monitoring undertaken for the purposes of the Water Framework Directive indicates that the River Slaney at the site has a high Dissolved Oxygen (DO) and Biological Oxygen Demand (BOD). Concentrations of Nitrogen and Phosphorus are both classified as moderate.

Ecological Designations

The River Slaney Valley Special Area of Conservation (SAC Site Ref. 000781) lies immediately downslope and west of the proposed waste recovery facility at Brownswood and the existing N11 National Primary Road and is contiguous to Roadstone Wood Ltd.'s landholding. At its closest point, the separation distance between the proposed facility and the SAC is just over 100m.

The River Slaney Valley is afforded protection 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. There are no Special Protection Areas (SPAs) or proposed Natural Heritage Areas (NHA's) within or immediately contiguous to the proposed application area or to Roadstone Wood Ltd.'s landholding.

Ecological surveys indicate that the riparian margins of the Slaney adjacent to the site at Brownswood are dominated by alluvial wet woodland and wet grassland / marsh habitat within the floodplain. The conservation value of these habitats is recognised with the designation of this section of the river within the Slaney River Valley cSAC

3.3 Assessment of Risks

All potential environmental risks associated with the facility, as identified by SLR, are listed in the Project Risk Register presented on Table 3-1 overleaf:

**Table 3-1
Project Risk Register**

| Risk Ref. No. | Potential Failure Mode/Risk |
|---------------|--|
| 1 | Excessive dust emissions from site processes |
| 2 | Excessive noise emissions from site processes |
| 3 | Contamination from non-inert non-compliant waste |
| 4 | Road fuel tank leak or spillage |
| 5 | Other minor hydrocarbon spill (mobile fuel tank, gas-oil, hydraulic oil, engine oil, transmission oil, waste oil etc.) |

Table 3-2 below provides a classification of risks in terms of likely occurrence and estimated severity, as detailed in the EPA Guidance manual.

**Table 3-2
Risk Classification Table**

| Rating | Occurrence | | Severity |
|--------|-------------|--|--------------------|
| | Description | Probability (%) (in a 30 year period) | Financial Cost |
| 1 | Very Low | 0-5 | 0 - €1,000 |
| 2 | Low | 5-10 | €1,000 - €10,000 |
| 3 | Medium | 10-20 | €10,000 - €50,000 |
| 4 | High | 20-50 | €50,000 - €100,000 |
| 5 | Very High | >50 | >€100,000 |

The Risk Assessment Table provided in Table 3-3 below assigns a 'Risk Score' to the risks identified in the Project Risk Register based on the likely occurrence and severity of the event. The Risks are then ranked on that basis of the most serious to the least serious.

At this point of the report, mitigation measures such as personnel protection equipment (ppe), staff training, spill kits, bunding, etc, are not considered when assessing the risks. These are addressed in the next section of this report, where use of such mitigation reduces the likely occurrence or severity of the risks.

**Table 3-3
Risk Assessment Table for Unmitigated Risks**

| Risk Ref. No. | Potential Failure Mode/Risk | Occurrence Rating | Severity Rating | Risk Score |
|---------------|---|-------------------|-----------------|------------|
| 1 | Excessive dust emissions from site processes | 3 | 3 | 9 |
| 2 | Excessive noise emissions from site processes | 3 | 3 | 9 |
| 3 | Contamination from non-inert non-compliant waste | 4 | 3 | 12 |
| 4 | Fuel tank leak or spillage | 4 | 5 | 20 |
| 5 | Other hydrocarbon spill (hydraulic oil, engine oil, gear/transmission oil, waste oil, etc.) | 4 | 4 | 16 |

The rationale behind the risk scores assigned above is as follows:

3.3.1 Excessive Dust Emissions from Site Processes:

Established activities at Brownswood appear not to have resulted in any excessive dust deposition problems and available monitoring data over a four year period (between 2007 and 2010) shows dust emissions levels at the quarry boundary well below the threshold limit value of 350mg/m²/day. It is expected that this environmental performance would continue over the life of the proposed waste recovery facility. However, a prolonged dry spell could result in dust nuisance, particularly if wind speeds were to rise at any stage. The likely future occurrence of such an incident, without mitigation, is therefore considered 'medium'.

