

INERT LANDFILL AND MATERIALS RECOVERY / RECYCLING FACILITY

Ballinclare Quarry, Kilbride, Co. Wicklow

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

Prepared for: **Kilsaran Concrete
Unlimited Company**

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EXECUTIVE SUMMARY

Activity Details

Name	Ballinclare Quarry Inert Landfill and Materials Recycling Recovery Facility
Address	Kilbride, Co. Wicklow
Licence No.	TBC
Licensee	Kilsaran Concrete Unlimited Company (hereinafter 'Kilsaran')

Activities to be Licensed

Class D1 : Deposit in, on or under land. This activity principally provides for used of inert soil and stone to backfill the former quarry void.

Class D5 : Specially engineered landfill, (e.g. placement into lined discrete cells which are capped and isolated from each other and from the environment (Principal Activity). This is the principal waste activity and references the requirement for basal and side liners as part of the overall phased development of the landfill.

Class D15 Storage pending any of the operations numbered D1 to D14 (excluding temporary storage (being preliminary storage according to the definition of "collection" in Section 5(l), pending collection on the site where the waste is produced. This provides for on-site storage of materials pending disposal to landfill. This activity provides for stockpiling of inert wastes prior to placement and final disposal at the inert landfill.

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 R5 (P): Recycling/reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials.

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).

Report Preparation

This Closure, Restoration and Aftercare Management Plan (CRAMP) in respect of the proposed inert landfill and materials recovery / recycling facility at Ballinclare Quarry, Kilbride, Co. Wicklow has been independently prepared by SLR Consulting Ireland, 7 Dundrum Business Park, Windy Harbour, Dublin 14.

Comparison with Previous Plans

This plan is the preliminary draft CRAMP which has been prepared in support of a waste licence application to the Environmental Protection Agency (EPA) by Kilsaran. It is anticipated that this plan will be updated and amended in light of any specific conditions applied by any waste licence issued by the EPA in respect of the proposed waste facility at Ballinclare Quarry in due course. It is expected that the updated CRAMP will influence the quantum of any financial provision to be agreed with the EPA put in place in respect of future site closure.

Overview of the Plan

This CRAMP has had regard to the requirements outlined in the EPA publication, *Guidance on Assessing and Costing Environmental Liabilities (2014)*.

Scope

The closure plan envisages that the licensed landfill and materials recovery / recycling facility will achieve a clean closure, such that, on cessation of waste disposal and 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 and that there is no requirement for active and ongoing management of the facility to minimise / mitigate environmental risks.

Cost Summary

As a result of this assessment, the total combined cost of the facility closure, restoration and aftercare management is calculated at **€875,150** (including 15% contingency) of which **€542,225** provides for closure works and **€332,925** provides for final restoration works and aftercare.

Financial Provision

Arising out of this assessment, Kilsaran is prepared to make such financial provision as may be deemed necessary 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

This preliminary Closure, Restoration and Aftercare Management Plan (CRAMP) is prepared in respect of the proposed inert landfill and materials recovery / recycling facility proposed by Kilsaran Concrete Unlimited Company (hereinafter 'Kilsaran') at Ballinclare Quarry, Kilbride, Co. Wicklow and is submitted in support of a waste licence application to the Environmental Protection Agency (hereinafter 'the Agency' or 'EPA').

1.1 Scope of this CRAMP

This CRAMP relates to the inert landfilling and materials recovery / recycling activities which are currently proposed for Ballinclare Quarry, as described in Section 1.4 below. The objective of the CRAMP is to ensure that

- (i) on completion / cessation of the inert landfilling activities at the former quarry void, the former quarry footprint will be restored to a natural grassland / scrub habitat comparable to that which existed prior to quarrying, and the surrounding site area will be substantially re-integrated into the surrounding landscape; and
- (ii) on completion / cessation of C&D waste recovery / recycling activities, the working area will be restored to a natural grassland / scrub habitat and substantially re-integrated into the surrounding pastoral landscape.

The scope of this CRAMP comprises:

- a Site Evaluation, including the planning history and a site inventory;
- 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 Site Restoration and Aftercare proposals, including a restoration and aftercare management costing.

The CRAMP has also been prepared in general accordance with the EPA publication, *Guidance on Assessing and Costing Environmental Liabilities (2014)*, with due regard to requirements / conditions for CRAMPs set out in waste licences previously issued by the EPA for similar (inert / C&D) waste facilities.

1.2 Site Activities and Description

The site to which this CRAMP refers is located at Ballinclare Quarry and comprises a former rock quarry and tied manufacturing facilities. The quarry lies approximately 2.5km to the north-west of the small settlement of Kilbride and 2.5km south of the village of Glenealy. The quarry location is indicated on an extract from the Ordnance Survey map of the area in Figure 1. The overall Kilsaran land ownership area at Ballinclare Quarry extends to c.36 ha (89 acres), while the prospective waste licence area covers approximately 32.5ha (78.3 acres). The Applicant's landholding is shown edged blue in Figure 1, while the extent of the waste licence application area is shown edged red on the same figure.

Ground levels in the vicinity of the quarry vary between 55mOD to 60mOD along the southern site boundary, close to the L1157 Local Road and rise to 90mOD at the highest point along the northern boundary where the main quarry face cuts into a rock slope which rises northwards. Typical ground levels along the northern quarry boundary range from 50mOD to 70mOD.

Extraction across the quarry generally extended to a floor level of approximately 37mOD. At the time of its closure, two active quarry benches were being extended westwards. As a result the quarry floor is locally higher at the western end, where the first bench has only been developed to a level of approximately 52mOD. The quarry floor is also locally deeper in the central eastern area of the quarry area and extends to approximately 22mOD where a third bench was commenced. This area acted as the quarry sump when it was operational.

The quarry is accessed via a 120m long surfaced entrance road leading off the L1157 Local Road, known locally as the Breagura Road. The former concrete batching plant, aggregate plant and asphalt plant were located to the south-east of the quarry holding, east of the access road, in an area where rock was previously excavated to a relatively shallow depth (of between 5m and 10m).

Established ancillary facilities at the quarry include the main site office, a weighbridge and adjoining weighbridge office, staff canteen and toilets, a wastewater treatment system, a wheelwash, a bunded fuel storage area, a garage / workshop and a laboratory.

A number of former farm buildings and a storage yard are in place to the west of the site access road, together with a recently constructed concrete block yard. The farm buildings comprise a stone barn and two concrete walled barns, each with a corrugated tin roof. A more modern brick-built two-storey building is also present in this location. The existing and proposed development layout at Ballinclare Quarry is shown in Figure 2.

When it was operating, the quarry at Ballinclare was effectively worked dry, with very little inflow of groundwater recorded into the quarry void. A sump was located at the lowest point on the quarry floor and principally collected any surface water falling over the excavation area, as well as any minor inflows of groundwater which may have arisen.

The water collecting in the sump was periodically pumped to water storage tanks for subsequent re-use in concrete production on-site or for dust suppression. Any surplus water was pumped off-site via a surface water treatment system (a number of excavated ponds in series) to a drainage channel which flows to the Ballinclare Stream immediately beyond the north-western site boundary.

1.3 Development / Planning History

The existing site comprises a bedrock quarry located in the townlands of Ballinclare and Carrigmore, near the village of Kilbride, Co. Wicklow. Historically, permitted activities at the quarry have included extraction of diorite bedrock using blasting techniques; processing (crushing and screening) of the fragmented rock to produce aggregates for concrete (readymix) production and asphalt production for road construction and site development works.

The quarry was owned and operated by S.M. Morris Ltd up to 2009, at which time it closed as a result of the downturn in the Irish construction industry which followed the Global Financial Crisis of 2008. In 2014, the quarry was acquired by Kilsaran and quarry activities re-commenced shortly thereafter, with significant investment made in upgrading the concrete batching plant and installing a new aggregate production plant and asphalt / tarmacadam plant.

In December 2014, Kilsaran sought planning permission for the continuation of previously permitted development at the quarry for a period of 25 years. Permission was sought for a revised extraction scheme which provided for deepening of the quarry to a floor level of +1mOD over an extended extraction area of 16.5 hectares, a concrete block manufacturing plant and concrete block manufacturing yard and an increase in output from the quarry to c. 800,000 tonnes per annum. Planning permission for the quarry extension and associated development was granted by Wicklow County Council subject to 23 conditions in January 2016 (Planning Ref. 14/2118).

Extraction and production activities at the quarry ceased in June 2016 following the discovery of small quantities of naturally occurring asbestos (NOA) in the diorite bedrock being quarried at the time. Since then, and following the cessation of quarry dewatering, the water level in the quarry void has risen to cover the quarry floor.

Following its closure in 2016, a range of options for future use of the quarry were identified and reviewed. Arising out of this review, Kilsaran elected to backfill and restore the quarry as an inert waste landfill with the installation of a clay lining system at its base and sides in order to protect groundwater in the surrounding aquifer.

The company also elected to establish a C&D waste recovery / recycling facility and install a soil washing plant on-site to complement the inert landfill facility and provide it with a source of secondary (recycled) aggregate which could be supplied for future production of construction materials at off-site production facilities.

In June 2019, Kilsaran submitted a request to An Bord Pleanála (ABP, or ‘the Board’) under Section 37B of the Planning and Development Act 2000 (as amended), to enter into pre-application discussions with respect to the proposed inert landfilling and materials recovery / recycling activities at the quarry, to establish whether or not the proposed waste facility should be classified as Strategic Infrastructure Development (SID) under the Planning and Development Act of 2000 (as amended).

The Board’s representatives met with the Kilsaran in November 2019, and a formal request was made to close the pre-application consultation process in December 2019. Having reviewed the matter, the Board concluded that the proposed development did satisfy the statutory criteria for designation as Strategic Infrastructure and, as such, issued a direction to Kilsaran in February 2020 stating that a planning application should be submitted directly to it (the Board) for consideration.

