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**Calary Quarry Inert Waste Recovery Facility
Killough Upper
Kilmacanogue
Co. Wicklow**

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

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CONTENTS

EXECUTIVE SUMMARY	1
1.0 INTRODUCTION.....	3
1.1 Calary Quarry Inert Waste Recovery Facility	3
1.2 Site Description	3
1.3 Planning Status - Former / Planned Activities	4
1.4 Classes of Licensed Waste Activities	5
1.5 Scope of this CRAMP	5
2.0 SITE EVALUATION	7
2.1 Operator Performance.....	7
2.2 Environmental Pathways and Sensitivity.....	9
2.3 Site Processes and Activities	12
2.4 Site Inventory / Infrastructure	12
2.5 Inventory of Raw Materials, Product and Waste.....	13
3.0 FACILITY CLOSURE.....	14
3.1 Closure Considerations.....	14
3.2 Criteria for Successful Closure.....	14
3.3 Closure Plan Costing.....	15
3.4 Closure Plan Update and Review	18
3.5 Closure Plan Implementation.....	18
3.6 Closure Plan Validation	18
4.0 FACILITY RESTORATION AND AFTERCARE	19
4.1 Facility Restoration.....	19
4.2 Backfilling / Earthworks / Grass Seeding.....	19
4.3 Aftercare Management	20
4.4 Restoration and Aftercare Management Costs.....	21
4.5 Assessed Costs	24
4.6 Financial Provision.....	24
5.0 REPORT CLOSURE.....	25

TABLES

Table 1 Inventory of Raw Materials, Products and Waste.....	13
Table 2 Waste Recovery Facility Closure Costs	16
Table 3 Restoration and Aftercare Costs (Based on 5 Year Aftercare Period)	22

FIGURES

Figure 1 Site Location Map
Figure 2 Surrounding Land Use
Figure 3 Site Infrastructure Layout Plan
Figure 4 Environmental Monitoring Locations
Figure 5 Restoration Plan
Figure 6 Restored Cross Sections

APPENDIX

Appendix A Verification Of Rates Provided

EXECUTIVE SUMMARY

Activity Details

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

Report Preparation

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

Overview of the Plan

This closure and restoration / aftercare management plan was prepared in accordance with the EPA publication, *Guidance on Assessing and Costing Environmental Liabilities (2014)*.

Scope

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

Cost Summary

As a result of this assessment, the total combined cost of the facility closure, restoration and aftercare management is calculated at **€1,025,458** (including contingency) of which €548,493 is for closure and €476,965 is for aftercare.

Financial Provision

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

Review

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

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1.0 INTRODUCTION

1.1 Calary Quarry Inert Waste Recovery Facility

Roadstone Ltd is applying to the Environmental Protection Agency (hereinafter 'EPA' or 'the Agency') for a waste licence in respect of a proposed inert waste recovery facility at Calary Quarry, in the townlands of Killough Upper and Glencap Commons Upper, Killmacanogue, Co. Wicklow. The principal waste activity at the application site will be the restoration of an existing quarry void using imported inert soil and stone.

The proposed waste recovery facility provides for

- Use of approximately 3,280,000 tonnes of imported inert natural materials, principally excess soil, stones and/or broken rock, to restore a large existing quarry by backfilling it to former ground level;
- Installation of temporary site infrastructure and services including, site office, staff welfare facilities, weighbridge (with dedicated office), wheelwash, settlement ponds, pumphouse, hardstand areas, fuel and water storage tanks, waste inspection and quarantine facility and storage sheds;
- Separation of any construction and demolition waste (principally concrete, metal, timber, PVC pipes and plastic) inadvertently imported to site prior to removal off-site to authorised waste disposal or recovery facilities;
- Temporary stockpiling of topsoil 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 establishment of a heathland / grassland habitat similar to that which existed prior to quarrying;
- Environmental monitoring of noise, dust, surface water and groundwater for the duration of the site restoration works and for a short period thereafter.

Roadstone envisages that the importation of inert materials to the quarry will average 250,000 tonnes per annum, with an annual maximum of 300,000 tonnes, and that this imported material will be largely sourced from external development or construction sites.

1.2 Site Description

The site to which this Closure and Aftercare Management Plan (CRAMP) relates is located entirely within the townlands of Killough Upper, and Glencap Commons Upper, approximately 2.3km south-west of Killmacanogue, Co, Wicklow and the junction of the R755 Regional Road and the N11 National Primary Road. It also lies approximately 4.4km south of the village of Enniskerry and approximately 7km south-west of Bray, Co. Wicklow. The location of the proposed facility is shown on an extract from a 1:50,000 Discovery Series Map of the area in Figure 1.

The application area comprises an existing quarry void and surrounding land covering an area of approximately 9.1 hectares (21.9 acres). It lies within a larger landholding extending to 25.4 hectares (61.2 acres) occupied by Roadstone Ltd. The extent of the application site and Roadstone's land interest are outlined in red and blue respectively on Figure 2.

The application site is bound to the west by the R755 Regional Road, to the north by scrubland, to the east by commonage / grazing land across the western slope of the Great Sugar Loaf and to the south by more scrubland. Lands immediately west of the R755 Regional Road comprise a mix of agricultural grassland and scrubland.

The wider area surrounding the application site is largely rural in nature and typically comprises agricultural enterprises or small rural based enterprises interspersed with occasional isolated residential properties or small residential clusters, principally along the local road network.

The closest residential properties to the site are Kilmac Farm, Bellevue Cottage and Sugar Loaf Farm, all of which occur immediately to the south of the application site. Existing land use around the proposed recovery facility is shown in Figure 2.

The total void space to be backfilled and restored by backfilling with inert soils at the recovery facility at Calary Quarry is approximately 1,830,000m³. The backfilled materials will be imported to the recovery facility from off-site locations and subject to a degree of compactive effort in order to maximise the overall capacity of the proposed recovery facility. A target compaction density of 1.8 t/m³ assumed for tonnage assessment purposes gives an overall requirement for approximately 3,300,000 tonnes of inert soil and/or subsoil.

Original (undisturbed) ground levels around the top of the existing quarry void generally fall from 285mOD to 290mOD on its eastern side, to between 250mOD and 260mOD on the western side. The planned infrastructure area servicing on-site activities is located at an area of relatively flat ground in the central western section of the quarry, at ground levels of between 245mOD and 247mOD, shown in Figure 3.

Since quarrying activities were suspended in 2010, dewatering has been discontinued at the quarry. Natural drainage (principally surface run-off from surrounding sloping ground and rainfall) has caused water levels in the quarry void to gradually rise, from a former floor level of approximately 220mOD to approximately 244mOD, indicating water in the quarry void is approximately 24m deep.

No restoration works have been undertaken at Calary Quarry since rock extraction activities and associated aggregate production were suspended at the quarry in 2010.

1.3 Planning Status - Former / Planned Activities

The excavation and blasting of limestone has been undertaken at Calary Quarry for many decades, and for much of this time, the quarry had the benefit of a pre- 1 October 1964 authorisation. In subsequent years, a number of applications for planning permission were submitted and granted in respect of various elements of site infrastructure.

As was required under Section 261 of the Planning and Development Act of 2000, Roadstone's activities at Calary Quarry were formally registered with Wicklow County Council (Ref. No. QY/31) in 2005. Having reviewed the information provided to it as part of the registration process, Wicklow County Council directed Roadstone to submit a planning application (accompanied by an Environmental Impact Statement) to provide for continued extraction activity at the site.

A planning application (Ref. 06/6189) and accompanying EIS were submitted in September 2006. In June 2007, Wicklow County Council decided to grant permission for the established quarry operation, subject to 30 No. conditions and refused to grant permission for a northwards extension, primarily due to concerns about the impact of the proposed extension on existing visual and tourism amenities. This split decision was upheld on appeal to An Bord Pleanála (ABP Ref. PL 27.224400).

Following a European Court Judgement against Ireland in 2008, which identified shortcomings in the State's transposition of the EU Environmental Impact Assessment (EIA) and Habitats Directives into Irish law, amending legislation ('Section 261A') was introduced via the Planning and Development (Amendment) Act of 2010 to ensure that the regulation and control of quarries had due regard to the requirements of the two Directives.

A review of the planning status of the quarry undertaken by Wicklow County Council in 2012, in accordance with the requirements of Section 261A, concluded that no further action was necessary to regularise the planning status of extraction related activities and achieve compliance with EU EIA and Habitats Directives (and that there was no requirement to lodge an application for a form of retrospective consent known as Substitute Consent to An Bord Pleanála).

A planning application in respect of the proposed restoration and backfilling of Calary Quarry was submitted to Wicklow County Council in late May 2016 and is currently under consideration by it (Ref. 16/574).

The proposed restoration and backfilling of the existing void at Calary Quarry using imported inert 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.

An effluent discharge licence dated 7th October 2008, was issued by Wicklow County Council to provide for controlled discharge of treated trade effluent to the Killough River, which flows to the west of the application site, along the floor of a valley formed by the west facing slope of the Great Sugar Loaf and the east facing slope of Long Hill. Following an appeal to An Bord Pleanála (Ref. 27.WW.378), a number of conditions attaching to the discharge licence were amended in December 2009.

The existing planning permission at Calary Quarry provides for limited re-grading and planting of existing quarry side slopes. Some limited progressive restoration of the southern quarry slopes was undertaken by Roadstone in the years 2007 to 2009 using imported inert soil and stone, at a time when the quarry was still operational. These activities were controlled by a waste facility permit (Ref No. ESS/15/8/12) issued by Wicklow County Council which subsequently expired in 2010.

1.4 Classes of Licensed Waste Activities

It is expected that any future waste licence issued to Roadstone by the Environmental Protection Agency (EPA) will provide for the following licensed activities (as per the Fourth Schedule of the Waste Management Acts 1996 (as amended) :

- Class R5 : Recycling / reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials (Principal Activity).
- Class R3: Recycling / reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes), which includes gasification and pyrolysis using the components as chemicals.
- Class R13: Storage of waste pending any of the operations numbered R 1 to R 12 (excluding temporary storage (being preliminary storage according to the definition of 'collection' in section 5(1)), pending collection, on the site where the waste is produced).

1.5 Scope of this CRAMP

In preparing this CRAMP, regard has been had to the following requirements which are generally specified by the Agency in its guidance publications and when issuing new or revised licences:

- *A scope statement for the plan;*
- *The criteria that define the successful decommissioning of the activity or part thereof, which ensures minimum impact on the environment;*
- *A programme to achieve the stated criteria;*
- *Where relevant, a test programme to demonstrate the successful implementation of the CRAMP; and*
- *Details of the costings for the plan and the financial provisions to underwrite those costs.*

The objective of this CRAMP is to ensure that on completion / cessation of the inert soil waste recovery activities at Calary Quarry, the former void will be backfilled and restored to a heathland / grassland habitat similar to that which existed prior to quarrying and will be substantially re-integrated into the surrounding protected landscape.