High levels of dust can impact on the health of visitors to the site and to neighbours, depending on individual sensitivities. Making due allowances for this, we consider that the severity of such a potential impact is 'medium'.

3.3.2 Excessive Noise Emissions from Site Processes:

Established activities at Brownswood have not resulted in any significant increase in noise levels above existing ambient levels. Recorded exceedences of noise emission limits, where they occur, are considered to be principally as a result of high volume of traffic (and HGV's) travelling along the N11 National Primary Road immediately west of the quarry. Noise analysis indicates that the proposed waste recovery activities will not result in any increase in ambient noise levels.

Notwithstanding this, it is conceivable that during a very busy period noise levels could be higher. The noise sources from waste management operations on site potentially include a crusher working alongside a bulldozer and HGV vehicles. The resultant occurrence rating, without consideration of mitigation measures, is considered to be 'medium'.

High levels of noise emissions can be a nuisance to neighbours and can impair the hearing of visitors to site workers. Considering the existing separation distance and screening provided by the quarry void, the severity of such an occurrence, without mitigation, is considered 'medium'.

3.3.3 Contamination from Non-Inert Non-Compliant Waste

The Brownswood inert waste recovery facility will only be permitted to accept inert wastes and it is likely that any waste licence in respect of the activity will oblige the facility operator to regularly characterise and test the integrity of incoming wastes. In the absence of any waste acceptance and checking procedures, there is potential for non-conforming waste to be hidden unknowingly or undetected within compliant waste intake. The probability of contamination by non-compliant material is considered to be 'high'.

Non-compliant waste, were it imported to site, could include potentially hazardous substances, including hydrocarbons, but most likely this would only be in relatively small volumes. In view of this assessment therefore, the severity of contamination from such a source is considered 'medium'.

3.3.4 Fuel Tank Leak or Spill

At the present time, there is a 50,000 litre fuel tank located beside the maintenance shed at Brownswood. The tank, shown in Plate 1 overleaf, is located adjacent to a flat concrete slab where plant and machinery stands during re-fuelling. The tank has a double skin to provide protection against damage, reducing the potential risk of rupture and the consequences of any resultant escape of fuel.

Plate 1
Existing Double Skin 50,000 Litre Fuel Tank



Should fuel spill onto the paved concrete fuelling slab in front of the tank, it will enter the slab sub-surface drainage system and will be captured by a full retention petrol interceptor with any remaining run-off being discharged to ground via an effluent percolation system. Although the interceptor will contain some hydrocarbons, a discharge of a full 50,000 litre fuel tank would be too great a volume for the interceptor to retain. In this scenario, the operator may be able to arrest the discharge from the interceptor until such time as the fuel can be collected. Failure to contain the fuel would result in contamination of the groundwater beneath the site.

In the absence of any protective barrier around the fuel tank, the likely occurrence of a major fuel spillage during re-fuelling operations or after a potential impact from mobile site plant is considered to be 'high'. The impact of such a spillage may depend on the circumstances of the incident (whether fuel is captured by the sub-surface drainage system beneath the slab) and the mitigation measures put in place to deal with the incident.

In the absence of any mitigation, the severity of a 50,000 litre fuel spill into the bedrock and groundwater aquifer beneath the site and ultimately to the River Slaney Valley SAC is considered to be 'very high' as the potential clean-up costs could run to in excess of €100,000.

3.3.5 Other Hydrocarbon Spill

There are a number of other potentially hazardous substances stored at and around the maintenance shed at the existing quarry, principally the engine, hydraulic and gear oils and waste soil stored in the larger double skinned tanks located on an external concrete slab at a lean-to on the eastern side of the maintenance shed, as shown on Plate 2 overleaf. These tanks comprise

- A 600 litre tank of waste oil (double skinned).
- 3 No. tanks, each with a capacity of 300 litres to store engine oil, hydraulic oil and gear oil (all double skinned)

A number of small drums of various types of oil are also stored on a spill tray at this location.

Plate 2 Oil Storage Tanks to Side of Maintenance Shed



Smaller quantities of other oils and lubricants are kept within the maintenance shed and are generally protected against leaks by storing them on bunded pallets.