In arriving at its decision to classify the proposed development at Ballinclare Quarry as strategic infrastructure, the Board had regard to

- (i) the size and scale of the proposed inert landfill and C&D waste recovery / recycling facility;
- (ii) the fact that it would meet a previously identified need for additional capacity for management of inert soil and stone waste within the Eastern / Midland waste region; and
- (iii) support the attainment of national and regional planning objectives to increase the recycling and recovery of construction and demolition waste and in so doing, contribute to the development of a circular economy and promote the long-term sustainable use of resources.

Following a consultation exercise with statutory bodies and the general public, an application for Strategic Infrastructure Development in respect of the proposed inert landfill and materials recovery / recycling management facility at Ballinclare Quarry was submitted to An Bord Pleanála in April 2021. As of the time of writing, the Board has yet to make a decision in respect of the application.

1.4 Ballinclare Inert Landfill and Materials Recovery / Recycling Facility

As outlined above, Kilsaran has applied to An Bord Pleanála for Strategic Infrastructure Development to

- develop and operate an inert landfill facility at its existing quarry in Ballinclare, near Kilbride, Co. Wicklow to backfill it to original (pre-development) ground level using imported inert soil and stone waste;
- progressively restore the backfilled quarry to long-term grassland / scrub habitat, similar to that which existed prior to the quarry development;
- establish and operate a construction and demolition (C&D) waste recovery facility across the footprint of a pre-existing concrete blockyard at the quarry; and
- install and operate a soil washing plant at the former concrete / asphalt production yard to recover sand and gravel aggregate from imported soil and claybound / intermixed wastes. The recovered materials will be supplied for subsequent use in the production of construction materials.

It is anticipated that any inert soil and stone or C&D wastes to be imported, managed and handled at the facility will be generated by construction projects in the eastern part of the country, principally in Counties Wicklow, Dublin and Wexford.

The principal non-soil and stone / C&D wastes to be recycled at the facility will include solid concrete (ready-mixed, reinforced, blocks and/or pavement slabs), bricks, ceramics and solid bituminous waste mixtures (hardened asphalt returns and road planings). These materials will be processed (crushed and screened) and supplied as recycled (secondary) aggregates to the construction market, subject to any relevant End of Waste criteria set by the Environmental Protection Agency (EPA).

It is envisaged that C&D waste recovery / recycling activities will continue for the duration of the landfilling operations and follow-on restoration works and that planning permission for the activity will expire thereafter, unless otherwise renewed by the company / Planning Authority.

The soil washing plant to be installed at the facility will effectively recover sand and gravel and secondary aggregates from selected, more granular soil waste and mixed, clay bound construction and demolition waste imported to the facility. Soil washing activities will also continue in operation up to the final phase of the proposed landfill development which will extend across the former concrete / asphalt production area.

When fully operational, the proposed development will provide for the following:

- Backfilling of the existing void at Ballinclare Quarry to original ground level through the development and operation of an inert waste landfill facility. The landfill will have a total intake capacity of approximately 6,165,000 tonnes, comprising inert, primarily soil and stone, waste and non-waste soil and stone by-product
- Progressive restoration of the backfilled landform to long-term scrub / grassland habitat;
- Continued use of existing site infrastructure and services including, site / weighbridge office, staff welfare facilities, wastewater treatment system, outbound weighbridge, garage / workshop, wheelwash, hardstand areas, fuel and water storage tanks to service the proposed development;
- Installation of a new weighbridge along the inbound lane of the quarry access road and installation of a new wheelwash facility along the egress route leading off-site ;
- Decommissioning of any remaining fixed plant and infrastructure associated with former rock extraction activities or with aggregate, concrete and asphalt production activities at the site;
- Off-site removal of any materials or bulky wastes associated with former quarrying and production activities;
- Construction of an industrial shed (portal frame structure) at the paved blockyard area to house crushing and screening equipment and to process / recover / recycle inert C&D waste (principally concrete, bricks, ceramics and solid bituminous waste mixtures);
- Use of any external paved area surrounding the C&D waste processing shed as a hardstanding area for the external handling and storage of both unprocessed and processed C&D wastes;
- Separation of any intermixed C&D wastes (principally metal, timber, PVC pipes and plastic) prior to its off-site removal to authorised waste disposal or recovery facilities;
- Installation and operation of a soil washing plant at the former concrete / asphalt production yard to recover sand and gravel and secondary aggregates from natural soil and stone waste or intermixed claybound / C&D wastes for subsequent use in the production of construction materials;
- Construction of an on-site (passive) wetland treatment system and attendant drainage infrastructure to treat surface water run-off / groundwater collecting in the sump / floor of the quarry area during landfilling operations and any surface water run-off arising over the C&D waste recovery / recycling area prior to its discharge off-site;
- Re-use of an existing storage shed as a dedicated waste inspection and quarantine facility to inspect and store suspect waste consignments as required;
- Upgrading and ongoing maintenance of established internal haul roads across the site;
- Temporary stockpiling of topsoil pending re-use as cover material for phased and/or final restoration of the inert landfill / backfilled quarry; and
- Environmental monitoring of noise, dust, surface water and groundwater for the duration of the landfilling and restoration works and C&D waste recovery / recycling activities, and for a short period thereafter.

All traffic to and from the proposed waste facility at Ballinclare Quarry will be routed along the L1157 Local Road. Following discussions with the Roads Authority, provision is made for road improvements along the length of the L1157 leading up to the quarry access, including road widening to 6.0m over most of the route length (within the existing road curtilage), with road strengthening and repair overlay and road markings.

1.4.1 Classes of Licensed Waste Activities

Any waste licence issued to be issued to Kilsaran by the Environmental Protection Agency (EPA) is expected to provide for the following licensed activities (according to the Third and Fourth Schedules of the Waste Management Acts 1996-2022).

- Class D1 : Deposit in, on or under land. This activity principally provides for used of inert soil and stone to backfill the former quarry void.
- Class D5 (Principal Activity) : Specially engineered landfill, (e.g. placement into lined discrete cells which are capped and isolated from each other and from the environment (Principal Activity). This is the principal waste activity and references the requirement for basal and side liners as part of the overall phased development of the landfill.
- 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 R5 : Recycling/reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials.
- 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).

The planning (SID) application in respect of the proposed waste recovery facility at Ballinclare Quarry (ABP Ref. No. PL27.309991) provides for a maximum combined maximum waste intake to the facility of 800,000 tonnes per annum. The application further limits the number of HGV traffic movements in (and out) of the facility to 150 per day (in line with the existing quarry planning permission).

Within the annual intake limit, provision is made in the EPA waste licence application for importation of up to 400,000 tonnes of potentially recoverable claybound C&D waste to be supplied as feedstock to the soil washing plant and for up to 100,000 tonnes of source segregated C&D waste.

2.0 ENVIRONMENTAL MANAGEMENT AND PERFORMANCE

2.1 Operator Performance

2.1.1 Environmental Management Systems

Kilsaran implements an Environmental Management System (EMS) in respect of its core quarrying and construction material production activities at quarries and production facilities across Ireland. In recent years, as it has moved to embrace materials recycling and recovery and to support the development of the circular economy, the company has extended the scope of its EMS to encompass inert landfilling and materials recovery / recycling activities. As part of its EMS, Kilsaran has developed standard procedures to address waste intake and acceptance procedures and waste handling activities, as well as an enhanced emergency response plan.

2.1.2 Compliance History

Although it is unclear when extraction activities first commenced at Ballinclare Quarry, it is known that the use pre-dated 1964. As was required under Section 261 of the Planning and Development Act of 2000, Ballinclare Quarry was registered by SM Morris with Wicklow County Council (WCC) on the 4th March 2005 (Quarry Ref. QY/4).

A planning application (Ref. 07/45) for continuation of quarrying activities was submitted (with an Environmental Impact Statement) to Wicklow County Council in January 2007 in response to a direction issued by the Council on foot of the quarry registration process. Planning permission was granted in November 2007, subject to 21 conditions.

As previously noted, planning permission for a quarry extension and associated development was granted by Wicklow County Council subject to 23 conditions in January 2016 (Planning Ref. 14/2118).

Quarrying, aggregate and concrete production at Ballinclare have always operated in compliance with necessary permits and planning consents and Kilsaran has not been subject to any enforcement action by the Local Authority.

Kilsaran has never been convicted of any offence under the Waste Management Acts 1996-2022, the Environmental Protection Agency Act 2003 or the Air Pollution Act 1987.

2.1.3 Incident History

Insofar as the Applicant is aware, no significant environmental incidents have arisen in the course of on-site operations at Ballinclare Quarry, either prior to, or since it acquired the site in 2014. Specifically, there is no record of any significant fuel leak or spill having occurred.

2.1.4 Environmental Monitoring

When the quarry was operational previously, there was an established programme of environmental monitoring in connection with extractive and concrete / asphalt production activities. Much of the monitoring infrastructure remains in place and was used to obtain updated monitoring data to support the ongoing planning and waste licence applications.

Kilsaran will establish an environmental management programme to monitor and manage emissions from the proposed waste facility at Ballinclare Quarry, in line with the requirements of any planning permission issued by An Bord Pleanála and/or a waste licence issued by the EPA. At present, and subject to approval of regulatory authorities, it is anticipated that most of the pre-existing monitoring infrastructure will be brought back into operation / service.

It is expected that limit values for environmental emissions generated by waste disposal and recovery activities at the proposed waste facility at Ballinclare Quarry will be similar to those applied to other EPA licenced facilities. Environmental sampling, monitoring and testing will be undertaken by Kilsaran personnel and/or specialist

contractors appointed by it. Records of environmental monitoring and testing will be maintained on-site and forwarded to the EPA and Wicklow County Council as required under the terms of any grant of planning permission and/or waste licence issued in respect of the proposed waste facility.

Preliminary proposals for monitoring locations around the site are presented below. Proposed monitoring locations are indicated in Figure 3.

Surface Water

During quarry dewatering, monitoring of surface water discharged off-site from Ballinclare Quarry will be undertaken on a daily and weekly basis, in line with the requirements of the existing trade effluent discharge licence (Ref. WPL116). This monitoring regime will continue until such time as it is replaced by an EPA Waste Licence in respect of the proposed waste disposal / recovery / recycling activities at the quarry.