The scope of this CRAMP comprises:

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

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

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2.0 SITE EVALUATION

2.1 Operator Performance

2.1.1 Environmental Management Systems

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

2.1.2 Compliance History

As previously noted, the excavation and blasting of limestone has been undertaken at Calary Quarry for many decades and for much of this time, the quarry had the benefit of a pre- 1 October 1964 authorisation. Calary Quarry was operated in compliance with all relevant legislation and permits.

Neither Roadstone Ltd. nor any of its predecessor companies (which includes Roadstone Dublin, Roadstone Provinces and John A. Wood), has ever been convicted of any offence under the Waste Management Acts 1996 (as amended), the Environmental Protection Agency Act 2003, the Local Government (Water Pollution) Acts 1977 and 1990 or the Air Pollution Act 1987.

2.1.3 Incident History

No known environmental contamination incident has occurred at Calary Quarry.

2.1.4 Environmental Monitoring

Prior to the suspension of quarrying activities in 2010, an established programme of environmental monitoring was implemented at Calary Quarry while rock extraction and concrete production activities were ongoing. Environmental monitoring of surface water, groundwater, noise and dust was undertaken at designated locations across the licensed facility, at the locations indicated in Figure 4.

Roadstone previously operated an environmental management programme to monitor and manage emissions from the quarry site. That monitoring programme complied with the requirements set out in the Schedule of Conditions for the continued operation of Calary Quarry imposed by Wicklow County Council under the quarry registration process undertaken in accordance with Section 261 of the Planning and Development Acts. Environmental sampling, monitoring and testing was undertaken by in-house environmental staff and external consultants as required.

Emission limits for air (dust), noise and water emissions will be set by the EPA should it decide to issue a waste licence in respect of the proposed inert waste recovery facility at Calary Quarry.

Surface Water

The proposed inert waste recovery facility is located upslope, up-gradient and east of the Killough River, flows along the floor of a minor valley formed by the west-facing slope of the Great Sugar Loaf and the east-facing slope of Long Hill. It rises approximately 800m south-west of Calary Quarry, at an elevation of around 280mOD. It flows northwards and collects the flow from a tributary stream to the south of the application site as well as from the ditch running down the western slope of the Great Sugar Loaf which carries discharge waters from the quarry.

The Killough River is a tributary of the Dargle River and flows into it just over 3km north of the application site. The River Dargle enters the sea at Bray, Co. Wicklow and has been designated a “salmonid” river in accordance with national and EU legislation.

Currently almost all rain falling around the application site runs-off into the flooded quarry void. Prior to suspension of quarry operations, the water management system at the quarry comprised collection of rainfall run-off and groundwater in the sumps on the quarry floor and pumping it to a series of settlement tanks at a higher level for treatment, from whence it flows via off-site via a discharge pipe.

At a point approximately 200m further north, the discharge pipe emerges into a drainage ditch running along the western boundary of the application site and the eastern verge of the R755 Regional Road. This ditch also collects surface water run-off from the western slopes of the Sugar Loaf. After a short distance, this drainage ditch enters a culvert which carries the flow beneath the R755 and discharges to another ditch or tributary which runs downslope to the Killough River.

It is expected that the emission point to the tributary stream of the Killough River (designated SW1), located downstream of the proposed settlement ponds, grit trap and hydrocarbon interceptor, indicated in Figure 4, will be set as the control point for the recovery facility and that water quality will be monitored on a weekly / quarterly basis for prescribed parameters for the duration of the proposed waste recovery activities.

Groundwater

The bedrock formations at and around Calary Quarry generally have very low permeability and are categorised as Poor Aquifers (PI) by the Geological Survey of Ireland. These are bedrocks which are generally unproductive except in local (fractured) zones. Maps published by the EPA indicate that the site is located in an area with high to extreme groundwater vulnerability status. This reflects the potential for rapid groundwater movement through thin (or non-existent) soil cover into the underlying (poor) bedrock aquifer.

There is an existing sewage / wastewater system (septic tank) and associated effluent treatment facility at the application site at Calary Quarry. This system previously treated wastewater from staff welfare facilities when the quarry was operational. It is envisaged that it will be brought back into service for the duration of the proposed soil waste recovery activities and that all sinks and toilet facilities will be plumbed and connected directly to the septic tank and associated effluent treatment facility. The location of these facilities and the existing on-site septic tank servicing them are shown in Figure 3.

Previous sampling and testing of groundwater from monitoring wells at Calary Quarry indicates that groundwater quality at the application site is generally good and that former quarry operations had no significant impact on local groundwater quality. It is expected that groundwater quality at the application site will be monitored on a monthly / quarterly basis at the existing groundwater wells, at the locations shown in Figure 4, for the duration of the proposed waste recovery activities.

Dust

Calary Quarry previously operated an Environmental Management System (EMS) which applied an emission limit value for dust deposition (at the site boundary) of 350 mg/m²/day (30 day composite sample) when measured using the conventional ‘Bergerhoff’ method.

Atmospheric emissions generated by former quarry activities primarily comprised dust emissions from rock extraction, aggregate processing activities, vehicle exhaust emissions, traffic to and from the R755 Regional Road and heavy goods vehicle (HGV) / truck movements on unpaved roads around the quarry site.

Dust emissions were previously monitored using Bergerhoff dust gauges at two locations (D1 and D2) around the quarry, shown on Figure 4, closest to emission sources and/or potentially sensitive receptors beyond the property boundary.

At the time quarrying and production of construction materials was underway, monitoring data indicated that total dust deposition rates along the boundary of the site was comfortably below the threshold limit of 350 mg/m²/day.

It is envisaged that these dust monitoring stations (plus an additional one, D3) will be monitored at the locations shown in Figure 4 for the duration of the proposed waste recovery activities and that the dust deposition limit will be 350 mg/m²/day, similar to that at existing licensed soil waste recovery facilities.

Noise

Calary Quarry previously operated an Environmental Management System (EMS) which applied noise emission limit values of 55 dB(A) LAeq at the property boundary during day-time hours, with a reduced limit of 45 dB(A) LAeq during night-time hours.

Noise emissions were monitored at 4 No. locations (N1, N2, N3 and N4) across the quarry, shown on Figure 4. Monitoring points were located closest to emission sources and/or potentially sensitive receptors beyond the property boundary and indicated that noise levels around the quarry were occasionally elevated above the permissible limits, principally on account of intermittent noise generated by traffic movements along the nearby R755 Regional Road.

The principal noise impact associated with the operation of the inert soil waste recovery facility will be the increased noise generated by moving HGV trucks and/or earthworks equipment during daytime hours (07:00 to 18:00 hrs). No recovery operations or traffic movements will be undertaken at the recovery facility outside of these hours.

It is envisaged that these noise monitoring stations will be monitored for the duration of the proposed waste recovery activities and that any waste licence issued in respect of the proposed recovery facility will specify noise monitoring techniques, monitoring frequencies and day-time, evening-time and night-time emission limits.

2.2 Environmental Pathways and Sensitivity

2.2.1 Geology

Topsoil (the upper layer of soil capable of sustaining vegetation and crop growth) and subsoil was previously stripped across the recovery facility in order to facilitate quarry development. The Teagasc / IFS soil map of the area identifies three soil types around the application site, namely shallow well drained mineral soils (AminSW), shallow / rocky / peaty soils (AminSRPT) and deep, well drained mineral soils (AminDW). Each of these soil types are classified as acidic (ie. derived from mainly non-calcareous parent materials).

The GSI quaternary / subsoil map of the area indicates that the valley to the west of the existing quarry (downslope, on the opposite side of the R755 Regional Road) is underlain by glacial till, with quartzite as the dominant clast type. It is likely that this material extends upslope, gradually thinning out as it approaches the R755. The subsoil map also indicates outcrop or subcrop occurring around the site, which is consistent with exposures visible in adjoining fields.

Calary Quarry is underlain by rocks of the Bray Head Formation. The lithologies consist of a sequence of greywackes, sandstones and shales overlain by indurated quartzites. The quartzites form the higher ground in the area, typified by the Great Sugar Loaf. The current Wicklow County Development Plan identifies the Sugar Loaf as a site of geological and geomorphological interest, largely on account of its weathered / scree slopes.

The unexcavated land surrounding the quarry void is largely underlain by glacial till with quartzite as the predominant clast (cobble) type. The thickness of the glacial till can be seen in face exposures to thin with increased elevation toward the peak of the Great Sugar Loaf.

2.2.2 Hydrology

As previously noted, the Killough River rises approximately 800m south-west of Calary Quarry, at an elevation of around 280mOD and flows northward toward the Dargle River, collecting flow from tributaries that flow down the western flank of the Great Sugar Loaf, including that which carries surface water run-off collecting in the void at Calary Quarry. The catchment area of the Killough River, upstream of its confluence with the tributary carrying discharge from the quarry is approximately 1.8 km².

Intermittent (temporary) springs can be seen along fractures on the exposed rock faces at the quarry. At the time the quarry was operational and being dewatered, the quarry floor was generally dry, with spring flows generally only emerging on the north-eastern and southern faces of the quarry after heavy rainfall.

Surface water runoff and shallow groundwater flow entering the application site is restricted by a number of features. As well as the drain along the R755 on the western side of the application site, there is also a drain along the eastern boundary which runs south and discharges into a small stream located to the south of the quarry.

The only surface run-off and shallow groundwater flow into the application site occurs along the northern section of the eastern boundary (which extends for approximately 350m). Consequently, water management at the application site is only required to manage surface run-off generated by rainfall directly over the quarried area, the surface water inflow along the northern part of the eastern boundary and the low volume groundwater seepage into the excavation.

As part of Ireland's obligations under the Water Framework Directive, a River Basin Management Plan (RBMP) has been prepared for the Killough River. The current plan for 2009-2015 indicates that the Killough River water body is part of the Dargle water management unit, that its status is "Moderate" and that the water body is "at risk" due to diffuse pollution inputs across the catchment. The plan notes that the water body unit is not heavily modified and sets an objective for the water body to be restored to "Good" Status by 2027. Surface water samples have previously been taken from the Killough River downstream of the quarry discharge. The test results for these samples indicated acceptable water quality standards at the time of testing.

The Office of Public Works website (www.floodmaps.ie) indicates that there are no records of historic flood events on or in the vicinity of the site. Previously, surface water run-off and discharges at the site are managed on a continual basis so that they do not increase the risk of flooding in the surrounding area.