There is a risk that plant or machinery at the site vehicle could collide with the unprotected soil storage tanks in the lean-to on the side of the maintenance shed. There is also a risk that plant could topple or overturn some fuel / oil tanks within the maintenance shed. The risk of such an occurrence is considered 'high'.

A spill of up to 600 litres of hydraulic / fuel oil outside the maintenance shed could be would be expected to percolate to ground. A fuel spill inside the shed would fall initially onto a sealed concrete surface but could run or be carried by plant out of the shed onto unpaved ground. The severity of such an event is considered 'high' with potential clean-up costs of between €50,000 and €100,000.

3.4 Risk Matrix

The ranking of the unmitigated risks identified above can be visualised on a 'Risk Matrix' diagram, as presented on Table 3-4 below. In line with the EPA Guidance, the risks have been colour coded in the matrix to provide a broad indication of the critical nature of each risk. The colour code is as follows:

- Red – These are considered to be high-level risks requiring priority attention. These risks have the potential to be catastrophic and as such should be addressed quickly.
- Amber – These are medium-level risks requiring action, but are not as critical as a red coded risk.
- Green - These are lowest-level risks and indicate a need for continuing awareness and monitoring on a regular basis. Whilst they are currently low or minor risks, some have the potential to increase to medium or even high-level risks and must therefore be regularly monitored and if cost effective mitigation can be carried out to reduce the risk even further this should be pursued.

**Table 3-4
Risk Matrix of Unmitigated Risks**

| 30 year Probability % | | Ranking of Unmitigated Risks | | | | |
|-----------------------|---------------|------------------------------|----------------|-------------|-----------|----------------|
| | | >50% | Very High 5 | | | |
| 20%-50% | High 4 | | | 3 | 5 | 4 |
| 10%-20% | Medium 3 | | | 1, 2 | | |
| 5%-10% | Low 2 | | | | | |
| <5% | Very Low 1 | | | | | |
| Impact | | Very Low 1 | Low 2 | Medium 3 | High 4 | Very High 5 |
| Estimated Cost | | <€1k | €1-10k | €10-50k | €50-100k | >€100k |
| | | Severity | | | | |

The Risk Matrix shows that Risk No. 4 (fuel spill) and Risk No. 5 (other hydrocarbon / oil spill) require priority attention as they have the potential for a catastrophic outcome. The other risks are lower priority, but all can be improved by mitigation as described in the next section of this report.

Much of the proposed mitigation is either required by planning permission, or is likely to be required by a future waste licence issued by the EPA. In such circumstances, enforcement action can be initiated in the event of failure to implement the necessary mitigation measures.

3.5 Identification and Assessment of Mitigation Measures

The risk levels identified above can be mitigated in a number of ways as discussed below.

3.5.1 Excessive dust emissions from site processes:

Employees and visitors to site who are likely to be in the immediate vicinity of soils / materials which could potentially become air-borne will be issued with dust masks to minimise potential dust inhalation.

Where dust deposition at the site boundaries exceed, or are likely to exceed, the emission limit values set by the EPA in the waste licence, the existing site sprinkler system will be used to dampen more heavily worked / trafficked surfaces.

A wheelwash and vehicle wash is employed at the exit of the proposed waste recovery area and these lead to a surfaced local road. This appears effective in minimising dust emissions from vehicles exiting the site.

It is considered that these mitigation measures reduce the risk of occurrence of excessive dust emissions from 'medium' to 'low'.

3.5.2 Excessive Noise Emissions from Site Processes:

Employees and visitors to site that are likely to be in the vicinity of loud noise sources on site will be issued with ear protectors.

Where noise emissions from site based activities exceed, or are likely to exceed, the emission limit values at the site boundary, the facility operator will implement such further mitigation in the form of

- (i) improved working practices
- (ii) provision of additional sound barriers or
- (iii) improved performance of (or reduced sound output from) plant and machinery

as is necessary to comply with the required emission limit.

It is considered that these mitigation measures reduce the risk of occurrence of excessive dust emissions from 'medium' to 'low'.

3.5.3 Contamination from Non-inert Non-compliant Waste

If waste recovery activities re established at Brownswood, it is likely that the facility operator will be required regularly test the integrity of the incoming waste streams as a condition of the waste licence. The facility operator will need to satisfy itself that all wastes pre-approved for import to the site are demonstrably inert and are accepted into the facility in accordance with documented waste acceptance procedures.

