

ATTACHMENT E4 – EMISSIONS TO GROUNDWATER

There will be no emissions to public (Local Authority) sewers associated with the operation of the proposed waste recovery facility. There is an existing sewage / wastewater system (septic tank) and associated effluent treatment facility at the application site at Calary Quarry, located to the south-east of the proposed site offices. This system was authorised by a previous (2006) planning application and treated wastewater from staff welfare facilities when the site operated as a quarry.

This on-site system was emptied and cleaned out by a licensed waste contractor in June 2014, as water levels rose in the adjoining quarry void. Any potential pollution source related to the effluent treatment system has therefore been removed from the application site.

The staff changing, washing and cooking facilities at the planned waste recovery facility will be provided at a new staff welfare / canteen unit, which will house toilets / handwashing facilities. Sinks will be supplied with water pumped from the on-site groundwater well(s). It is envisaged that the existing wastewater system 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 Drawings D1-2 and D1-5 in Attachment D1.

GROUNDWATER PROTECTION - QUALITY

Pumping and dewatering of Calary Quarry will be required for the duration of backfilling and restoration activities at the facility. The surrounding rock is of sufficiently low permeability that the quarry void can be dewatered and kept dry by pumping from temporary sumps at low points in the quarry floor. During the backfilling operations, any groundwater daylighting in the quarry faces will flow into the quarry and be diverted to the on-site surface water management system and to the surrounding surface water drainage network.

In order to minimise the risk of pollution to groundwater arising as a result of waste recovery and backfilling activities at Calary Quarry, a number of mitigation measures will be implemented to protect groundwater, prevent possible accidental discharge of fuel or chemicals and detect / monitor potential adverse impacts.

These measures, which will give effect to Articles 3,4,5,6 and 7 of Council Directive 80/68/EEC of 17 December 1979 on the protection of groundwater against risk of pollution by dangerous substances and the European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. No. 9 of 2010), are identified under a range of headings below.

Notwithstanding the measures proposed, it is emphasised that the materials which will be imported and handled at the proposed waste recovery facility at Calary Quarry will be inert and by definition therefore, devoid of contamination by the Annex 1 and Annex 2 substances listed in Council Directive 80/68/EC. The development and operation of the proposed waste recovery facility will not require discharge of untreated effluent or any listed dangerous substances to groundwater and no provision for such discharge will be made in any legal consent or authorisation issued in respect of the facility.

Inspection of Imported Material

- Loads of imported material will be screened and inspected in line with an approved waste acceptance plan to confirm they are inert prior to deposition at the application site. Additional precautionary measures associated with the acceptance and handling of inert soil waste are detailed in the following sections of the Environmental Impact Statement:
 - Chapter 2, Paragraphs 2.104 to 2.113 (Waste Acceptance and Handling)
 - Appendix 2.1 (Waste Handling and Acceptance Plan)
 - Appendix 2.2 (Contingency Plan, Section 3, Spillage / Leakage Management Plan)

Handling of Fuels and Chemicals

- All petroleum based products and chemicals shall be stored in containers and drums stored over bunded pallets in a storage container which is itself placed over a drained concrete slab;
- Refuelling of vehicles to be either be undertaken at over the proposed concrete slab adjacent to the bunded fuel tank(s) or from a mobile double skinned fuel bowser in order to minimise the risk of uncontrolled release of polluting liquids / liquors;
- An emergency response kit will be kept at the application site to minimise the potential migration of any spillages / leaks of petroleum based products;

- All plant to be regularly maintained and inspected daily for leaks of fuels, lubricating oil or other contaminating liquids/liquors;
- Routine maintenance of plant and machinery would be undertaken over the concrete slab adjacent to the banded fuel tanks to minimise the risk of uncontrolled release of polluting liquids. Any non-routine servicing or maintenance would be undertaken at off-site facilities;
- All fuel, chemicals, petroleum based products, mechanical and electrical equipment shall be removed prior to closure of the site.

Monitoring

- Groundwater monitoring will be required. Previous groundwater wells and monitoring well GW1/BH3, GW2, GW3 and BH4 are believed to be blocked / partially collapsed and will be redrilled prior to commencement of soil importation at the proposed waste facility. Some further baseline groundwater monitoring will also be undertaken prior to commencement. Groundwater quality monitoring will then be undertaken on at least a six monthly basis.
- The results of all monitoring undertaken will be recorded and submitted for its records and review to the EPA in an Annual Environmental Report;
- It is currently envisaged that the groundwater monitoring regime will remain in place for the duration of the quarry backfilling and restoration works. Sampling and monitoring will continue as long as backfilling activities continue and for a short period thereafter.

GROUNDWATER PROTECTION - FLOW

The rocks of the Devil's Glen and Bray Head Formations at Calary Quarry 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,

Within the Wicklow Groundwater Body, the majority of groundwater flow occurs 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 (where present), into the weathered zone. High rates of potential recharge are often expected in hilly areas due to thin subsoils, rock exposure close to the surface and high rainfall.