2.2.3 Hydrogeology

The rocks of the Devil's Glen and Bray Head Formations generally have very low permeability and are categorised as Poor Aquifers (PI) by the GSI i.e. bedrock which is generally unproductive except for local zones. Across the quarry footprint, all overburden cover has been removed and bedrock is exposed. On this basis, groundwater vulnerability at the application site is classified as extreme, principally because rock occurs at the surface.

Calary Quarry is indicated to lie within the Wicklow Groundwater Body (GWB), for which the Geological Survey of Ireland has prepared an initial characterisation study. This study suggests that the majority of the flow within this groundwater body will occur in the upper few metres, mainly in the weathered zone, in a lateral direction towards rivers and springs.

The dominant recharge process is diffuse recharge from water percolating through overlying glacial till, into the weathered zone. Higher rates of potential recharge are often expected in hilly areas due to thin subsoils, rock exposure close to the surface and high rainfall. In this area however, a large proportion of this potential recharge is rejected because the rocks are poor aquifers (with low storage capacity) and because steeply sloping ground increases surface water run-off.

At Calary Quarry, groundwater flow occurs mostly in a shallow upper weathered zone, though deeper groundwater flow is possible along fractures, joints and major faults. Recharge occurs diffusely through subsoils and via rock outcrops. Although the presence of rock close to the surface would suggest high potential recharge, this does not arise due to the effect of rejected recharge from the low permeability rock. The aquifers within the groundwater body are generally unconfined, but may become locally confined where the subsoil is thicker and/or of lower permeability. Groundwater flow around Calary Quarry is considered to recharge and discharge on a local scale.

2.2.4 Sensitive Receptors

The most sensitive ecological receptor in the vicinity of Calary Quarry is the Killough River. A discharge drain flows downslope and in a westerly direction for a short distance (approximately 250m) before entering the river. As previously noted, the Killough River is a tributary of the Dargle River which is a significant Salmon and Sea Trout fishery and has been designated a “salmonid” river in accordance with EU Directive 78/659/EEC (Quality of Fresh Waters Needing Protection or Improvement in Order to Support Fish Life).

The bedrock aquifer underlying the site is also considered as a sensitive receptor. The rocks of the Devil’s Glen and Bray Head Formations generally have very low permeability and are categorised as Poor Aquifers (PI) by the GSI i.e. bedrock which is generally unproductive except for local zones.

The GSI national well database (www.gsi.ie) shows a number of wells in the immediate vicinity of the site (<1km) which are principally associated with domestic dwellings in the surrounding area. The boreholes have a yield class which is classified as *poor to moderate*.

Dwellings within the vicinity of the site generally comprise farmsteads, one off housing and isolated development along the primary and local road network. The nearest dwellings to the landholding site boundary are located to the south, west, and north of the site with the closest dwelling 195m to the south of the site. For the purposes of this assessment, site users, operatives and visitors are also considered as receptors.

There are no internationally designated nature conservation sites within 2km radius of the site. The Great Sugar Loaf, immediately east of the application site is a proposed National Heritage Area (pNHA) and contains features of both ecological and geological value and interest, with the exposed rocky outcrops and areas of scree on the mountain slopes supporting dry mountain heath and upland grassland habitats.

2.2.5 Pathways

The only surface water emission from the proposed waste recovery facility will be the off-site discharge to the existing drainage channel which leads to the tributary stream flowing to the Killough River. It is envisaged that all surface water run-off collected across the proposed recovery facility will pass through settlement ponds, grit trap and hydrocarbon interceptor prior to being discharged off-site via the existing ditch and tributary stream leading to the Killough River. The quality of this run-off could be adversely impacted if it comes into contact with loose sediment, hazardous materials or contaminated ground. Water quality is a key indicator of environmental performance and as such, the proposed on-site / off-site surface water management infrastructure is a critical environmental pathway for the facility.

Some rainfall across the site percolates down through the unsaturated zone (in soil / rock close to the ground surface) and recharges to the underlying poorly productive aquifer. In the event that some contamination of near-surface soil or ground occurs, this recharge can introduce contaminants to the groundwater body and have an adverse impact on its quality and resource potential (though this is already low given the low permeability and low yields obtained from these formations). As such, groundwater recharge through the ground is another critical environmental pathway for the facility.

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

2.3 Site Processes and Activities

The waste licence application provided for the placement, compaction and capping of approximately 1,830,000m³ of inert soil and rock. Of this approximately 10,000m³ will be sourced from existing overburden stockpiles around the quarry, leaving a net import requirement of approximately 1,820,000m³. The inert soil and rock to be placed and recovered at this facility will be sourced from construction and demolition sites where inspection and/or testing has indicated that no contamination is present. The inert materials will be imported by permitted waste contractors.

The quarry restoration scheme at Calary Quarry provides for:

- (i) Use of approximately 3,280,000 tonnes of imported inert natural materials, principally excess soil, stones and/or broken rock, to restore a large existing quarry by backfilling it to former ground level;
- (ii) Installation of temporary site infrastructure and services including, site office, staff welfare facilities, weighbridge (with dedicated office), wheelwash, settlement ponds, pumphouse, hardstand areas, fuel and water storage tanks, waste inspection and quarantine facility and storage sheds;
- (iii) Separation of any construction and demolition waste (principally concrete, metal, timber, PVC pipes and plastic) inadvertently imported to site prior to removal off-site to authorised waste disposal or recovery facilities;
- (iv) Temporary stockpiling of topsoil pending re-use as cover material for final restoration of the site;
- (v) Restoration of the backfilled void (including placement of cover soils and seeding) and establishment of a heathland / grassland habitat similar to that which existed prior to quarrying;
- (vi) Environmental monitoring of noise, dust, surface water and groundwater for the duration of the site restoration works and for a short period thereafter.

The existing void will only be infilled using inert soil materials imported from pre-approved external construction sites. No peat, contaminated soils, construction and demolition waste or non-hazardous waste will be accepted at the recovery facility. Any non-inert construction and demolition waste will be removed off-site.

2.4 Site Inventory / Infrastructure

The site facilities and fixed infrastructure at the recovery facility at Calary Quarry are listed below.

- **Buildings:** site office, storage shed, weighbridge office, waste quarantine and inspection area.
- **Site Security:** security gates at the existing site access point are closed at all times when the site is not operational.
- **Fixed Infrastructure:** paved / unpaved internal road network; paved employee and visitor parking areas, hardstanding, weighbridge, fuel / oil storage facilities and proposed wheelwash facility (including pumphouse and settlement / water recirculation pond).
- **Services:** overhead electricity wires, septic tank, effluent treatment area, sewerage pipework (serving welfare facilities) and water supply pipework (connected to groundwater supply well);

- Surface Water: sumps, pipelines, drains, proposed settlement ponds, grit trap and hydrocarbon interceptor;
- Plant and Machinery: mechanical excavators; bulldozers; pumps.

2.5 Inventory of Raw Materials, Product and Waste

At the present time, it is envisaged that there will be minimal storage of raw materials and products at the recovery facility. All site based plant (excavators / bulldozer) will be refuelled on hardstanding areas from on-site fuel storage tanks and/or directly from refuelling lorries. Insofar as feasible, routine maintenance of plant or equipment will be undertaken on site over sealed (concrete paved) areas. As and when necessary however, plant servicing will be undertaken off-site, at other Roadstone or third party facilities.

Table 1 below provides an outline inventory of the raw materials, products and waste likely to be stored at the recovery facility. Most of the materials stored are oils, fuels and lubricants required for limited maintenance and repair of plant and equipment used in recovery activities.

Table 1
Inventory of Raw Materials, Products and Waste

Type	Storage Area	Storage Type	Maximum Storage Capacity	Measurement Unit
Marked Diesel (Gasoil)	External Tank	Bunded Tank	20,000	Litres
Diesel Engine Lubricant	Maintenance Shed	Drum Spill Pallets or Bunded Area	1,000	Litres
Hydraulic Oil	Maintenance Shed	Drum Spill Pallets or Bunded Area	1,000	Litres
Transmission Fluid	Maintenance Shed	Drum Spill Pallets or Bunded Area	500	Litres
Waste Oil	Maintenance Shed	Drum Spill Pallets or Bunded Area	1,000	Litres

3.0 FACILITY CLOSURE

3.1 Closure Considerations

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

On suspension or unplanned cessation of waste recovery activities:

- the landform within the quarry void will be graded, rolled and compacted to create a uniform stable surface (flat or at shallow slope angle);
- any temporary settlement ponds at the base of the filling area will be dewatered and infilled with inert soil and stone;
- all mobile plant and equipment associated with the backfilling, placement and compaction of backfilled materials will be removed off-site;
- any dedicated water pumping and transmission infrastructure (flexible piping carrying surface water run-off and dewatered groundwater) will be maintained in place and operated for a 24 month period following facility closure;
- the dedicated grit trap / hydrocarbon interceptor will be emptied and decontaminated; deposited silts will be removed from the wheelwash and the septic tank will be desludged. All wastes arising will be transferred off-site to appropriately licensed waste disposal or recovery facilities;
- any unused oil and fuel storage tanks will be emptied and decontaminated. Any drums / IBC's holding unused oil and fuel will be removed off-site and used elsewhere;
- any unused oils, greases, lubricants, chemicals stored in the maintenance shed will be removed off-site and re-used elsewhere. Other hazardous materials will be removed to appropriately licensed waste disposal or recovery facilities;
- any materials which are stored on site and found to exceed inert waste acceptance criteria will be transferred off-site by licensed waste contractors to a suitably licensed waste disposal or recovery facility;
- environmental monitoring will continue over the period of the closure works (note however that provision will be made for monitoring over a 24 month period following facility closure);
- attendance by security staff at the facility for a 24 month period following facility closure.

3.2 Criteria for Successful Closure

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

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

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

3.3 Closure Plan Costing

The expected costs (present-day values), associated with the future closure of the waste recovery facility at Calary Quarry, are outlined in Table 2 below. Note that the costs provided for assume a worst case scenario, where there is unexpected shut down of the facility, with no on-site activities or resources from the Licensee / Operator to cover facility closure or environmental protection costs.