The facility operator will maintain a high-level of awareness about the activities of the companies that deliver inert wastes to the facility and a high level of confidence about the source of the incoming wastes.

It is envisaged that the facility operator will provide a waste quarantine and contamination facility comprising a covered shed with mass concrete floor. Non compliant wastes can be safely stored at this location, prior to removal off-site for appropriate treatment, recovery or disposal at off-site authorised waste facilities.

It is considered that these mitigation measures reduce the risk of contamination from non-inert waste from 'high' to 'low'.

3.5.4 Fuel Tank Leak or Spillage

Should any leak or spill from the fuel tank be captured by the sub-surface drainage system beneath the paved concrete fuelling slab, it will be retained by an existing interceptor upstream of the effluent percolation area. This existing infrastructure will reduce the potential scale and impact of any leak or spill, were it ever to arise.

At the present time, there is no protection provided around the 50,000 litre double skin fuel tank. Accordingly, it is proposed to place protective concrete barriers around the fuel tank to prevent mobile plant from colliding into it. It is envisaged that this work will be undertaken as part of the proposed infrastructure works to be prior to commencing waste recovery activities

at this facility. It is also envisaged that regular visual inspection and integrity testing of the tank will be undertaken in order to identify small or otherwise undetected leaks.

The fuel pump fitted to the fuel tank is designed to cut-out when the fuel tank of the plant of machine being re-fuelled is full, thereby avoiding over-spill.

It is considered that these mitigation measures, when fully installed and maintained, will reduce the risk of a leak or spill from the fuel tank from 'high' to 'low'.

3.5.5 Other Hydrocarbon Spill

It is envisaged that further protective measures will be provided around the existing storage area for hydraulic / engine / waste oils at the lean-to on one side of the maintenance shed tank to prevent mobile plant from colliding into it. The operator will also improve the protection provided to other oil / fuel storage tanks within the maintenance shed in order to reduce the risk of mobile site plant colliding into them.

Spill kits comprising containment booms and absorbent materials are stored in the maintenance shed and are easily accessible in the event of a hydrocarbon spill or leak in the shed or from plant or machinery operating on the site.

Regular visual inspection and integrity testing of the smaller tanks and drums will be undertaken in order to identify small or otherwise undetected leaks.

It is considered that these mitigation measures, when fully installed and maintained will reduce the risk of a fuel spill from the tank from 'high' to 'low'.

3.6 Risk Reduction

By introducing the existing and recommended mitigation measures described above, the risks posed by the site activities are reduced. This risk reduction is detailed on Table 3-5 below where the resulting mitigated risks are assessed and ranked.

It is important that the facility operator implements all recommended mitigation measures to achieve the full risk reduction outlined in Table 3-5. Failure to do so will lead to risk levels that fall between the unmitigated and the mitigated positions.

**Table 3-5
Risk Reduction due to Existing and Proposed Mitigation Measures**

| RISK IDENTIFICATION | | | RISK ASSESSMENT | | | | | | |
|---------------------|---|---|-----------------|----------|------------|--|---------------|----------|------------|
| No. | Risk | Impact | BEFORE CONTROL | | | Mitigation Measures | AFTER CONTROL | | |
| | | | Occurrence | Severity | Risk Level | | Occurrence | Severity | Risk Level |
| 1 | Excessive dust emissions from site processes | Potential impact on the health of employees, visitors and neighbours. | 3 | 3 | 9 | Employees and visitors should be issued with dust masks. Surfaces should be damped down during prolonged dry spells to keep yards and roads dust free. A wheelwash and vehicle wash is employed at the exit of the waste facility and these lead to a paved local road. | 2 | 3 | 6 |
| 2 | Excessive noise emissions from site processes | Potential impact on the health of employees, visitors and neighbours. | 3 | 3 | 9 | Employees and visitors to be issued with ear protectors. Where noise emissions from the site are excessive, the facility operator should employ further mitigation in the form of improved working practices and/or better performing plant and machinery. | 2 | 3 | 6 |
| 3 | Contamination from non-inert non-compliant waste | Potential contamination of locally important gravel aquifer. | 4 | 3 | 12 | The facility operator should ensure that all wastes accepted at the site are inert. The facility operator should be aware of the activities of companies that deliver inert wastes to it and maintain a high level of confidence about source of incoming waste. | 2 | 3 | 6 |
| 4 | Fuel tank leak or spillage | Potential contamination of locally important gravel aquifer. | 4 | 5 | 20 | Sub-surface drainage at the adjoining paved concrete fuelling slab and an existing interceptor tank reduce the potential 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 should be readily accessible on site. Regular visual inspection and integrity testing of the tank will be undertaken to identify small or undetected leaks | 2 | 5 | 10 |