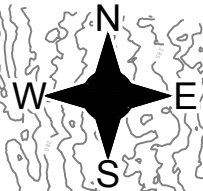
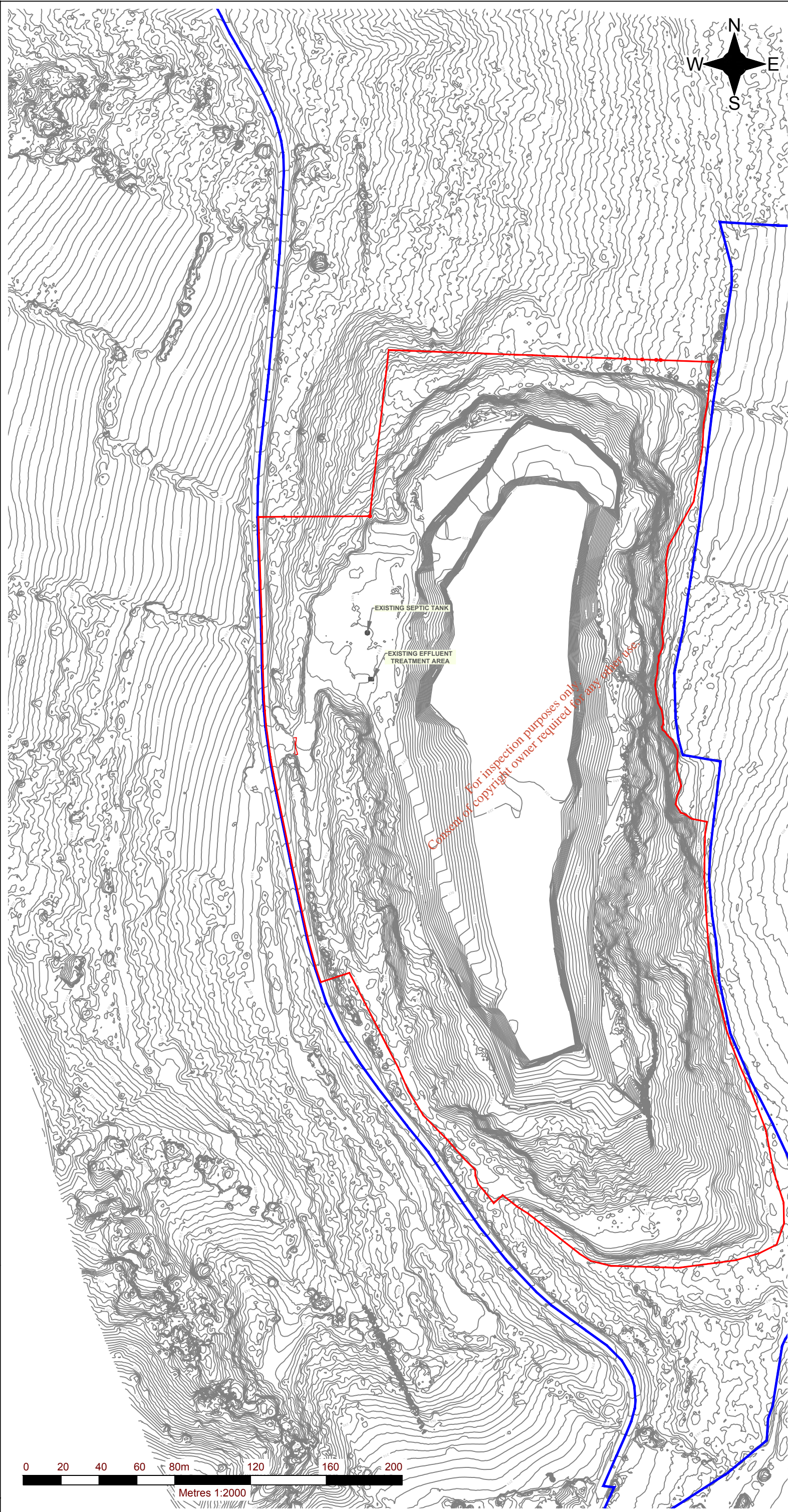
In the area around the application site however, a large proportion of this potential recharge is rejected because the rocks are poor aquifers (with low storage capacity) and because steeply sloping ground increases surface water run-off. The aquifers within the GWB are generally unconfined, but may become locally confined where the subsoil is thicker and/or of lower permeability. Groundwater flow is considered to recharge and discharge on a local scale.

Dewatering of Calary Quarry had been ongoing for in excess of 35 years up to 2010. The resumption of dewatering of the quarry to facilitate backfilling with inert soil waste will not alter established regional groundwater flows toward the Killough River, nor will it alter the groundwater flow pattern around the application site.

Over the longer-term, backfilling of the quarry void is unlikely to have any adverse long term impact on the local groundwater flow regime; it will not create any barrier to groundwater flow, nor will it reduce groundwater recharge nor lead to a reduction in groundwater levels at off-site supply wells.

As noted previously, several measures are proposed in order to monitor any potential impact of the proposed waste recovery operations on groundwater quality. Groundwater levels will also be recorded at the time of groundwater sampling.

Further information is provided in Chapter 6 of the EIS which accompanies this waste licence application.



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.

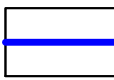
The accuracy of the orthomosaics and the digital elevation models (DEM) strongly depends on the flight height, lighting conditions, availability of textures, image quality, overlap, and type of terrain. Contours / 3D data relates to the surface model and not terrain levels. Typical accuracies: E: 0.05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

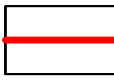
All Dimensions and Levels are to be checked on site.

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LEGEND

 ROADSTONE LIMITED LAND INTEREST (c.25.4 Hectares)

 PLANNING APPLICATION AREA (c.9.1 Hectares)

EXISTING SEPTIC TANK

EXISTING EFFLUENT TREATMENT AREA

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00180.00109.0.E4-1.GW Emissions Location.dwg

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

SLR

ROADSTONE LIMITED
WASTE LICENCE APPLICATION

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

GROUNDWATER EMISSION LOCATIONS

DRAWING E4-1

Scale: 1:2,000 @ A3 Date: JUNE 2016