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Table 2
Waste Recovery Facility Closure Costs

ACTIVITY	QUANTITY	UNITS	RATE (€)	COST (€)	SOURCE
Remove all mobile plant (excavator / bulldozer) off site	Item	Sum	3,000	3,000	McCabes Miles River Ltd
Decommission waste recovery infrastructure					
Test sediments in settlement ponds / grit trap	6	No.	250	1,500	Chemtest
Excavate settlement pond sediments	500	m ³	5	2,500	NRA Rates
Remove sediments to landfill facility (as cover)	500	m ³	40	20,000	Greenstar
Empty hydrocarbon interceptor and tanker off-site (assume 5 tonnes sludge)	Item	Sum	2,000	2,000	Enva
Emptying and cleaning of oil and fuel storage tanks (assume 5 tonnes sludge) and transfer of bottom sludge to off-site disposal / recovery facility	Item	Sum	3,200	3,200	Enva
Removal of oils and lubricants from garage, workshop and external tanks for recovery at off-site facility	10	Tonnes	150	1,500	Rilta
Removal of other (solid / liquid) chemical wastes from laboratory / workshop for disposal or recovery off-site	5	Tonnes	150	750	Rilta
De-silting of wheelwash tanks and disposal of silt at off-site landfill facility (assume 5 tonnes solid waste)	Item	Sum	2,000	2,000	Enva
Emptying of septic tank and disposal of waste (10 tonnes) at off-site facility	Item	Sum	1,000	1,000	Enva

ACTIVITY	QUANTITY	UNITS	RATE (€)	COST (€)	SOURCE
Re-profile and grade upper surface of in-situ soils to create stable landform to facilitate surface water drainage (incl. backfilling above infrastructure area)	90,000	m ³	0.65	58,500	NRA Rates / Landscape Contractors* / McCabes Mile River Ltd
Continued pumping of surface water run-off and dewatered groundwater from part backfilled quarry to settlement ponds (estimated upper bound energy consumption of 50,000 kWh/yr for 2 years)	100,000	kWh	0.125c / kWh	12,500	Electric Ireland
Environmental Monitoring of Noise, Dust, Water. One monitoring round during closure works and quarterly monitoring for one year	5	No.	1,500	7,500	SLR IE
Off-site transfer and recovery / disposal of non-inert material	200	m ³	100	20,000	Rilta
24 hour manned security cover (during works and/or following unexpected closure or abandonment)	Month	24	13,500	324,000	TOP Security
Provision of utilities to security office	Month	24	500	12,000	ESB / Irish Water
Closure Validation Report	Item	Sum	5,000	5,000	SLR IE
Total Site Closure Cost (excl. VAT)				€476,950	
15% Contingency (to address unforeseen issues / liabilities)				71,543	
Total Site Closure Cost (excl. VAT)				€548,493	

- * O'Brien Landscaping / Redlough Landscapes

3.4 Closure Plan Update and Review

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

3.5 Closure Plan Implementation

If an average importation rate of 250,000 tonnes/year, is assumed, the expected operational life of the waste recovery facility at Calary Quarry is up to 13 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 or suspension of activities and 6 months notice of the intended final closure date. Notice will be provided in accordance with prevailing guidance and it is anticipated that there will also be ongoing discussions with the EPA in respect of required closure procedures.

3.6 Closure Plan Validation

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

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

- an assessment of how the objectives of the Closure Plan have been achieved;
- final 'as-closed' drawings and photographs of the facility;
- results of short-term environmental monitoring undertaken over the closure works period (note however that provision is made for an extended monitoring period thereafter);
- a Certificate of Completion for the CRAMP.

4.0 FACILITY RESTORATION AND AFTERCARE

4.1 Facility Restoration

The waste recovery activities at Calary Quarry primarily provide for the backfilling of a large quarry void previously created by 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 quarry to a heathland / grassland habitat similar to that which existed prior to quarrying;

The operational life of the recovery facility is anticipated to be up to 13 years and is ultimately contingent on the availability of inert soil waste from local development projects for import. On planned completion of the final phase of backfilling, much of the work required to achieve the final closure and restoration of the waste facility will already have been completed. It is expected that the final restoration of the waste recovery areas to grassland / natural habitat will be completed within a period of 12 months following closure.

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

- Progressive decommissioning of site infrastructure used for waste recovery activities;
- Break up of dedicated hard standing or paved surfaces using a hydraulic breaker;
- Classification testing of construction and demolition wastes;
- Removal of construction and demolition wastes off-site to appropriate construction and demolition waste recovery facility;
- Final grading of the backfilled materials within the quarry void to create the approved restoration landform / slope;
- On-going water management of surface water run-off;
- Backfilling of settlement ponds and construction of long-term site drainage infrastructure (drainage channels) to collect and divert any surface water run-off into the surrounding drainage network;
- Topsoiling and seeding of the final landform / slope with a native grassland mix to facilitate the development of grassland habitat;
- Attendance by security staff at the facility for the duration of the aftercare works.

4.2 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. It is currently envisaged that backfilling of the existing quarry void will be undertaken in a number of 'lifts' from the existing quarry floor. 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.

During the quarry backfilling works, the upper surface of the backfilled materials will be graded so as to ensure surface water run-off falls to sumps at temporary low points within the final worked-out quarry void. Water will be pumped from these temporary sumps as and when required to existing channels and settlement ponds / treatment infrastructure at the original ground surface. Treated run-off will be discharged off-site to the tributary of the Killough River.

During and after the final phase of the quarry backfilling works, ground contours and/or drainage channels will be modified as necessary to ensure that surface water run-off across the restored site is directed to boundary ditches or to the proposed collector channel to be constructed along the western side of the site, shown on the restoration plan in Figure 5 and in cross-sections in Figure 6.

It is envisaged that the proposed collector channel will provide for gravity drainage toward the existing off-site discharge point at the north-western corner of the site. Thereafter surface water will be discharged via the existing surface water drainage network to the Killough River.

Temporary access ramps into and out of active backfilling areas will have a gradient of approximately 1v:10h. Temporary side slopes in soil will be constructed at gradients no greater (steeper) than 1v:1.5h in order to ensure stability. On completion, final gradients across the restored ground surface will be relatively shallow, typically of the order of 1v:8v or less.

Topsoil will be imported to the site on a continual basis and will not be used immediately in general backfilling of the worked-out quarry void. The topsoil will be stockpiled separately pending re-use toward the latter stages of the quarry backfilling works, as the top surface of backfilled ground approaches the finished ground levels envisaged by the restoration scheme. Some soil material will also be stockpiled in order to backfill around the infrastructure area – this can only be placed once infrastructure has been decommissioned and/or removed off-site.

The waste licence area will be fully restored to heathland / grassland habitat on completion of backfilling operations and will better integrate into the surrounding landscape. On attaining the planned final level, the final landform will be graded, rolled and compacted. Thereafter a cover layer of topsoil will be placed and graded across the backfilled site. It is likely that this cover will comprise 150-300mm of topsoil over subsoil. The upper (ground) surface will then be rolled and seeded with a native grass mix in order to promote stability, minimise soil erosion and dust generation and to establish a grassland habitat.

A short aftercare period, of up to 12 months, will follow in order to ensure that vegetation becomes well established and that any bare or exposed soils are re-seeded. Thereafter, the restored lands will be left largely unattended, to be naturally recolonised by native vegetation. It is expected that over time, the infilled site will return to a heathland / grassland habitat, similar to that which originally existed prior to quarrying, and that the restored landform will ultimately merge into the surrounding local landscape.

4.3 Aftercare Management

On completion of facility closure and restoration works, provision will also be made for subsequent environmental monitoring of air, surface water and groundwater to confirm that there is no evidence of soil or groundwater contamination. Established in-situ groundwater monitoring wells will be maintained and will continue in service.

It is expected that following the aftercare phase, there should be no constraints on future land use associated with soil or groundwater contamination.

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

4.3.1 Short-Term Aftercare Management

The restoration aftercare management plan for the waste recovery facility at Calary Quarry will comprise the following short-term activities:

Environmental Monitoring

A five year program of environmental monitoring of air, surface water and groundwater will be undertaken by the Operator / Licensee to ensure that no surface water or groundwater contamination is present or emerging following closure of the waste recovery facility and completion of the restoration works.

Maintenance of Grass Sward

The aftercare of the grass sward will be as per grass supplier's instructions, consistent with the planned creation of a grassland habitat within the restored area. Initial maintenance following restoration (principally cutting) will be overseen by the waste facility manager at Calary Quarry or by other designated Roadstone staff nominated by the manager.

After final restoration works have been completed and the aftercare period has elapsed, the land will be left to evolve naturally as a heathland / grassland habitat.

4.3.2 Long Term Aftercare Management

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

4.4 Restoration and Aftercare Management Costs

The expected cost, associated with the site restoration and aftercare management, are outlined in Table 3 overleaf. Verification of some of the rates provided herein is provided in Appendix A.

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Table 3
Restoration and Aftercare Costs
(Based on 5 Year Aftercare Period)

ACTIVITY	QUANTITY	UNITS	RATE (€)	COST (€)	SOURCE
Breaking up of pavement and hard-standing surfaces (using hydraulic breaker),	200	m ³	15	3,000	McCabes Mile River Ltd
Validation testing to classify C&D waste	20	sample	150	3,000	SLR IE
Transfer C&D waste to off-site recovery facility (incl. haulage)	500	tonne	9	4,500	McCabes Mile River Ltd
5 year Environmental Monitoring program (at quarterly intervals)	20	No.	1,500	30,000	SLR IE
Final placement of topsoil (assumed to be previously imported and stockpiled on site) (150-300mm)	9	ha	9,000	81,000	Landscape Contractors*
Surface water management costs (pumping from temporary sumps to settlement ponds / discharge point for 1 year)	Item	Sum	6,250	6,250	McCabes Mile River Ltd
Remove pumping equipment / infrastructure	Item	Sum	4,000	4,000	McCabes Mile River Ltd
Empty interceptor and tanker waste off-site	Item	Sum	1,000	1,000	Enva
Surface preparation, grass seeding, ground repair and spraying	9	ha	4,000	36,000	Landscape Contractors*
24 months establishment maintenance for grassland	2	years	34,000	68,000	Landscape Contractors*
Preparation of Waste Licence Surrender application	Item	Sum	4,000	4,000	SLR IE
Surrender of Waste Licence to EPA	Item	Sum	6,000	6,000	EPA
24 hour security cover (during restoration works)	Month	12	13,500	162,000	TOP security
Provision of utilities to security office	Month	12	500	6,000	ESB / Irish Water

ACTIVITY	QUANTITY	UNITS	RATE (€)	COST (€)	SOURCE
Total Restoration and Aftercare Cost (excl. VAT)				€414,750	
15% Contingency (to address unforeseen issues / liabilities)				62,215	
Total Restoration and Aftercare Cost (excl. VAT)				€476,965	

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4.5 Assessed Costs

4.5.1 Closure Plan Costs

The anticipated costs of the planned facility closure following completion of projected soil intake is **€548,493** (present day value, incl 15% contingency), as outlined in Table 2 of this plan. As previously indicated, the plan envisages that the proposed waste recovery facility will achieve a clean closure, such that, following cessation of inert soil waste intake and recovery activities and the subsequent removal of hazardous substances / waste from plant and infrastructure at the facility, no remaining environmental liabilities will attach to the restored site.