| RISK IDENTIFICATION | | | RISK ASSESSMENT | | | | | | |
|---------------------|--|--|-----------------|----------|------------|--|---------------|----------|------------|
| No. | Risk | Impact | BEFORE CONTROL | | | Mitigation Measures | AFTER CONTROL | | |
| | | | Occurrence | Severity | Risk Level | | Occurrence | Severity | Risk Level |
| 5 | Other hydrocarbon spill (hydraulic oil, engine oil, transmission oil, waste oil, etc.) | Potential contamination of locally important gravel aquifer. | 4 | 3 | 12 | The existing external soil storage tanks and any other oil / fuel storage tanks / drums within the maintenance shed to be protected by placing protective barriers around them to prevent mobile plant colliding with them. Spill kits comprising containment booms and absorbent materials should be readily accessible on site. Regular visual inspection and integrity testing of tanks and drums will be undertaken to identify small or undetected leaks. | 2 | 3 | 6 |

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The identified risks all fall within the green zone after mitigation. The two highest risks remain as No. 4 (fuel tank spill) and No.5 (other hydrocarbon / oil spill).

3.7 Mitigated Risks

Table 3-6 below shows the Risk Matrix for the facility after full mitigation is considered.

**Table 3-6
Risk Matrix of Mitigated Risks**

| 30 year Probability % | | Ranking of Mitigated Risks | | | | | |
|-----------------------|-----------------------|----------------------------|--------|----------|----------|-------------|-----------------|
| Occurrence | >50% | Very High 5 | | | | | |
| | 20%-50% | High 4 | | | | | |
| | 10%-20% | Medium 3 | | | | | |
| | 5%-10% | Low 2 | | | 1,2,3 | 5 | 4 |
| | <5% | Very Low 1 | | | | | |
| | Impact | Very Low 1 | Low 2 | Medium 3 | High 4 | Very High 5 | |
| | Estimated Cost | <€1k | €1-10k | €10-50k | €50-100k | >€100k | |
| | | | | | | | Severity |

Each of the identified risks has a reduced likelihood of occurrence in the mitigated scenario. Compliance with the waste licence and health and safety legislation should ensure that the identified risks stay within the Green Zone (Low Risk) in the Risk Matrix.

4.0 RISK MANAGEMENT

4.1 General

The risks identified in the previous section must be managed to ensure that they remain in the Green Zone (low risk) category. The mitigation identified in this report requires ongoing inspection and management. The site requires a Risk Management Programme, whereby risks are allocated to 'Risk Owners', who have responsibility for maintaining or improving mitigation measures that are needed to minimise the risks.

4.2 Risk Management Programme

Table 4-1 below allocates the identified mitigation measures to 'Risk Owners'. The facility operator site should maintain and update a version of this Table to inform the Risk Management Programme at the facility. The job titles may differ from those suggested below, depending on the staffing structure at the facility, but the Programme should include the names and position of the 'Risk Owners'.