When the waste facility is operational, surface water will be monitored at any temporary surface water body / sump across the quarry footprint. Occasional surface water sampling and testing will also be undertaken on samples taken from any other significant, temporary water body or pond which may be constructed or form naturally at low points across the site.

Surface water run-off from the proposed landfill and inert C&D recovery / recycling facility will be treated at a wetland facility and monitored thereafter as it is discharged off-site to a drainage channel leading to the Ballinclare Stream.

It is also envisaged that surface water monitoring will also be undertaken along the Potters River, upstream and downstream of the discharge from the Ballinclare Stream, in accordance with the existing requirements of the Local Authority discharge licence (Ref. No WPL116). Existing surface water monitoring locations at and around Ballinclare Quarry (designated SW1, SW2, SW3a, SW3b and SW4) are shown on Figure 3.

Testing of key chemical parameters is likely to be undertaken on water samples collected on a weekly basis, while testing of other chemical parameters will be undertaken on either a bi-annual or annual basis (depending on the test parameter involved), as may be required by any EPA Waste Licence issued in respect of the proposed waste facility.

The principal objective of surface water monitoring is to assess water quality and to confirm there is no contamination associated with waste recovery activities on-site. Surface waters will be monitored for the duration of the proposed landfilling and materials recovery / recycling activities at the facility and for a limited closure and aftercare period thereafter.

Groundwater

Three groundwater monitoring wells (designated GW1, GW2, GW3) were installed at Ballinclare Quarry in 2014 and have been monitored since that time. Groundwater well locations are shown in Figure 3.

Groundwater wells at the proposed waste facility will be sampled and tested on a regular basis for a range of physical and chemical parameters in order to assess water quality and confirm the absence of contamination by the proposed landfilling and waste recovery activities.

It is currently envisaged that a programme of groundwater water monitoring as outlined below will be implemented by Kilsaran at the facility (subject to review and approval by the EPA on foot of any waste licence it may ultimately issue):

- Groundwater levels will be monitored at each of the 3 No. existing wells and at any groundwater pond in the central eastern floor area of the quarry;
- Limited groundwater quality testing will be undertaken on samples recovered from the 3 No. groundwater monitoring wells on a quarterly basis;
- More detailed groundwater quality testing (to include metals and a number of specified hazardous substances) will be undertaken on an annual basis.

The groundwater monitoring regime will remain in place for the duration of the landfilling and/or materials recovery / recycling activities at the facility and for a limited closure and aftercare period thereafter.

In general, background groundwater quality is good, with no evidence of significant anthropogenic sources of pollution beyond the impact of farming. The available groundwater monitoring data shows that there are naturally elevated concentrations of arsenic and nickel in groundwater which are considered to reflect the natural chemistry of the diorite bedrock. There were also occasional detections of nitrite during consecutive winters and it is considered that these were short term point sources from surrounding agricultural land-use. Elevated levels of orthophosphates also occur occasionally and are also most likely attributable to agricultural practices in the local area.

Wastewater from the existing site offices and staff welfare facilities is piped to an existing on-site effluent treatment system. This system, which comprises an aeration treatment unit and two modular Puraflo system over a 300mm deep gravel bed, was previously approved by way of the most recent quarry planning permission (Ref. 14/2118).

Dust

Planning permissions for quarry activities at Ballinclare Quarry specify 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.

There are 3 No. existing dust monitoring points around the site boundary (designated D1, D2 and D3). These are shown in Figure 3. Dust emissions are monitored using Bergerhoff dust gauges at on-site locations between likely dust sources and potentially sensitive receptors beyond.

Available dust monitoring data obtained during quarry operations and subsequently, indicates that dust deposition levels around the site were, and continue to be, comfortably within the prescribed emission limit value of 350mg/m²/day.

It is envisaged that dust monitoring at existing locations will continue for the duration of the on-site waste activities. Dust monitoring locations shall be reviewed on an ongoing basis and revised as and when necessary. The results of regular dust monitoring shall be submitted to the EPA and/or Wicklow County Council on a periodic basis for review and record purposes as required.

Noise

Planning permissions for quarry activities at Ballinclare Quarry specify an emission limit value of 55 dB(A) L_{Aeq} at the property boundary during day-time hours, with a reduced limit of 45 dB(A) L_{Aeq} during night-time hours.

There are 3 No. existing noise monitoring points close to, or immediately beyond the site boundary (designated N1, N2 and N3). These are shown in Figure 3. As can be seen, noise levels are monitored between likely noise sources and potentially sensitive receptors beyond.

Available dust monitoring data obtained during quarry operations and subsequently, indicates that noise levels around the site were, and continue to be, comfortably below the prescribed daytime emission limit value of 55 dB(A) L_{Aeq}.

It is envisaged that noise monitoring at existing locations will continue for the duration of the on-site waste activities. Noise monitoring locations shall be reviewed on an ongoing basis and revised as and when necessary. The results of the noise monitoring shall be submitted to the EPA and/or Wicklow County Council on a regular basis for review and record purposes as required.

2.2 Environmental Setting

2.2.1 Geology

Soils

The EPA website publishes soils and subsoils maps created by the Spatial Analysis Unit of Teagasc in collaboration with the Geological Survey of Ireland and the Forest Service. This mapping indicates that the soils which previously occurred around the site at Ballinclare Quarry comprised:

- Acid Brown Earths and Brown Podzolics around the existing treatment ponds / grassland area – these are shallow well drained soils, largely derived from siliceous parent material (eg., diorite and sandstone);
- Lithosols and Regosols, around the quarry / development footprint – these are deep, well-drained soils derived mainly from shales and sandstones; and
- Surface water and Groundwater Gleys along the eastern site boundary – these are shallow, poorly drained soils derived from bedrock at or close to surface.

Across the proposed landfill area, the soils have been removed as part of past quarry development.

Subsoils

The published subsoil map for the area around the site indicates that shallow bedrock occurs over much of the northern and eastern area and that the south-western area of the site is underlain by till derived from lower Palaeozoic sandstone and shale. As with soils, subsoils have previously been removed across the existing quarry development footprint to facilitate the extraction and processing of rock.

Till generally occurs in the lower lying areas beyond the site, while rock outcrops at or close to the surface on locally higher ground. Mapping indicates that areas of alluvial soil occur along the Potters River approximately 200m to the north and west of the site and approximately 300m to the south and east of it.

Bedrock Geology

The Geological Survey of Ireland (GSI) 1:100,000 regional bedrock map, indicates that the quarry at Ballinclare is developed within Silurian Intrusive Diorite. The diorite body in which the quarry is developed is identified as the Carrigmore Diorite and is described as massive, uniform dark grey-green, fresh, very strong diorite.

The diorite is indicated by the GSI as occurring at the centre of a volcanic intrusion, grading outwards to a quartz-diorite at the intrusion margins, although diorite is also recorded at the south-eastern part of the intrusion and granodiorite at the south-western part. The diorite is recorded as being composed of augite, plagioclase and biotite, with minor amounts of quartz and K-feldspar and rare hypersthene and olivine. The intrusion extends approximately 1.9km from west to east and 2.1km from north to south.

The GSI notes that the diorite has been deformed by regional deformation in the area and chlorite coated jointing or slickensides and breccia zones are recorded. It is noted that veining of fibrous amphiboles, sparry calcite and quartz may be present.

The south-western corner of the site is underlain by the Kilmacrea Formation, described as a dark grey slate, with minor pale sandstone. The GSI 1:100,000 scale regional bedrock map indicates that there is faulting at the contact between the Kilmacrea Formation and the Diorite.

Examination of the exposed quarry faces at Ballinclare confirms that the quarry is entirely developed within massive Silurian Diorite. One thin zone of sheared and weaker rock with associated quartz veining was identified within the existing quarry, but this zone is thin and does not materially affect the resource present.

Extraction activity at the quarry ceased after a thin vein of naturally occurring asbestos (NOA) was exposed within the diorite at the quarry. This vein exposure has been contained and the associated risks to human health have been deemed by the Health and Safety Authority (HSA) to be acceptably low. Subsequent detailed visual

assessment of fibrous coated discontinuities within the exposed diorite indicated that they were typically very thin (<5mm), with the quantity of fibrous material present within them described as rare / very rare.

2.2.2 Hydrology

Ballinclare Quarry lies entirely within the Water Framework Directive (WFD) Ovoca-Vartry Catchment and the Redcross Sub-Catchment. At the EPA sub-basin level, the quarry is located within the Potter's River catchment. Potter's River flows to the north and east of the quarry. As it does, it initially flows in an easterly direction to the north of the quarry before then turning to flow in a south-easterly direction beyond its eastern boundary. The river is located c. 300m from the site at its closest point. The Kilmacurra Stream is located c. 200m to the south of the site and flows in an easterly direction, to its confluence with the Potter's River.

The Irish Sea lies c. 7.5km east of Ballinclare Quarry. The coastal area of the Irish sea east of the site is designated a Special Area of Conservation (SAC) for species and habitat. The water in the Potters River is not abstracted for drinking water or recreational use (refer to www.catchments.ie). There are no recorded surface water abstractions from Potter's River in the vicinity of the site indicated by the EPA 2009 abstraction register (www.epa.ie).

Surface water run-off collecting in sumps at the site represent a mixture of groundwater and rainfall / direct run-off to the quarry. Testing of run-off indicates elevated levels of ammonia and orthophosphate and are attributed to local agricultural practices. Elevated levels of arsenic are present due to naturally occurring arsenic in the quarry.

Existing surface water quality surrounding the quarry site is generally good. Slightly elevated levels of nitrates recorded in test samples are attributed to local agriculture practices / land use. Elevated levels of mercury have been recorded in surface water surrounding the application site in the past, and it was previously considered that discharge from the quarry would, in effect, reduce the concentration of mercury in the Potters River.