4.5.2 Site Restoration and Aftercare Management Costs

The anticipated costs of the site restoration and aftercare management, outlined in Table 3 of this plan comes to a total of **€476,965** (present day value, incl. 15% contingency). These costs are based on a projected 5 year aftercare management period, with no provision for long-term aftercare monitoring and maintenance thereafter.

4.6 Financial Provision

Subject to Agency approval and agreement, Roadstone Ltd. will make financial provision for the closure and restoration of the waste recovery facility at Calary Quarry 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 closure and/or completion of site restoration and aftercare works at Calary Quarry.

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

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5.0 REPORT CLOSURE

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

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

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FIGURES

**Figure 1
Site Location Map**

**Figure 2
Surrounding Land Use**

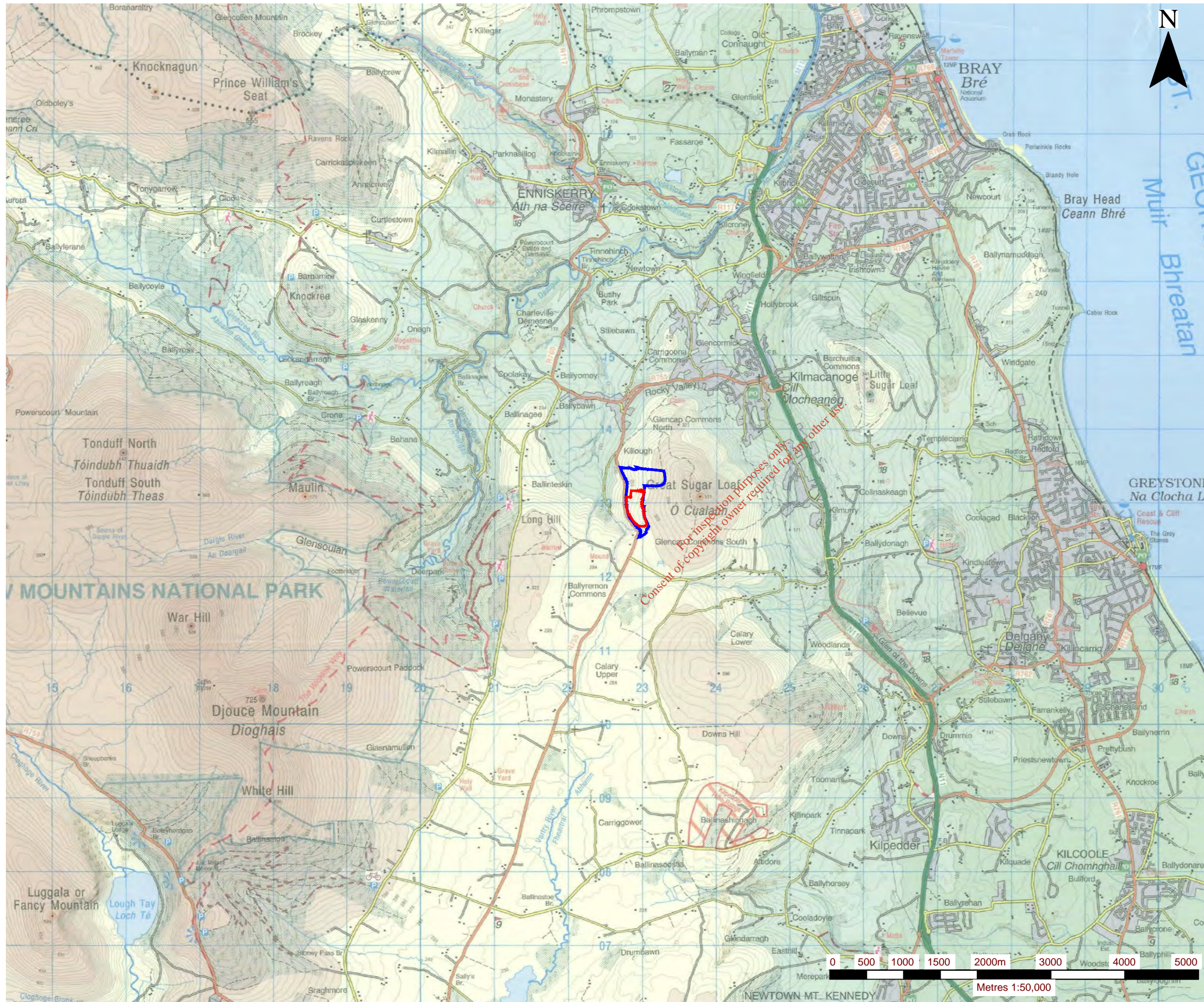
**Figure 3
Site Infrastructure Layout Plan**

**Figure 4
Environmental Monitoring Locations**

**Figure 5
Restoration Plan**

**Figure 6
Restored Cross Sections**

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NOTES

1. ORDNANCE SURVEY IRELAND LICENCE NO. **SU 0000716 (C)** ORDNANCE SURVEY IRELAND & GOVERNMENT OF IRELAND
2. MAPPING FROM ORDNANCE SURVEY DISCOVERY SERIES MAPPING - MAP NO'S **68, 69, 76 & 77**

LEGEND

- ROADSTONE LIMITED LAND INTEREST (c.25.4 Hectares)
- PLANNING APPLICATION AREA (c.9.1 Hectares)

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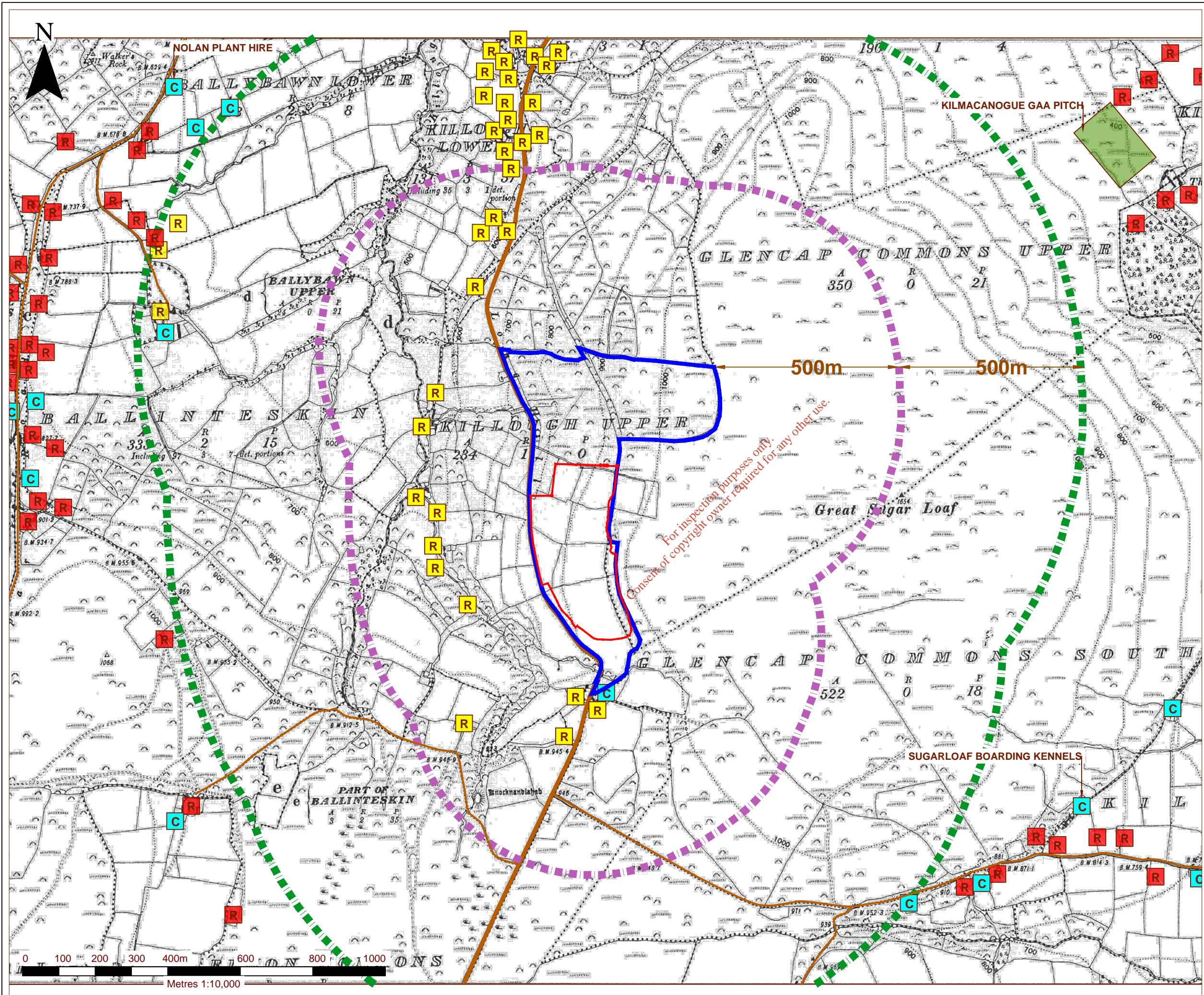
**ROADSTONE LIMITED
CRAMP
INERT SOIL WASTE RECOVERY FACILITY
CALARY QUARRY,
KILMACANOGE, CO. WICKLOW
SITE LOCATION MAP**

FIGURE 1

Scale 1:50,000 @ A3	Date JUNE 2016
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00180.00109.0.FIG_1.Site Location Map.dwg

00180.00109.0.FIG_2.Local Land Use.dwg



NOTES

1. ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000716 (C) ORDNANCE SURVEY IRELAND & GOVERNMENT OF IRELAND
2. EXTRACT FROM ORDNANCE SURVEY IRELAND 6 INCH DIGITAL MAPPING MAP NO. WW007

LEGEND

- ROADSTONE LIMITED LAND INTEREST (c.25.4 Hectares)
- PLANNING APPLICATION AREA (c.9.1 Hectares)
- 1km BUFFER FROM LAND INTEREST BOUNDARY
- 500m BUFFER FROM LAND INTEREST BOUNDARY
- RESIDENTIAL PROPERTIES WITHIN 1km OF THE APPLICATION SITE
- RESIDENTIAL PROPERTIES OUTSIDE 1km OF THE APPLICATION SITE
- COMMERCIAL PROPERTIES / FARM YARDS ETC.
- LOCAL ROAD NETWORK