**Table 4-1
Proposed Risk Mitigation Management Measures**

| Risk Owner | Mitigation Measure | Relevant Risk id | Mitigation Measure Completion Date |
|------------------------|--|------------------|------------------------------------|
| H&S Officer | Site operatives to be issued with dust masks. | 1 | |
| H&S Officer | Site operatives to be issued with ear protectors. | 2 | |
| Waste Facility Manager | Surfaces should be damped down during prolonged dry spells to keep yards and roads dust free | 1 | |
| Waste Facility Manager | Wheelwash and vehicle wash facilities should be maintained in working order | 1 | |
| Waste Facility Manager | Where noise emissions from the facility are excessive, the facility operator should employ further mitigation in the form of improved working practices, noise screening and/or better performance of / reduced sound output from plant and machinery. | 2 | |
| Waste Facility Manager | Ensure that all wastes accepted at the facility are inert. | 3 | |
| Waste Facility Manager | Be aware of the activities of the companies that deliver inert wastes to the facility and maintain a high level of confidence about the source of the incoming wastes. | 3 | |
| Waste Facility Manager | The fuel tanks should be properly banded and should be properly maintained and periodically tested (every 3 yrs). | 4 | |
| Waste Facility Manager | Spill kits comprising containment booms and absorbent materials should be maintained in good order and be easily accessible. | 4, 5 | |
| Waste Facility Manager | The operator should have a mechanism in place to block the pipe under the concrete plinth to contain diesel spills in the concrete production yard | 4 | |
| Waste Facility Manager | The facility operator should improve the bunding of any other oil / fuel storage tanks within the maintenance shed in order to reduce the risk of a spill | 5 | |

4.3 Risk Management Review

The Risk Management Programme is a dynamic process that must be updated to reflect changes that occur on site. 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 site. Additional mitigation measures can become available or better techniques developed. The staff structure can change and new responsibilities allocated to the site management team.

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5.0 ASSESSMENT OF POTENTIAL ENVIRONMENTAL LIABILITIES

5.1 Best Case Scenario

As regards potential environmental liability, in a best case scenario, the mitigation measures will succeed in preventing any environmental liability, so the cost to the facility operator will be zero.

5.2 Worst Case Scenarios

In the worst case scenario, 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 if proposed mitigation measures are fully implemented.

Given the nature of the wastes being handled and the location and configuration of office and storage facilities on site, the risks associated with a fire outbreak are considered minimal. Any fire at plant or the office should be covered by general insurance (of buildings and equipment). 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.

The worst-case environmental costs relate to

- the acceptance of non-inert waste that could contaminate the underlying regionally important bedrock aquifer or
- leakage / spillage of fuels that could also contaminate the underlying regionally important bedrock aquifer.

We have assessed these costs in each case on the basis that mitigation measures are either

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

As regards the importation of non-inert wastes, the computed site clean-up / remediation costs essentially provide for

- (i) the cost of ground investigation of recently imported waste (to identify source) (estimated cost €10,000) and
- (ii) the cost of excavation and removal of contaminated material for recovery or remediation at an appropriately licensed / permitted facility (€50,000). This provides for the excavation, handling and remediation of up to 500 tonnes of lightly contaminated soil, at a relatively conservative rate of €100 / tonne.

As regards the potential leak of a maximum of 50,000 (50m³) of fuel from the fuel tank, if is assumed (allowing for site topography and geology) that 80% of any release runs-off over the ground surface and 20% percolates to ground, the computed site clean-up and remediation costs essentially provide for

- (i) mobilising emergency response contractor to site for spill containment and site clean-up (€7,500);
- (ii) collection and removal off-site (as contaminated waste) of up to 200 tonnes of captured fuels, absorbent materials and soil (€20,000);
- (iii) the cost of ground investigation to delineate the extent of the area affected by the spill (estimated cost €15,000);
- (iv) the cost of constructing and commissioning several abstraction well(s) into the bedrock (€15,000);

- (v) installation and commissioning of 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 (€15,000);
- (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 (€30,000).

| Risk Identification | | Potential Environmental Impact | Remediation Required | Estimated Worst Case Remediation Cost |
|---------------------|--|---|-------------------------------|---------------------------------------|
| 3 | Contamination from non-inert waste or minor fuel spill | Contamination of surface water or groundwater | Soil and groundwater clean-up | €60,000 |
| 4 | Fuel tank leak or spillage | Contamination of surface water or groundwater | Soil and groundwater clean-up | €102,500 |

**Table 5-1
Environmental Liabilities – Worst Case Scenarios**

The cost of excavating and removing / remediating the 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 assumed it is unlikely the two extreme events will occur simultaneously and have accordingly recommended provision of €102,500 for remediation / evacuation of contaminated groundwater in the event of a large scale fuel spillage. It should however be recognised that following implementation of all mitigation measures, the probability of such an occurrence is considered low (5% to 10% in a 30 year period).