2.2.3 Hydrogeology

Bedrock aquifer maps published on the GSI website provide a detailed classification of bedrock aquifer types and indicate that the diorite bedrock is classified as a poor aquifer (PI) which is generally unproductive except in local zones. The closest classified sand and gravel aquifer is a locally important aquifer, located approximately 9km to the north of the application site and not connected to it.

The groundwater at the quarry site is indicated to be of good status according to the EPA Groundwater Body WFD Status Report for 2010-2015. The overall objective is to protect the water body and the groundwater body overall risk is described as "*Possibly at risk of not achieving good status*".

Ballinclare Quarry is located within the Wicklow Groundwater Body (GWB) which covers an area of 1,396km². It is described as being as a generally poorly productive aquifer, being composed primarily of low permeability rocks. There are large areas of the GWB where the rock is close to surface, which would suggest high potential recharge values, although recharge calculations must also consider the effect of rejected recharge by lower permeability rocks.

Mapping published by the GSI shows that the maximum recharge capacity at the site is 100mm/yr, although this can be expected to be further reduced by the typically low permeability of any landfill liner systems and inert wastes which is likely to be used to backfill the existing quarry void. Aquifers within the GWB are generally unconfined.

The majority of groundwater flow is likely to occur within the weathered near surface horizon and principally within the range of groundwater fluctuation, this is typically 10m in thickness, although it is reported that the majority of flow occurs within the upper 3m of the aquifer. Flow is mostly along a weathered zone in the bedrock, with flow in a lateral direction towards rivers and springs. As well as discharging to overlying streams and rivers as baseflow, groundwater flow also discharges directly to the sea along the coast.

In some instances, a greater degree of structural deformation may provide a fracture network which will allow groundwater movement at greater depth. Deep-water strikes are encountered (between 10m and 40m bgl), but

these are more isolated features along open fractures which allow groundwater flow. Only flow in isolated fractures is expected to occur below 30m depth (bgl).

Background groundwater quality samples have been taken from the three existing monitoring boreholes (GW1, GW2 and GW3) monthly from June 2019 to April 2021 and again in September 2022. Although it is noted that GW01 and GW02 will ultimately be down-gradient of the site, given that no landfilling has taken place to date, all three boreholes can be considered representative of background groundwater quality.

The groundwater monitoring data indicates that there are naturally elevated concentrations of arsenic and nickel in the groundwater. These are considered to reflect the natural chemistry of the diorite bedrock. There were detections of Nitrite at one monitoring well (GW1) during consecutive winters and it is considered that these were short term point sources from surrounding agricultural land-uses. Elevated levels of orthophosphates are also most likely attributable to agricultural practices in the local area.

In general the background quality is good, with no evidence of significant anthropogenic sources of pollution beyond the impact of farming.

2.2.4 Sensitive Receptors

Waste 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.

The principal sensitive receptors in the vicinity of the licensed facility comprise a number of private residential properties located immediately beyond the site boundaries. Emissions of dust and noise from waste disposal and recovery activities have the potential to adversely impact on the residents of these properties. In order to mitigate some of the potential impacts on residents of these properties, Kilsaran will implement a number of mitigation measures which will control and/or reduce emissions and provide enhanced screening (including locating plant and activities within quarry so as to maximise separation distance).

The two watercourses to the south and east of the site, the Potters River and Kilmacarra Stream are also considered to be sensitive receptors from the planned waste facility as they will receive (treated) surface water run-off and groundwater baseflow which has the potential to be impacted by the landfilling. The Potters River, as the significant surface water receptor, is classified as being of moderate quality but at risk of deteriorating. The river is of local significance but is noted to include an important salmonid system. The river would be sensitive to any reduction in surface water quality.

The groundwater bedrock aquifer (diorite) is classified as a poor aquifer which is generally unproductive and has only local significance. There are large areas where the rock occurs close to surface. Although this would suggest high potential recharge, when the effect of rejected recharge from lower permeability bedrocks is considered, the recharge capacity is quite limited. A number of groundwater supply boreholes are located within 1km of the quarry with poor yields recorded in all boreholes. Notwithstanding this however, boreholes located down-gradient of the site, to the south or east are considered to be potential sensitive receptors (most notably wells 3217NWW103 and 3217NWW126).

There are no designated nature conservation sites (Special Area of Conservation (SAC), Special Protection Area (SPA), Natural Heritage Area (NHA) or proposed Natural Heritage area (pNHA) within or immediately contiguous to Ballinclare Quarry. The closest such sites are the Deputy's Pass Nature Reserve SAC (Site Code 000717) and the Glenealy Woods pNHA (Site Code 001756), which, at their closest point are located approximately 1.6 km and 1.1km to the north-west of the application site respectively. The next closest site is the Buckronev-Brittis Dunes and Fen SAC (Site Code 000729) some 7km southeast of the application site.

2.2.5 Pathways

Potential noise and dust emissions from the waste recovery activities may be generated by HGV truck movements, by (mobile) earthworks plant and equipment engaged in haulage and landfill activities or by (fixed) crushers and

washing plant processing C&D wastes to produce recycled aggregates. Air borne emissions of dust and noise transmission from the proposed waste facility have the potential to impact on the occupants of the nearest residential properties.

Surface Water

At present, active water management currently routes excess surface water from the quarry site to the Ballinclare Stream to the west of it. Surface water run-off along with any groundwater inflow into the quarry void is currently pumped from two sumps in the base of the quarry and routed through a series of treatment (settlement) ponds before being discharged to the Potters River via the Ballinclare Stream in accordance with the requirements of the existing discharge licence (Ref. No. WPL-116).

In advance of landfilling, the quarry void is currently being dewatered, and the ponded water is being treated and discharged to the Ballinclare Stream via the route described above. This will continue to be the active water management route for excess surface water run-off / groundwater ingress during the inert landfilling and materials recovery / recycling activities at the site.

The existing quarry discharge licence (Ref. No. WPL-116) provides for the discharge of treated water to the Potters River. The discharge licence limits the volume of discharge from the development site to a maximum of 72m³/hr (1,728m³/day). Discharge emission limit values are set out in Table 1 of the licence. Elevated levels of arsenic in site run-off can be mitigated with the bespoke 'Siltbuster' water treatment system (as required by discharge licence WPL-116).

Although the existing discharge licence will remain in force as the quarry is dewatered, it will be superseded by any waste licence issued in respect of the proposed waste facility.

Groundwater

The proposed inert landfill facility will be developed within a quarry excavated within diorite bedrock with no overlying superficial deposits. Although high rates of potential recharge would be expected in areas where there are very thin subsoils, the area around the quarry site accepts little recharge from precipitation as the diorite is considered to be a poor aquifer with low storativity, with the majority of potential recharge flowing over ground to surface water features or, where site infrastructure is in place, to collection points for treatment. In addition, the steep slopes across the GWB area also give rise to increased surface water run-off.

Any groundwater flow within the bedrock will be minimal due to its very low bulk permeability. Groundwater flow will therefore be primarily within the near surface weathered horizon, which based on groundwater level monitoring data is at least 5m - 6m in thickness, with the bulk of flow likely to occur within the upper 3m of the aquifer. Groundwater flow is in a broadly southerly to easterly direction towards the Kilmacurra Stream and Potters River with groundwater providing baseflow to these watercourses.

Following completion of landfilling and restoration of the site, groundwater pathways will follow the local topography and route groundwater in a south-easterly to easterly direction towards the Kilmacurra Stream and Potters River.

In the event that some surface contamination of near-surface soil or ground were to arise, it could introduce contaminants both to surface waters (via discharge) and/or groundwater (via recharge) and have an adverse impact on water quality and/or resource potential.

2.3 Site Processes and Activities

Previous site processes and activities at Ballinclare Quarry which have been discontinued since 2016 which were similar in some respects to those at the proposed waste facility. Future activities at the quarry will focus on backfilling as opposed to excavating it, while the proposed waste recovery and recycling activities will primarily concentrate on the production of recycled aggregates (to engineering specifications and End of Waste standards) as opposed to production of primary (or 'virgin') aggregates. Past activities at the quarry also included the production of readymix concrete and concrete products as well as asphalt.

The proposed waste facility at Ballinclare Quarry provides for the continued use of much of the established site infrastructure and services in future including, site / weighbridge office, staff welfare facilities, wastewater treatment system, weighbridge, garage / workshop, wheelwash, hardstand areas, fuel and water storage tanks and internal haul roads. Some additional infrastructure will also be installed as necessary to support the proposed development, including an additional weighbridge and wheelwash, a portal frame shed and an on-site (passive) wetland treatment system and attendant drainage infrastructure to treat surface water run-off / groundwater.

The future waste activities at Ballinclare Quarry will include the following :

- Backfilling of the existing quarry void, through disposal of imported inert wastes (predominantly soil and stone and other claybound or particulate wastes) and its progressive restoration to long-term grassland / scrub habitat thereafter;
- Placement and compaction of the imported inert waste materials in backfilling and restoring the quarry void;
- Processing / recycling of solid construction and demolition (C&D) wastes (principally concrete products, bricks, ceramics and solid bituminous waste mixtures) in a new purpose-built shed housing crushing and screening equipment;
- Installation and operation of a soil washing plant in the former concrete / asphalt yard to recover sand and gravel aggregate for use in construction.
- Separation of any non-inert construction and demolition waste (principally metal, timber, PVC pipes and plastic) in any intermixed soil and stone / construction and demolition (C&D) wastes imported to site prior to its removal off-site to authorised waste disposal or recovery facilities;
- Re-use of an existing storage shed as a dedicated waste inspection and quarantine facility to inspect and store any suspect waste consignments as and if required.
- Stockpiling and storage of imported topsoil and/or subsoil pending re-use as cover material in phased restoration of the landfill;
- Environmental monitoring of noise, dust, surface water and groundwater for the duration of the proposed waste activities and for a defined aftercare period thereafter.

2.4 Site Inventory / Infrastructure

The existing / planned future site facilities, site plant and site infrastructure are listed below and are located in areas indicated in Figure 2. Some of these facilities and infrastructure were in place when the site was previously operated as a quarry and have been in place for many years.