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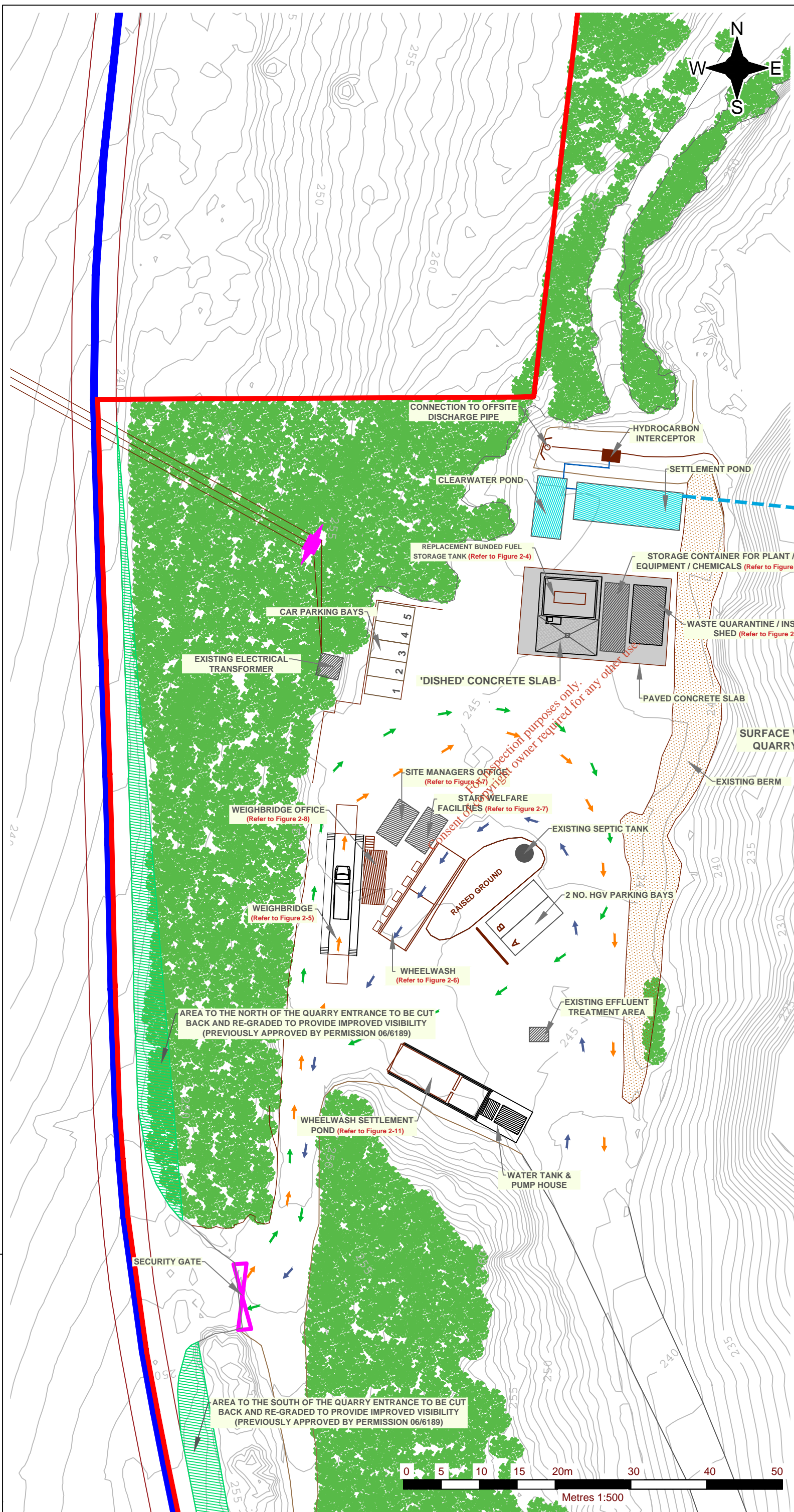
ROADSTONE LIMITED CRAMP

INERT SOIL WASTE RECOVERY FACILITY
 CALARY QUARRY,
 KILMACANOGUE, CO. WICKLOW

LOCAL LAND USE

FIGURE 2

Scale 1:10,000 @ A3 Date JUNE 2016



NOTES

1. 'Orthomosaic produced from Aerial Photography flown February 2015 by SLR Consulting Ireland (IAA Permit No. 04/2015) www.slrconsulting.com Tel. +353-1-2964667. Orthomosaic produced using Ground Control Points: Related to Irish Transverse Mercator Coordinate System and OS Malin Head Level Datum.

The accuracy of the orthomosaics and the digital elevation models (DEM) strongly depends on the flight height, lighting conditions, availability of textures, image quality, overlap, and type of terrain. Contours / 3D data relates to the surface model and not terrain levels. Typical accuracies: E: 0.05 m; N:0.05 m; Levels: 0.30 m.

All Dimensions and Levels are to be checked on site.

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LEGEND

	ROADSTONE LIMITED LAND INTEREST (c.25.4 Hectares)
	PLANNING APPLICATION AREA (c.9.1 Hectares)
	HGV TRAFFIC IN
	HGV TRAFFIC OUT
	CAR / LGV TRAFFIC IN/OUT

00180.00109.0.FIG_3.Existing Site Layout.dwg

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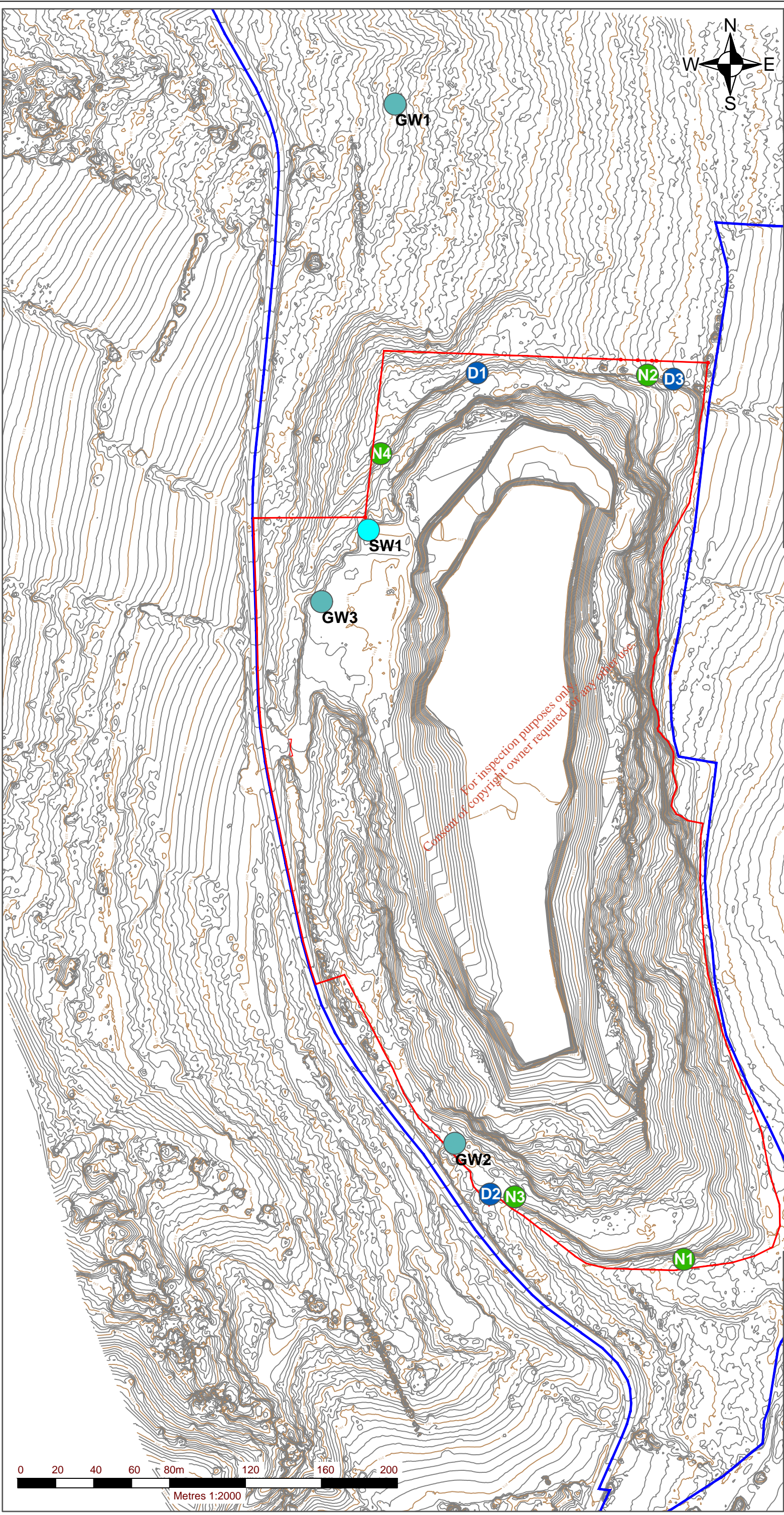
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CRAMP**

**INERT SOIL WASTE RECOVERY FACILITY
CALARY QUARRY,
KILMACANOGE, CO. WICKLOW**

SITE INFRASTRUCTURE LAYOUT

FIGURE 3

Scale 1:500 @ A3	Date JUNE 2016
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NOTES

1. 'Orthomosaic produced from Aerial Photography flown February 2015 by SLR Consulting Ireland (IAA Permit No. 04/2015) www.slrconsulting.com Tel. +353-1-2964667. Orthomosaic produced using Ground Control Points; Related to Irish Transverse Mercator Coordinate System and OS Malin Head Level Datum.

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All Dimensions and Levels are to be checked on site.