5.3 Most Likely Scenario

The most likely scenario is based on the median probability and severity for each risk after implementation of the Risk Management Programme as shown in Table 5-2 overleaf:

| Risk Identification | | Occurrence Rating | Probability | Severity Rating | Cost Range | Median Probability | Median Severity | Most Likely Scenario Cost |
|---------------------|--|-------------------|-------------|-----------------|--------------------|--------------------|-----------------|---------------------------|
| 1 | Excessive dust emissions | 2 | 5-10% | 3 | €10,000 - 50,000 | 7.5% | €30,000 | €2,250 |
| 2 | Excessive noise emissions | 2 | 5-10% | 3 | €10,000 - 50,000 | 7.5% | €30,000 | €2,250 |
| 3 | Contamination from non-inert waste | 2 | 5-10% | 3 | €10,000 - 50,000 | 7.5% | €30,000 | €2,250 |
| 4 | Fuel tank leak or spillage | 2 | 5-10% | 5 | €100,000 - 150,000 | 7.5% | €125,000 | €9,375 |
| 5 | Hydrocarbon spill (engine oil, hydraulic or waste oil) | 2 | 5-10% | 3 | €10,000 - 50,000 | 7.5% | €30,000 | €2,250 |
| | | | | | | | Total | €18,375 |

**Table 5-2
Environmental Liabilities – Most Likely Scenario**

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6.0 CONCLUSIONS

6.1 Financial Provision

6.1.1 Worst Case

In consideration of the worst case scenario, we recommend that the facility operator should have the following insurances in place as a minimum:

- Employers Liability – indemnified for at least €2 million (preferably higher).
- Public Liability – indemnified for at least €2 million (preferably higher).

In addition, the worst-case scenario could incur environmental liabilities and clean-up costs assessed at approximately €102,500 relating to potential groundwater contamination arising from placement of non-inert waste at the site or a potential fuel spill on site. Financial provision should be made for these environmental liabilities by means of Environmental Liability Insurance.

6.1.2 Most Likely Case

The 'Most Likely Scenario', as detailed in Table 5-2 above, incurs a total estimated environmental liability of €18,375. The facility operator (Roadstone Wood) must install and maintain all necessary infrastructure and implement required mitigation measures for this scenario to be realised. Failing this, the probability of occurrence of the identified risks is increased, together with the associated environmental liabilities.

It is considered that some of the calculated quantum (Items No.1 and 2 on Table 5-2 above) can be covered by Employee Liability and Public Liability insurance. The facility operator should therefore make provision to cover the remaining environmental liabilities itemised in Table 5-2 (No.3, No.4 and No.5).

This will entail making a financial provision of €13,875 under the 'most likely' scenario. In addition, the operator should make provision for any excess included in insurance policies.

6.1.3 Closure Plan Costs

The anticipated costs of the planned facility closure following completion of projected soil intake is €24,200 (present day value), as outlined in Table 1 of the Closure, Restoration and Aftercare Management Plan. Note that the closure 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.

6.1.4 Site Restoration and Aftercare Management Costs

The anticipated costs of the site restoration and aftercare management, outlined in Table 2 of the Closure, Restoration and Aftercare Management Plan, comes to a total of €31,900 (present day value). These costs are based on a projected 2 year aftercare management period, with no provision for long-term aftercare monitoring and maintenance thereafter.

6.2 Summary

In summary, the 'worst case' and 'most likely case' scenarios can be covered as follows:

Worst Case:

- Employers Liability Insurance – indemnified for at least €2 million.
- Public Liability Insurance – indemnified for at least €2 million.
- Environmental Liability or Contractors All-Risks insurance – indemnified for at least €2 million
- Provision for 'excess' in relation to insurance cover.

Most Likely Case:

- Employers Liability Insurance – indemnified for at least €2 million.
- Public Liability Insurance – indemnified for at least €2 million.
- Provide for 'excess' in relation to insurance cover.
- Provision for €13,875 environmental clean-up costs.
- Provision of €24,200 for site closure costs
- Provision of €31,900 for aftercare management costs.

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7.0 CLOSURE

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