Much of this infrastructure will remain in place and continue to be used following cessation of waste recovery activities:

- Buildings: site office; maintenance garage / workshop; waste quarantine shed.
- Drainage : proposed on-site (passive) wetland treatment system and attendant drainage channels and infrastructure (pipework) to collect, channel and pump site water to it;

- **Hardstanding and paved areas:** former concrete / asphalt production yard (to be re-used for soil washing activities) and former block yard (to be re-used for C&D waste recycling activities); paved and unpaved internal road system; employee and visitor parking
- **Plant and machinery:** wheel wash; weighbridges; bunded fuel tanks; mobile crushing and screening plant; soil washing plant, mechanical excavators; bulldozers;
- **Services:** existing septic tank and effluent treatment area; on-site transformer, electric cabling (buried and overhead).

2.5 Inventory of Raw Materials, Product and Waste

Table 1 overleaf provides a preliminary inventory of the raw materials, products and waste likely to be stored on-site at the proposed waste facility at Ballinclare Quarry. Materials to be stored will include oils, fuels and lubricants required for ongoing maintenance and repair of plant and equipment used in waste disposal / recovery / recycling activities and site handling / transport.

Table 1
Inventory of Raw Materials, Products and Waste

Type	Likely Storage Area	Likely Storage Type	Maximum Storage Capacity	Measurement Unit
Road Diesel	External Tanks	Bunded Tank	TBC	Litres
Marked Diesel (Gasoil)	Internal Tank	Bunded Tank	TBC	Litres
Diesel Engine Lubricant	Maintenance Garage / Workshop	Barrel on spill trap / Double skinned tank	TBC	Litres
Hydraulic Oil	Maintenance Garage / Workshop	Barrel on spill trap / Double skinned tank	TBC	Litres
Waste Oil	Maintenance Garage / Workshop	Bunded Area or Bunded Tanks	TBC	Litres
Hydrocarbon Fluids and Gels	Maintenance Garage / Workshop	Bunded Area or Bunded Tanks	TBC	Litres

3.0 FACILITY CLOSURE

3.1 Closure Considerations

This closure plan envisages that the licensed waste facility at Fassaroe will achieve a successful closure, such that, on cessation of waste disposal and 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 following works will be undertaken:

Inert Landfill Area

- the landform within the quarry void will be graded, rolled and compacted to create a uniform stable surface (flat and/or at appropriate safe slope angle)
- the temporary slope will be covered with 1m of compacted low permeability soil liner, comprising waste or non-waste soils already stockpiled on site (or, alternatively if required, imported to site either as waste or non-waste by-product under an Article 27 notification to the EPA);
- excess groundwater / surface water run-off from across and around the landfill footprint collecting in sumps at low-point(s) within the quarry void or with the partially backfilled landform will continue to be transferred by water pumping and transmission infrastructure (flexible piping) across the site to the on-site wetland treatment area for a 36 month period following facility closure;
- all mobile plant and equipment associated with the disposal, backfilling, placement and compaction of inert waste materials at the landfill facility will be removed off-site.

Waste Recovery Areas (C&D Shed and Soil Washing Plant)

- any unused oils, greases, lubricants, chemicals held in recovery plant and equipment (crushing and screening equipment or soil washing plant) will be drained off and removed off-site and re-used elsewhere;

Site Infrastructure / Overheads

- any used oil and fuel storage tanks will be emptied and decontaminated. Unused oil and fuel will be removed off-site and used elsewhere;
- any unused oils, greases, lubricants, chemicals held in the maintenance garage / workshop will be removed off-site and re-used elsewhere. Other hazardous (waste) materials will be removed to appropriately licensed waste disposal or recovery facilities;
- the hydrocarbon interceptor tank will be emptied and decontaminated; deposited silts will be removed from wheelwashes and the septic tank will be desludged. All wastes arising will be transferred off-site to appropriately licensed waste disposal or recovery facilities;
- any materials which are stored on site and found to exceed approved 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 (provision is made for monitoring over a 36-month period following the facility closure);
- attendance by appointed consultant / site manager to oversee closure works, co-ordinate environmental monitoring works and undertake any required liaison with EPA.

Given the restricted access to the quarry site and the absence of any shared access or shared infrastructure, it is considered that there is no requirement to make provision for any additional security attendance on site over and above remote monitoring (by way of CCTV).

As much of the storage and operational / maintenance infrastructure within the waste facility could be required for future re-start of disposal or recovery activities, all site offices and infrastructure servicing the development

will be left in place and will not be decommissioned, demolished or otherwise removed off site as part of the facility closure works.

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:

- existing backfilled landforms within the quarry voids will be covered by 1m of compacted low permeability soil liner and uniformly graded and stable;
- all dedicated mobile plant and equipment associated with the disposal and recovery activity (specifically landfilling, waste placement and compaction equipment) will have been decontaminated and/or removed off site;
- any potential pollutants and/or wastes associated with the disposal and recovery activities will have been removed off site.

3.3 Closure Plan Costing

The expected costs (present-day values), associated with the future closure of the planned waste facility at Ballinclare 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 used to cover facility closure or environmental protection costs.

Table 2
Waste Facility Closure Costs

ACTIVITY	QUANTITY	UNITS	RATE (€)	COST (€)	SOURCE
Remove all mobile plant (mechanical excavators and bulldozers) off site	Item	Sum	10,000	10,000	SLR Estimate
Decommission site infrastructure					
Empty hydrocarbon interceptor and tanker off-site (assume 5 tonnes sludge)	Item	Sum	2,000	2,000	SLR Estimate
Emptying and cleaning of oil and fuel storage tank (assume 5 tonnes sludge) and transfer of bottom sludge to off-site disposal/ recovery facility	Item	Sum	5,000	5,000	SLR Estimate
Removal of excess oils and lubricants from garage, workshop and external tanks and recovery at off-site facility	10	Tonnes	200	2,000	SLR Estimate
Removal of other (solid / liquid) chemical wastes from laboratory / workshop and disposal or recovery off-site	5	Tonnes	200	1,000	SLR Estimate
De-silting of wheelwashes and disposal of silt at off-site non-hazardous landfill facility (assume 5 tonnes solid waste)	Item	Sum	3000	3,000	SLR Estimate
Emptying of septic tank and disposal of solid waste (10 tonnes) at off-site facility	Item	Sum	1,500	1,500	SLR Estimate

ACTIVITY	QUANTITY	UNITS	RATE (€)	COST (€)	SOURCE
Re-profile and grade upper surface of any in-situ inert waste materials at landfill facility	25,000	m ³	1	25,000	TII / SLR Estimate
Place and compact available low permeability soil cover, create stable landform and facilitate surface water run-off	20,000	m ³	1.60	32,000	TII / SLR Estimate
Surface preparation, grass seeding, ground repair and spraying (sloped temporary landfill surface)	4	ha	7,500	30,000	SLR Estimate
Continued pumping of surface water run-off and dewatered groundwater from part backfilled quarry to settlement ponds / interceptor (assume energy consumption of 100,000 kWh/yr for 3 years)	300,000	kWh	0.25/ kWh	75,000	Electric Ireland
Ongoing maintenance / monitoring of on-site wetland treatment system	3	years	15,000	45,000	SLR Estimate
Net (after-sale) cost of processing / recovery and off-site transfer of waste materials remaining on-site	40,000	Tonne	2	80,000	Provision
Off-site transfer and recovery / disposal of non-inert waste materials remaining on-site	200	m ³	150	30,000	Provision
Environmental Monitoring of Noise, Dust, Water (Quarterly for 3-year period, incl. closure works)	12	Quarter	4,000	48,000	SLR Estimate
Provision of remote surveillance / security services	36	Month	1,500	54,000	SLR Estimate
Provision of utilities to site offices (light / heat / water)	36	Month	500	18,000	Electric Ireland / Irish Water

ACTIVITY	QUANTITY	UNITS	RATE (€)	COST (€)	SOURCE
Closure Validation Report	Item	Sum	10,000	10,000	SLR Estimate
Total Site Closure Cost (excl. VAT)				€471,500	
15% Contingency (to address unforeseen issues / liabilities)				70,725	
Total Site Closure Cost (excl. VAT)				€542,225	

3.4 Closure Plan Update and Review

Following award of any waste licence in respect of the proposed waste facility at Ballinclare Quarry, this preliminary Closure Plan will be reviewed and agreed with the EPA and will likely be reviewed annually thereafter (or otherwise in accordance with the requirements of the waste licence). Any updates necessary to take account of facility or operational changes, technology changes and costing changes (inflation) will be identified in Annual Environmental Report (AER) submissions to the EPA.

3.5 Closure Plan Implementation

The EPA will be given 3 month notice of any proposed temporary closure or suspension of activities and 6 month 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 3-year monitoring period thereafter);
- a Certificate of Completion for the CRAMP.

4.0 FACILITY RESTORATION AND AFTERCARE

4.1 Inert Landfill Facility

The principal waste activity to be at Ballinclare Quarry is the landfilling and restoration of the lands within the former bedrock quarry. It is intended that following completion of landfilling activity the site will be restored to a landform which closely resembles that which pre-existed the quarry development and merges with the surrounding landscape.

As working areas are progressively filled to within 1 metre of proposed final ground level over the working life of the landfill facility, a cover layer comprising 150mm of topsoil and up to 850mm of subsoil will be placed above the inert (principally soil and stone) waste materials.

The soil cover layer will initially be seeded with a grass mix in order to promote stability and minimise soil erosion and dust generation. Some hedgerows will also be planted to re-establish former field boundaries which were lost in order to facilitate the development of the quarry, as provided for in the long-term final restoration plan submitted for planning approval (and shown in Figure 4).

On completion, it is expected that the backfilled quarry land will be passively managed and that they will likely return to a long-term grassland / scrub habitat, and possibly some agricultural grassland use, similar to that which existed prior to quarrying.