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LEGEND

	ROADSTONE LIMITED LAND INTEREST (c.25.4 Hectares)
	PLANNING APPLICATION AREA (c.9.1 Hectares)
	NOISE MONITORING LOCATION
	DUST MONITORING LOCATION
	GROUNDWATER MONITORING LOCATION
	SURFACE WATER MONITORING LOCATION

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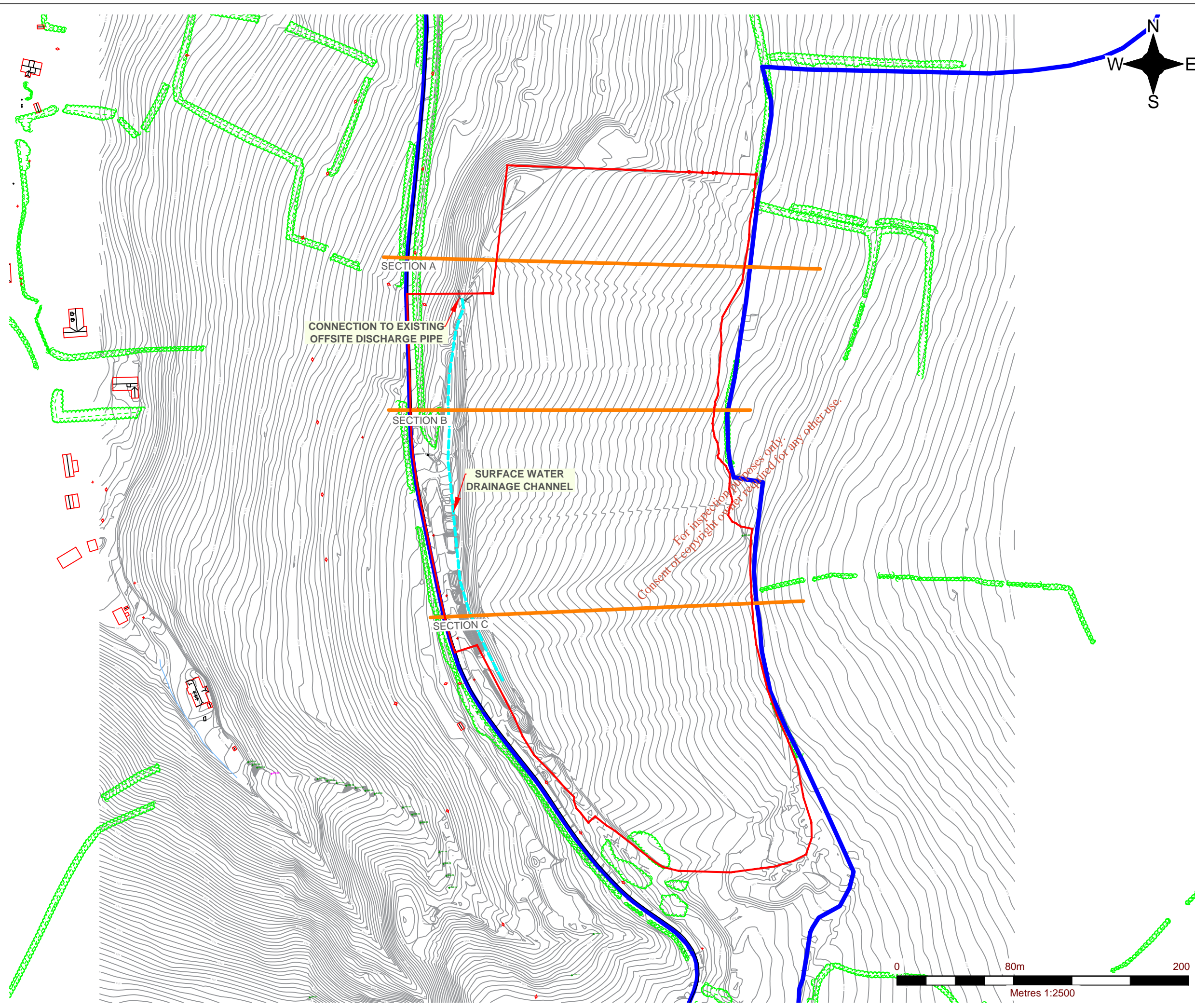
**INERT SOIL WASTE RECOVERY FACILITY
CALARY QUARRY,
KILMACANOGE, CO. WICKLOW**

ENVIRONMENTAL MONITORING LOCATIONS

FIGURE 4

Scale 1:2,000 @ A3	Date JUNE 2016
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00180.00109.0.FIG_5.Final Restoration Surface.dwg



NOTES

1. ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000716 (C) ORDNANCE SURVEY IRELAND & GOVERNMENT OF IRELAND
2. TOPOGRAPHIC SURVEY SUPPLIED BY EUROPEAN AIR SURVEYS

LEGEND

	ROADSTONE LIMITED LAND INTEREST (c.25.4 Hectares)
	PLANNING APPLICATION AREA (c.9.1 Hectares)
	PROPOSED SURFACE WATER DRAINAGE CHANNEL

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ROADSTONE LIMITED
CRAMP
INERT SOIL WASTE RECOVERY FACILITY
CALARY QUARRY,
KILMACANOGE, CO. WICKLOW
FINAL RESTORATION SURFACE


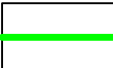
FIGURE 5

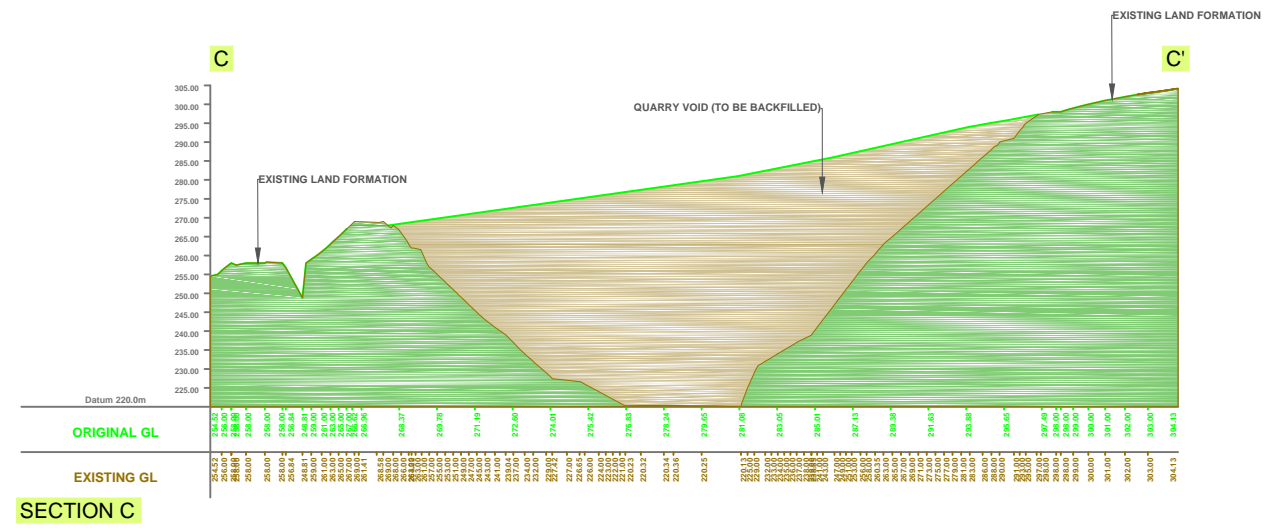
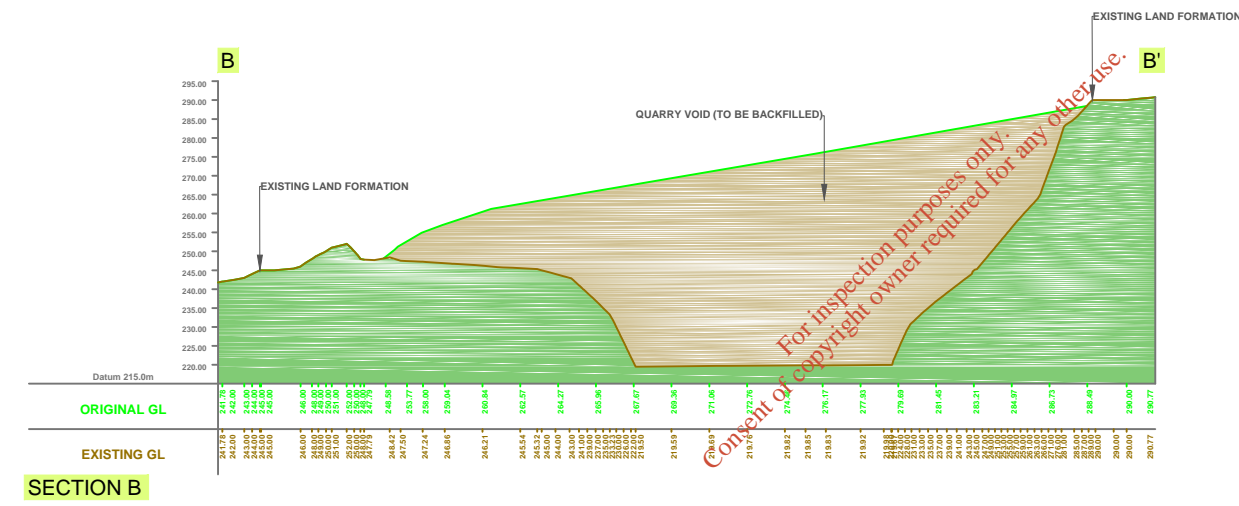
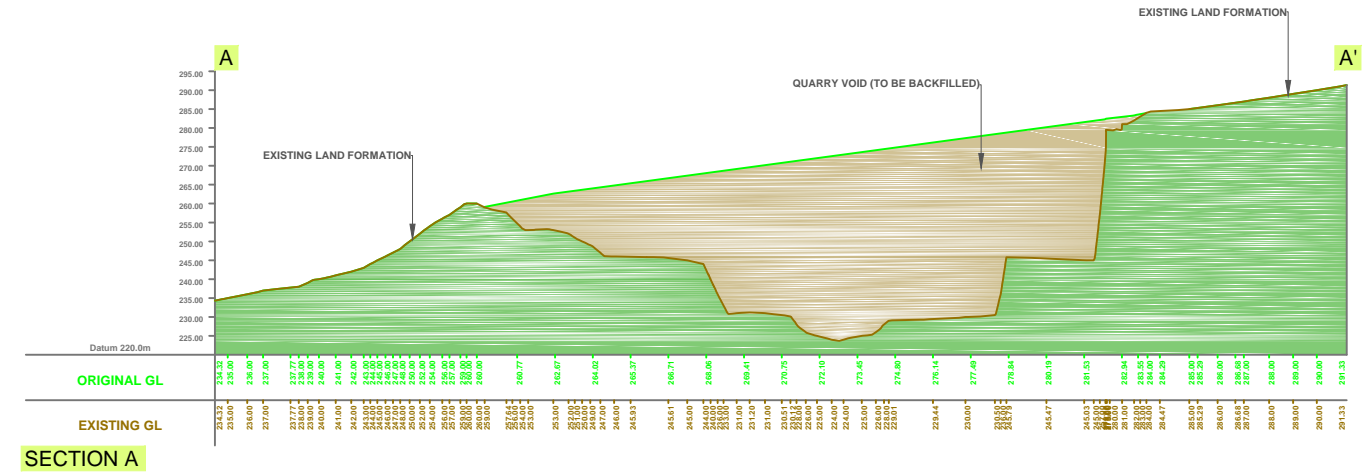
Scale 1:2,500 @ A3	Date JUNE 2016
-----------------------	-------------------

NOTES

1. REFER TO FIGURE 4 FOR CROSS SECTION LOCATIONS

LEGEND

-  QUARRY VOID
-  PROPOSED INFILL LEVEL




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

ROADSTONE LIMITED
CRAMP
INERT SOIL WASTE RECOVERY FACILITY
CALARY QUARRY,
KILMACANOGE, CO. WICKLOW
RESTORATION CROSS SECTIONS

FIGURE 6

Scale 1:2,000 @ A3 Date JUNE 2016

APPENDIX A
VERIFICATION OF UNIT RATES PROVIDED

*For inspection purposes only.
Consent of copyright owner required for any other use.*

McCabes Mile River Ltd.