Topsoil and subsoil will be imported to the site on a continual basis and used immediately in landfilling at the former quarry. Topsoil and subsoil shall be stockpiled separately within the quarry footprint, away from the active landfilling area and in such location and used on an ongoing basis in progressive restoration works as the upper surface of the landfill approaches the proposed final ground level.

On completion, most rainfall over the landfill footprint will run-off over the ground surface to be collected by surface water channels which will carry it to the wetland area (and/or separate settlement pond, if required) on the western side of site, from whence it will be discharged off-site to the Ballinclare Stream and Potter's River. A minor proportion (if any) may percolate into the backfilled soil mass (depending on the permeability and/or degree of saturation of the soil at the ground surface).

Locally, in the south eastern corner of the landfill area, the final restored ground levels will be lower than at the discharge point to the Ballinclare Stream and cannot therefore drain to it under gravity. Accordingly, surface water run-off from this area will collect at a swale / attenuation pond to be constructed close to the south-eastern boundary. Discharge from the swale will be to a minor (unnamed) stream which flows for 300m parallel to the L1157 Local Road and into the Kilmacurragh Stream, which in turn flows into the Potters River approximately 400m further downstream.

The long-term surface water management regime for the backfilled landform, will be established incrementally on an ongoing basis over the working life of the landfilling in line with progressive restoration works. On completion of landfilling activity, any outstanding long-term site drainage works will be completed.

4.2 C&D Waste Recovery / Recycling Facility

At the present time, it is anticipated that C&D waste recovery / recycling activities will cease at Ballinclare Quarry following cessation of landfilling activity at the adjoining inert landfill facility.

On cessation, any remaining stockpiles of unprocessed C&D waste will be crushed and added to processed waste stockpiles. These stockpiles will in turn be gradually run down as recycled (secondary) aggregate is sold to the market.

All processing plant and machinery will be removed off-site and any related site infrastructure will also be decommissioned and/or removed off-site as appropriate.

Any extended paved or hardstanding surfaces around the C&D waste recovery / recycling area will be excavated in phases as space is freed up and will be processed / recovered on-site and sold to market. If a residual volume of processed aggregate remains at the end, it will be either be used in final restoration works around the application site or transferred off-site to another C&D waste recovery / recycling facility.

As the paved or hardstanding surfaces are excavated and recycled, a replacement cover layer comprising a combined 500mm of topsoil and mineral subsoil will be placed over exposed in-situ soil. This material will most likely be imported (as non-waste by-product) from construction sites.

The upper surface of the reinstated ground around the recovery area will be graded so as to ensure that any surface water run-off falls to drainage channels which will run north-westwards, toward the wetland area. The area will then be seeded with a native grass mix and will most likely evolve to a seasonal grassland habitat over time.

4.3 Facility Closure Arrangements

4.3.1 Site Management and Supervision

Kilsaran will delegate responsibility for management of the final site closure and restoration works to a nominated individual or staff member and will ensure that this person has the necessary knowledge and authority to direct and oversee the closure and decommissioning activities and any aftercare activities (principally environmental monitoring and site maintenance works).

4.3.2 Long Term Site Safety and Security

All existing perimeter security features, site access and proposed upgrading / modifications thereto will remain in place following facility closure and expiry of any agreed aftercare period.

Existing perimeter berms, fencing and hedgerows will be surveyed again post facility closure and upgraded / enhanced where required. These works, combined with the securing and locking of the existing entrance gates will prevent any unauthorised third-party access to the facility.

Given the restricted access to the quarry site and the absence of any shared access or shared infrastructure, it is considered that there is no requirement to make provision for any additional security attendance on site over and above remote monitoring (by way of CCTV).

4.3.3 Long Term Surface Water and Groundwater Management

The quarry at Ballinclare is located at an area which originally had very little (if any) overburden cover and based on site observations is known to be relatively impermeable (below a thin, near-surface weathered zone). It is therefore inferred that the original (pre-quarrying) regime at the site would have meant that there was relatively small amount of recharge to groundwater and that most rainfall ended up as run-off over the ground surface to the natural drainage network.

The material to be used to complete the backfilled landform will generally comprise clayey glacial till and will likely replicate the pre-development hydrology of the site and minimise post-closure infiltration into the backfilled inert landfilled mass.

In the long-term, following closure, there will likely be no significant difference in infiltration characteristics between the original and restored landform and no requirement to attenuate any surface water run-off from the site.

In the short term however, immediately post-closure there could be some slight increase in the rate of run-off (relative to pre-development phase) while vegetative cover is establishing over the final landfill phase.

Following completion of restoration works, the wetland area at the western end of the application site will remain in-situ and allowed to naturally evolve and re-wild, with no provision being made for any active long-term maintenance. The wetland will then effectively serve as a long-term soakaway, settlement lagoon and/or

attenuation pond for any surface water run-off prior to its discharge off-site via the established drainage network to the Ballinclare Stream.

Post closure, the surface water management system at the landfill provides for a shallow scrape or swale to intercept surface water run-off from the restored landform and to direct it to the wetland area and / or a settlement lagoon on the western side of the site and to the Ballinclare Stream thereafter, as shown on Figure 4.

Due to the topography of the proposed landform, it will not be possible to direct all the run-off from the restored landform to the wetland / proposed settlement lagoon by gravity and as such, the residual, southern flank will be drained to a swale along the southern boundary that will discharge to an existing stream which flows to the Kilmacurra Stream, as also shown on Figure 4.

4.3.4 Decommissioning of Plant and Machinery

On completion of site operations, all mobile plant and equipment associated with backfilling and C&D waste recovery activities at Ballinclare Quarry will be removed off-site. Any dedicated site accommodation, infrastructure and/or services will also be progressively decommissioned and where appropriate will also be dismantled and/or removed off-site for re-use at other locations or disposal / recovery at authorised waste disposal or recovery facilities.

4.4 Aftercare Management

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

Some establishment maintenance will be carried out across the application site for a period of up to 3 years following final seeding / hedgerow establishment works, with a minimum of 3 maintenance visits per year (i.e. spring, summer and autumn). This work will principally comprise weed control, replacement planting where required and the adjustment/removal of tree ties and spiral guards.

Thereafter, the restored lands will either be returned to a local farmer and most likely passively managed. It is expected that over time, the restored landform will ultimately merge into the surrounding local rural agricultural landscape.

The process of surrendering the waste licence to the EPA will progress following closure and either simultaneously with, or immediately following, the aftercare period in order to remove the legal encumbrance on title deeds to the restored lands.

4.4.1 Short Term Aftercare Management

The restoration aftercare management plan for the proposed waste facility at Ballinclare Quarry will comprise two principal aftercare activities:

Ongoing Environmental Monitoring

Following final closure and restoration works, environmental monitoring of air, surface water and groundwater will continue as per waste licence requirements until such time as the waste licence is surrendered in its entirety. A minimum of 3 years post closure monitoring will be undertaken to demonstrate that no surface / groundwater contamination is present or emerging following the closure of the facility.

Maintenance of Grass Sward

The aftercare of the grass sward over the landfilled area will be as per the manufacturer's instructions of the grass seed used and as per the requirements of the proposed future use of the agricultural site. The initial maintenance management will be supervised by the facility manager or other designated Kilsaran staff.

4.4.2 Long-Term Aftercare Management

Due to the inert nature of the landfilled wastes and any waste handled and processed at the recovery facilities, it is considered that there is no requirement for any long-term aftercare monitoring and/or maintenance. This is expected to be confirmed by the ongoing environmental management programme.

4.5 Final Restoration and Aftercare Management Costs

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

Table 3
Restoration and Aftercare Costs (based on 3 Year Aftercare Period)

ACTIVITY	QUANTITY	UNITS	RATE (€)	COST (€)	SOURCE
Hedgerow Planting across landfill site are (ground preparation, supply of plants and planting works)	1,200	m	7.50	9,000	SLR Estimate
Breaking up of pavement and hard-standing surfaces (across C&D waste recovery / recycling area) using hydraulic breaker	2,500	m ³	18	45,000	SLR Estimate
Validation testing to classify C&D waste	20	sample	200	4,000	SLR Estimate
Net (after-sale) cost of processing / recovery and off-site transfer of waste materials remaining on-site	1,500	tonne	2	3,000	SLR Estimate
Final grading / placement of topsoil previously imported and stockpiled on site (principally limited to C&D waste recovery / recycling area)	4	ha	6,000	24,000	SLR Estimate
Surface preparation, grass seeding, ground repair and spraying (principally limited to C&D waste recovery / recycling area)	4	ha	7,500	30,000	SLR Estimate
Surface water management costs (pumping from temporary sumps to wetland area for 1 year)	Item	Sum	10,000	10,000	SLR Estimate
Decommission / remove pumping equipment and flexible pipeline infrastructure	Item	Sum	6,000	6,000	SLR Estimate
3 years establishment maintenance for grassland / hedgerows	3	years	6,000	18,000	SLR Estimate

ACTIVITY	QUANTITY	UNITS	RATE (€)	COST (€)	SOURCE
Empty interceptor and tanker waste off-site	Item	Sum	1,500	1,500	SLR Estimate
Additional 3-year environmental monitoring (at quarterly intervals)	12	Quarter	4,000	48,000	SLR Estimate
Post closure investigations, preparation and submission of Waste Licence Surrender Application	Item	Sum	25,000	25,000	SLR Estimate
Surrender of Waste Licence to EPA (Fee)	Item	Sum	6,000	6,000	SLR Estimate
Provision of remote surveillance / security services	36	Month	1,500	54,000	SLR Estimate
Provision of utilities to security office (light / heat / water)	Month	12	500	6,000	ESB / Irish Water
Total Restoration and Aftercare Cost (excl. VAT)				€289,500	
15% Contingency (to address unforeseen issues / liabilities)				€43,425	
Total Restoration and Aftercare Cost (excl. VAT)				€332,925	

4.5.1 Closure Plan Costs

The anticipated cost of the planned, phased facility closure is €542,225 (present day value and inclusive of 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 waste landfilling and materials recovery / recycling activities and the subsequent landfill temporary capping and decommissioning / removal of plant and waste infrastructure from the facility, no residual environmental risks will arise across the waste facility and/or areas where principal waste activities are located.