Civil Engineering, Public Works & Recycling
Contractors

V.A.T. No.: IE 9569885 A

Telephone: (042) 9663077
Fax: (042) 9663027

Email: mccabesmileriver@eircom.net

Cloughvalley Lower,
Carrickmacross,
Co. Monaghan.

Roadstone Ltd.

5th August 2015.

Re; Huntstown Quarry

Waste Recovery Facility Closure.

Dear Sirs,

Please find rates as requested for above.

Remove all mobile plant of site

(excavator & dozer)

€ 1000.00

Re-profile and grade upper surface of in-situ soils to create stable
landform and facilitate surface water drainage / run-off

75,000 m3 @ € 1.00 / M3

€ 75000.00

Break up pavement and hard surfaces using rockbreaker

200m3 @ € 4.00 / M3

€ 800.00

Transfer C& D waste 500 tonne @ € 9.00 / tonne

€ 4500.00

Surface water management

€ 36000.00

Decommission and removable of pumping equipment

€ 4000.00

If there are any further queries please contact me.

Yours faithfully,

Eamonn Mc Cabe

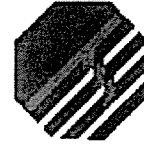
TOP SECURITY
THE SIGN OF SECURITY

Vat no: IE4813210E

INVOICE

**ROADSTONE LTD
BELGARD QUARRY
FORTUNESTOWN
TALLAGHT
DUBLIN 24**

REF: HUNTSTOWN



3278026
Jee
11/7/15

Payment Terms: Net Monthly

Your Order Number:
Account No: R159

Date: 30.06.2015
Invoice: S175734
Page: 1

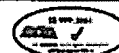
Code	Description	Net	Vat	Total
S1	Static Security June 2015	13569.62	3121.01	16690.63
310031-01	Vehicle Charge for June 2015	800.00	184.00	984.00

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Vat Summary

Vat Rate	Net Value	Vat
23.00	14369.62	3,305.01

Total Value:	14,369.62
Total VAT:	3,305.01
Total Amount Due:€	17,674.63



ROADWORKS UNIT RATE DATABASE

Version 1 - Base Date June 06



USER NOTES

General

- a) This database has been compiled by the NRA by reference to numerous tenders received in recent years with the purpose of assisting parties involved in the preparation of estimates for roadworks schemes.
- b) **Users making reference to the database do so entirely at their own risk.**
- c) The NRA welcomes and indeed invites feedback from Users.
Such feedback might include for example to seek clarification in relation to an item or advice as to how to apply the rates and prices or to bring to the attention of the NRA any potential shortcomings or deficiencies in the database.
- d) The rates are current as of the base date indicated within the database.
- e) All rates are in euro and are **exclusive of VAT**

Item Coverage

- f) Where possible, the range of rates and prices provided is based on reference to a number of projects - the intention is to provide an indication of the anticipated range of rates that are likely to be encountered in successful TRADITIONAL REMEASUREMENT tenders incorporating bills of quantities prepared in accordance with the NRA Method of Measurement.
- g) It is not intended that the list of items included covers all measurement items identified within the NRA Method of Measurement. Provision for measurement items not listed must be included for separately in any estimate which has made reference to this database.
- h) The database has not been compiled in accordance with the NRA Method of Measurement requirements for preparing a Bill of Quantities and therefore should not be used as a template for same.

ROADWORKS UNIT RATE DATABASE

Version 1 - Base Date June 06



PART 01 - PRELIMINARIES AND ROAD WORKS

PLEASE READ THE GUIDANCE NOTES ACCOMPANYING THIS SCHEDULE PRIOR TO REFERRING TO THE RATES BELOW

Description	Unit	Range	
		Lower	Upper
SERIES 100 - PRELIMINARIES (EXCLUDES DESIGN - BASED ON TRADITIONAL REMEASURE CONTRACTS)			
Percentage range from Contractors' priced Preliminaries items	%	10.00	15.00
SERIES 200 - SITE CLEARANCE			
Site Clearance	Ha	250.00	1,500.00
Demolition of Building or Structure	Item	500.00	1,500.00
SERIES 600 - EARTHWORKS			
Excavation - Topsoil	M3	0.50	2.50
Excavation, Deposition and Compaction - Acceptable	M3	1.50	4.70
Excavation - U1	M3	0.50	1.50
EO Hard Material	M3	3.00	6.00
Processing of unacceptable material Class U1 into Class 1C	M3	0.23	1.16
Processing of unacceptable material Class U1 into Class 4	M3	0.21	3.13
Processing of unacceptable material Class (Others)	M3	3.19	3.51
Crushing & Processing of excavated hard material into acceptable material Class 6B	M3	2.00	5.00
Disposal - U1	M3	0.50	3.60
Disposal - U2	M3	170.00	200.00
Disposal - Acceptable	M3	0.30	3.60
Disposal - 5A (Topsoil)	M3	0.30	3.60
Import Acceptable Material	M3	9.00	15.00
Import Capping	M3	10.00	16.00
Compaction of Acceptable (including Capping)	M3	0.30	1.00
Geotextile Grade 1	M2	0.85	1.85
Geotextile Grade 2	M2	2.50	2.50
Soft Spots - excavate below cuttings or under embankments	M3	2.00	5.00
Soft Spots - filling below cuttings or under embankments - Acceptable	M3	5.00	20.00
Topsoiling 300mm - 10 degrees or less	M2	1.00	2.60
Topsoiling 300mm - more than 10 degrees	M2	1.25	2.75
Grass Seeding , 10 degrees or less	M2	0.20	0.40
Grass Seeding , more than 10 degrees	M2	0.20	0.40
Preparation of Sub-Formation - Acceptable	M2	0.30	0.65
Preparation of Formation - Hard Material	M2	0.50	0.80
Preparation of Formation - Acceptable	M2	0.30	0.65
WORK FOR STATUTORY OR OTHER BODIES			
DUCTING			
<i>SERVICE DUCTS</i>			
4 Way - 100mm internal Dia - RCD / 500 / 51 (Sand)	M	40.00	60.00
2 Way - 100mm internal Dia - RCD / 500 / 51 (Sand)	M	28.00	40.00
2 Way - 100mm internal Dia - RCD / 500 / 52 (Concrete)	M	40.00	60.00
Chambers Dia - RCD / 500 / 55 Type A	No	650.00	800.00
MAIN WORKS FOR ESB (BY CONTRACTOR)			

Redlough Accounts

From: Redlough Landscapes
Sent: 25 March 2015 18:11
To: Redlough Accounts
Subject: FW: Cost query

From: Anne Merkle [mailto:amerkle@slrconsulting.com]
Sent: Monday, March 23, 2015 12:13 PM
To: Redlough Landscapes
Subject: Cost query

Good afternoon,

I wonder if you could help me with a general cost query. We are currently preparing cost estimates for the restoration of a number of quarry sites, for planning purposes.

As we have been using the same rates for landscape works for a number of years now, we want to ensure that these have not changed significantly. Would you be able to give us ball park figures (just so we have a rough guide) for the following landscape works?

- | | |
|---|-----------|
| • Re-grading of ground (mostly subsoil material) to achieve smooth contours | Price per |
| ha: €1200 | |
| • Placing of subsoil from storage on site (short haul) to a depth of 800mm | Price per |
| ha: €6m €1-20m ³ | |
| • Placing topsoil from storage on site (short haul) to a depth of 300mm | Price per |
| ha: €6m €1-40m ³ | |
| • Final cultivation and grass seeding (agricultural mix) | Price |
| per ha: €1500 | |
| • Hedge planting (60-90cm transplants, mix of native species, 4 plants per m) | Price per |
| 100m: €430 | |
| • Supply, planting and single staking of feathered trees (175-200cm height, 2 x TR) | Price per |
| plant: €18-25 | |
| • 1.2m high wooden post and wire fencing (two strands of barbed wire) | Price per |
| 100m: €260 | |
| • Establishment maintenance of agricultural grassland (for 2 years) | Price per |
| ha: €200 (2cats) FOC - 60m silage | |
| • Establishment maintenance of hedge planting (for 2 years, 4 visits per year) | Price per |
| 100m: €100- | |

If you can help with any of the above items, it would be very much appreciated.

Thank you very much and kind regards,

Anne.

Anne Merkle
Senior
 SLR Consulting Ireland

Email: amerkle@slrconsulting.com
 Tel: +353 1 2964667

25/03/2015

Redlough Landscapes Ltd.

Belgree.

Mulhuddart Dublin 15

Tel. 8207033 Fax

Anne of [unclear] 7/4/15

Anne Merkle

From: Peter O'Toole [peter@obrienlandscaping.com]
Sent: 25 March 2015 18:37
To: Anne Merkle
Subject: RE: Cost query

Anne,

Please find rates for your information as requested.

Regards

Peter O'Toole

From: Anne Merkle [mailto:amerkle@slrconsulting.com]
Sent: 23 March 2015 12:16
To: Peter O'Toole
Subject: Cost query

Hello Peter,

I wonder if you could help me with a general cost query. We are currently preparing cost estimates for the restoration of a number of quarry sites, for planning purposes.

As we have been using the same rates for landscape works for a number of years now, we want to ensure that these have not changed significantly. Would you be able to give us ball park figures (just so we have a rough guide) for the following landscape works?

- Re-grading of ground (mostly subsoil material) to achieve smooth contours
ha: € 4,000.00 Price per
- Placing of subsoil from storage on site (short haul) to a depth of 800mm
€24,000.00 Price per ha:
- Placing topsoil from storage on site (short haul) to a depth of 300mm
ha: € 9,000.00 Price per
- Final cultivation and grass seeding (agricultural mix)
ha: € 6,000.00 Price per
- Hedge planting (60-90cm transplants, mix of native species, 4 plants per m)
100m: € 480.00 Price per
- Supply, planting and single staking of feathered trees (175-200cm height, 2 x TR)
plant: € 30.00 Price per
- 1.2m high wooden post and wire fencing (two strands of barbed wire)
100m: € 500.00 Price per
- Establishment maintenance of agricultural grassland (for 2 years)
ha: € 2,600.00 (allowing 5 cuts/year) ??? Price per
- Establishment maintenance of hedge planting (for 2 years, 4 visits per year)
100m: € 80.00 Price per

If you can help with any of the above items, it would be very much appreciated.

Thank you very much and kind regards,

Anne.