4.5.2 Site Restoration and Aftercare Management Costs

The anticipated costs of the site restoration and aftercare management is €332,925 (present day value and inclusive of 15% contingency, as outlined in Table 3 of this plan. These costs are based on a projected minimum aftercare management period of 3 years post closure / final restoration, with no requirement for long-term aftercare monitoring and maintenance following waste licence surrender.

4.6 Financial Provision

Subject to Agency approval and agreement, Kilsaran will make financial provision for the closure and final restoration of the waste facility at Ballinclare 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 completion of site restoration and aftercare works at Ballinclare.

The initial amount of the bond will be agreed with the Agency on the basis of the assessments provided on foot of a CRAMP to be formally submitted for approval to the EPA on foot of any waste licence issued by it in respect of the proposed waste facility. The agreed CRAMP will have due regard to any specific conditions attaching to the waste licence and will be reviewed periodically as required by the waste licence. The amount of the financial provision will be adjusted following periodic review and update of the CRAMP (having due regard to ongoing progressive restoration and other related matters).

FIGURES

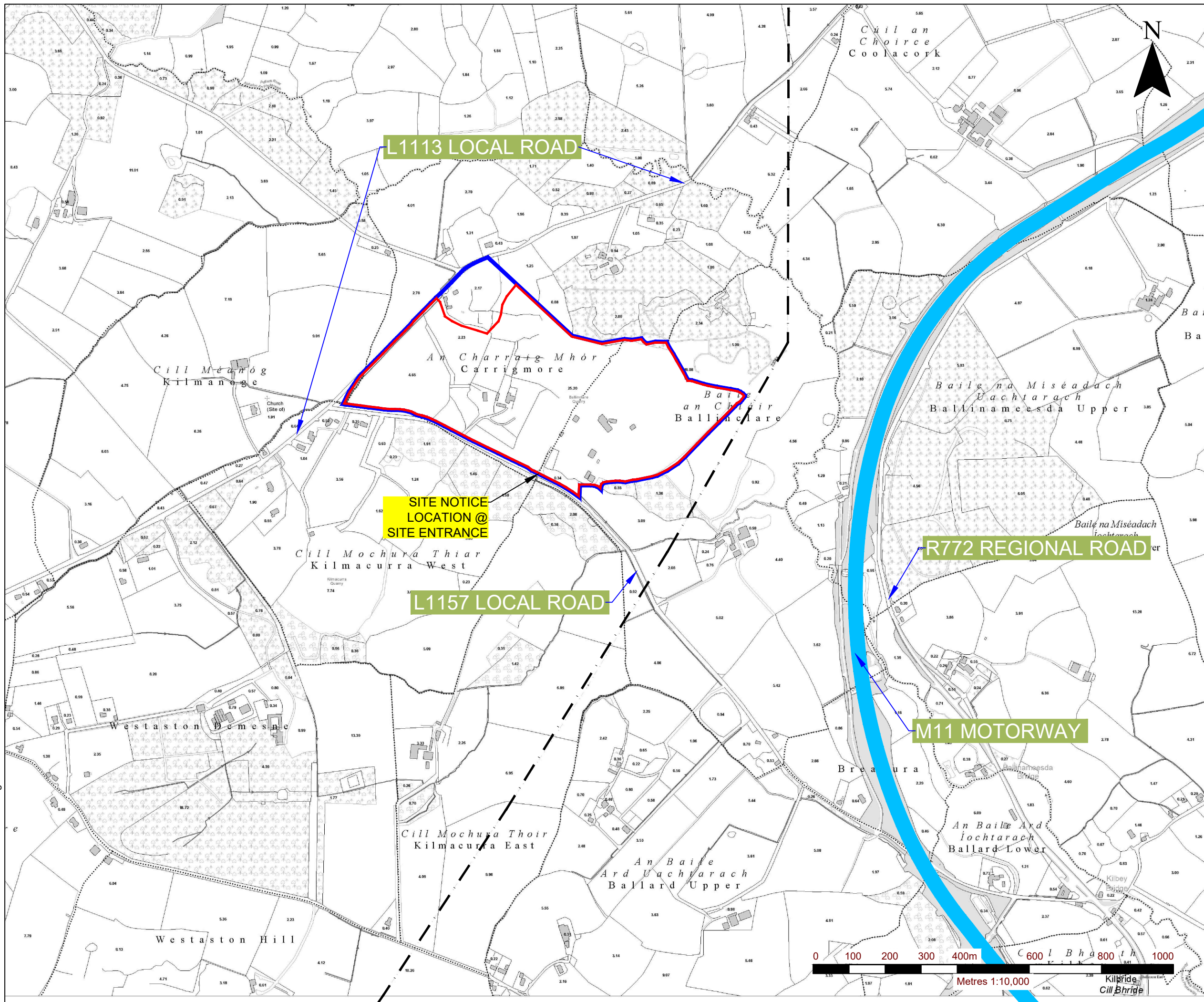
Figure 1
Existing Site Location

Figure 2
Site Layout

Figure 3
Environmental Monitoring Locations

Figure 4
Restoration Plan

00036.00080.0.16.FIG 1.Site Location Plan.dwg



NOTES

- EXTRACT FROM ORDNANCE SURVEY 6 INCH MAPPING WW030 & WW0311
- ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032 (C) ORDNANCE SURVEY IRELAND/ GOVERNMENT OF IRELAND

LEGEND

- LANDHOLDING BOUNDARY (c. 36 Ha. / 89 acres)
- PLANNING APPLICATION AREA (c. 32.5 Ha.)
- 220kV ELECTRIC OVERHEAD LINE

L1113 LOCAL ROAD

SITE NOTICE LOCATION @ SITE ENTRANCE

L1157 LOCAL ROAD

R772 REGIONAL ROAD

M11 MOTORWAY

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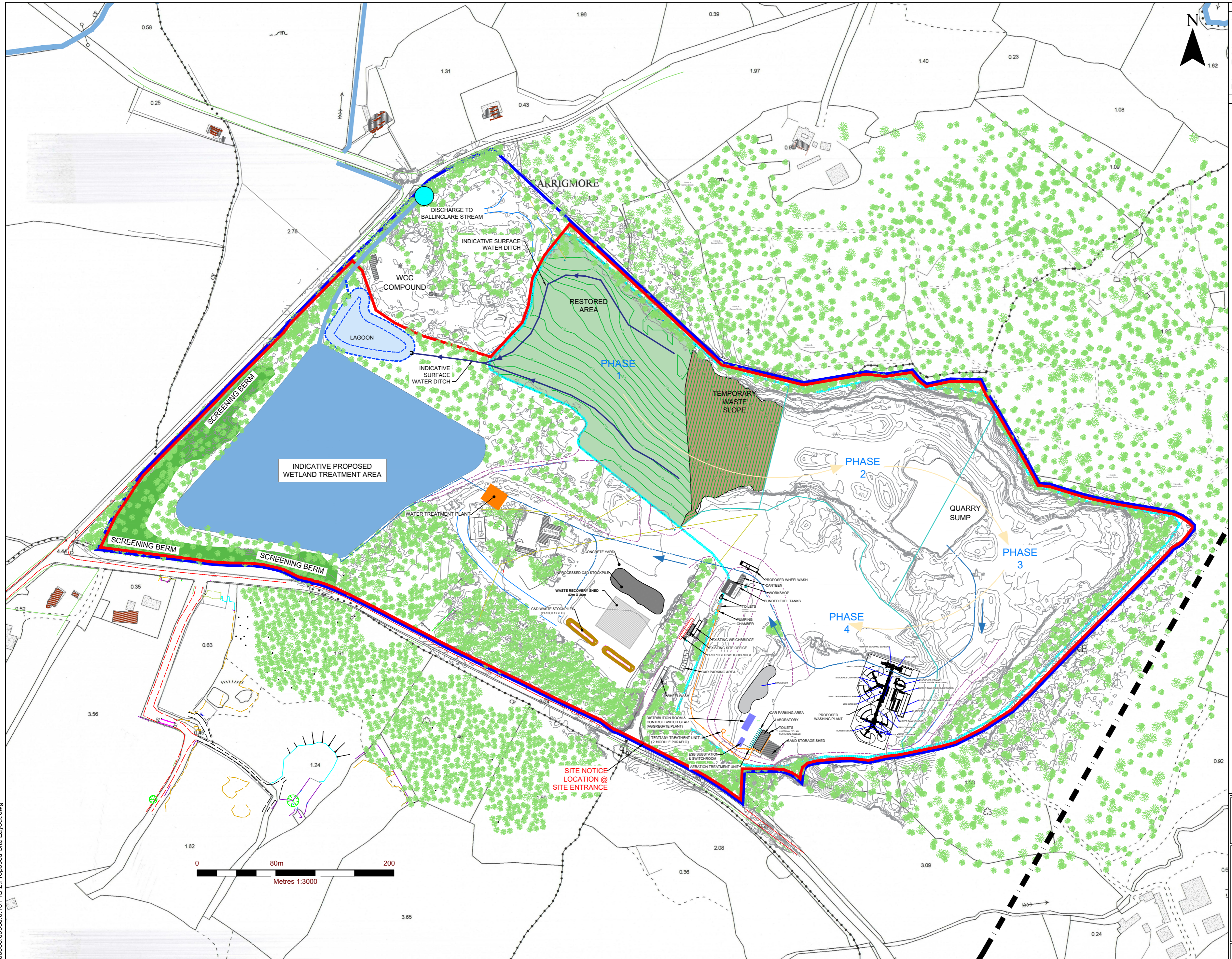
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CLOSURE, RESTORATION AND AFTERCARE MANAGEMENT PLAN

BALLINCLARE QUARRY RESTORATION
INERT WASTE & C+D WASTE RECOVERY FACILITY
KILBRIDE (N11), CO. WICKLOW

SITE LOCATION PLAN

FIGURE 1

Scale 1:10,000 @ A3 Date FEBRUARY 2023



NOTES

- EXTRACT FROM ORDNANCE SURVEY 1:2,500 / 1:5,000 MAP SERIES: 4137-B & 4137-D
- ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032 (C) ORDNANCE SURVEY IRELAND/ GOVERNMENT OF IRELAND
- EXISTING SURVEY (MAY 2016) PROVIDED BY KILSARAN

- LEGEND**
- LANDHOLDING BOUNDARY (c. 36 Ha. / 89 acres)
 - PLANNING APPLICATION AREA (c. 32.5 Ha.)
 - PROPOSED INERT LANDFILL AREA (c. 17.0 Ha.)
 - CONTOURS
 - INTERNAL ACCESS TRACKS
 - OVERHEAD LINES
 - 220KV ELECTRIC OVERHEAD LINE
 - PROPOSED DISCHARGE POINT
 - RESTORED AREA
 - TEMPORARY WASTE SLOPE
 - PUMPED WASTE WATER FROM SURFACE RUNOFF

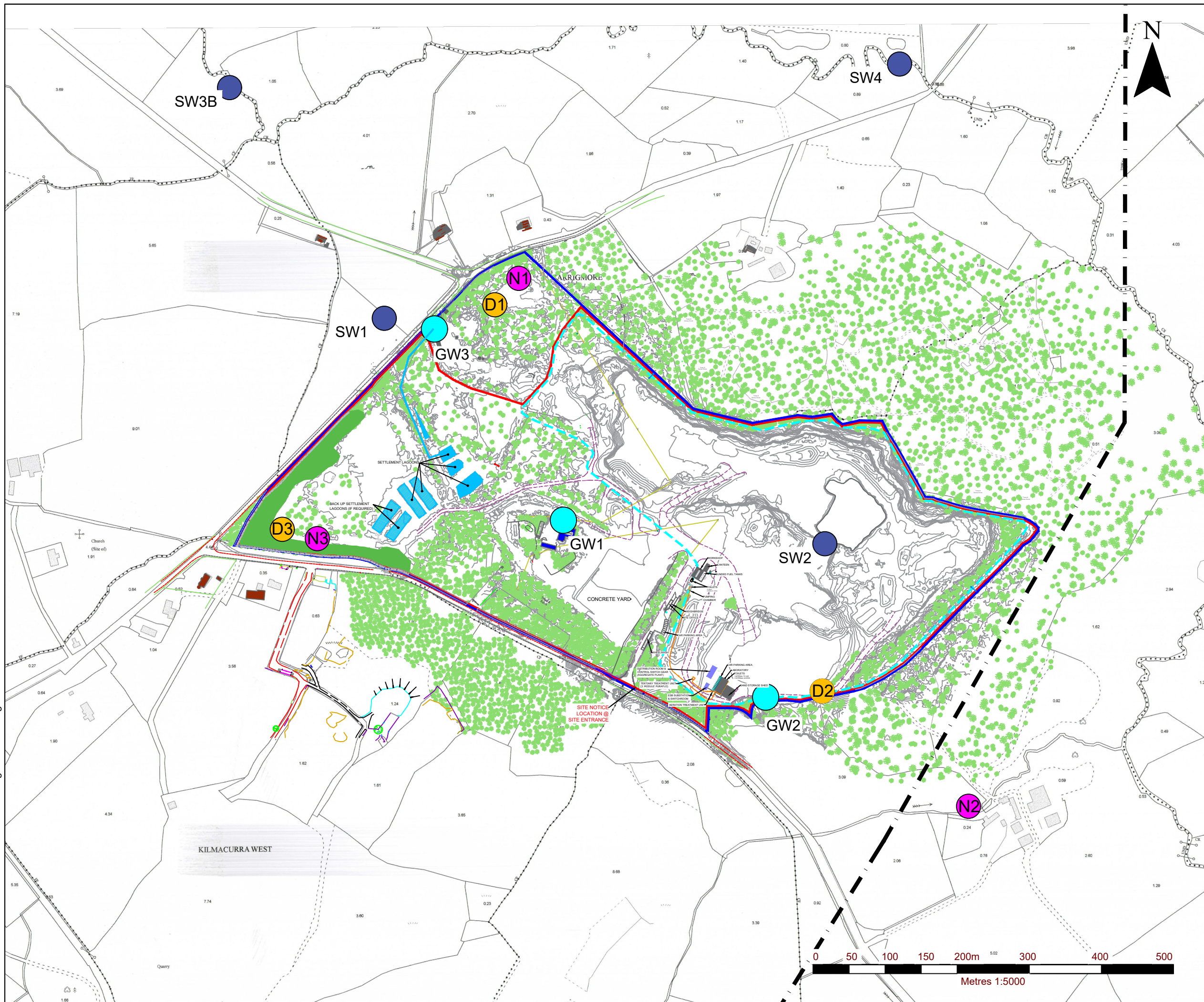
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KILBRIDE (N11), CO. WICKLOW
PROPOSED SITE LAYOUT

FIG 2
Scale: 1:2,500 @ A2 Date: FEBRUARY 2023

00036.00080.0.16.FIG 2.Proposed Site Layout.dwg

00036.00080.0.16.FIG 3.Environmental Monitoring Locations.dwg



NOTES

1. EXTRACT FROM ORDNANCE SURVEY 6 INCH MAPPING WW030 & WW0311
2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032 (C) ORDNANCE SURVEY IRELAND/ GOVERNMENT OF IRELAND
3. EXISTING SURVEY (MAY 2016) PROVIDED BY KILSARAN

LEGEND

	LANDHOLDING BOUNDARY (c. 36 Ha. / 89 acres)
	PLANNING APPLICATION AREA (c. 32.5 Ha.)
	PROPOSED INERT LANDFILL AREA (c. 17.0 Ha.)
	DUST MONITORING LOCATIONS
	NOISE MONITORING LOCATIONS
	SURFACE WATER MONITORING LOCATIONS
	GROUNDWATER MONITORING LOCATIONS

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ENVIRONMENTAL MONITORING LOCATIONS

FIG 3

Scale 1:5,000 @ A3 Date FEBRUARY 2023

00036.00080.0.16.FIG 4.Restoration Surface and Landscape Plan.dwg



NATIVE HEDGE MIX
 Two rows to be planted at 40cm centres with rows 40cm apart (i.e. 2.5 plants/m; approx. 1,250m in total = 3,125 plants). Transplants to be planted randomly with no more than 3 plants of the same species in one row. Feathered Transplants to be planted approximately every 8m, with a random allocation of alder and oak along the hedge, and to be maintained as hedgerow trees.

No.	Plant Name	Common Name	Height (cm)	Age	%
<i>Transplants/Container Grown Shrubs</i>					
340	Corylus avellana	Hazel	60-90	1+0	20
560	Crataegus monogyna	Hawthorn	60-90	1+1	25
225	Ilex aquifolium	Holly	60-80	2Lt	10
225	Prunus avium	Wild Cherry	60-90	1+0	10
340	Prunus spinosa	Blackthorn	60-90	1+0	20
225	Sambucus nigra	Elder	60-90	1+1	10
<i>Feathered Transplants</i>					
110	Alnus glutinosa	Common alder	175-200	2xTR	2.5
110	Quercus petraea	Sessile oak	175-200	2xTR	2.5

NOTES
 ORDNANCE SURVEY IRELAND LICENCE CO. SU 0000720 (c) ORDNANCE SURVEY IRELAND & GOVERNMENT OF IRELAND

LEGEND

- LANDHOLDING BOUNDARY (c. 36 Ha. / 89 acres)
- PLANNING APPLICATION AREA (c. 32.5 Ha.)
- PROPOSED INERT LANDFILL AREA (c. 17.0 Ha.)

RESTORATION MEASURES

- AREAS TO BE RESTORED TO AGRICULTURAL GRASSLAND
- PROPOSED NATIVE HEDGEROWS
- WETLAND TREATMENT AREA TO BE RETAINED AS A WILDLIFE / BIODIVERSITY FEATURE

RESTORATION PROPOSALS
 The inert landfill area at Ballinclare, Co. Wicklow will be restored to agricultural grassland, which is one of the beneficial afteruses recommended in the EPA Guidelines 'Environmental Management in the Extractive Industry' (2006). The restoration will take place on a phased basis, in conjunction with the phased filling activities. The below restoration elements will be implemented.

Retention of Existing Vegetation: All existing screening vegetation along the site boundaries, and most of the internal woodland areas and scrub vegetation will be retained.

Spreading of soil and grass seeding: The area to be grass seeded will be covered with approximately 350mm of subsoil and 150mm of topsoil on completion of each phase of the landfilling/re-grading works. The material will be sourced from the material imported into the site, which will be stored in temporary stockpiles. Once the earthworks are complete the area will be grass seeded, using a suitable agricultural grass seed mix.

Hedge Planting: On completion of all earthworks, native hedges will be planted in the approximate locations of former boundary lines, to provide green corridors and break up the large site.

NOTES:
Earthworks: All soil handling to be carried out, as per current best practice guidance. Topsoil and subsoil to be handled separately.
Grass Seeding: Prior to any seeding works surface preparation and final cultivation will be carried out in accordance with current best practice. Seeding to take place whilst suitable weather conditions prevail. The sowing specifications will be as per the manufacturer's instructions.

Planting General: All proposed species are native. All plants to be protected with spiral guards or alternatively with rabbit proof fencing. All plant handling, planting and establishment works will be carried out in accordance with current best practice and will take place in the appropriate planting season (e.g. bareroot planting: November to March only) and in favourable weather conditions. The planting will be carried out by a suitably qualified landscape contractor.
Aftercare: Establishment maintenance will be carried out for 2 years following each stage of the planting works (minimum 3 maintenance visits per year; i.e. spring, summer and autumn). This will include weed control, replacement planting where required and the adjustment/removal of tree ties and spiral guards.

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 KILBRIDE (N11), CO. WICKLOW
RESTORATION SURFACE AND LANDSCAPING PLAN

FIGURE 4
 Scale 1:2,500 @ A3 Date FEBRUARY 2023

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