Natura Impact Statement

Materials Recovery Facility and Inert Landfill
Ballinclare Quarry, Co. Wicklow

in support of the Appropriate Assessment Process

Prepared for:

Kilsaran Concrete Unlimited Company

Prepared by:

Ecology Ireland Wildlife Consultant Ltd.

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Table of Contents

1 Introduction 1
1.1 Methodology 3
1.1.1 Guidance 3
1.1.2 Information Consulted for this Report 4
2 Stage 1: Screening for Appropriate Assessment 5
2.1 Brief Description of the Site & Project 5
2.1.1 Site Location & Infrastructure 5
2.2 Existing Water Management System 5
2.3 Development Overview 6
2.3.1 Site Preparation / Establishment Works 8
2.3.2 Soil Washing / Aggregate Recovery Plant 11
2.3.3 C&D Waste Recovery Shed 11
2.3.4 Phasing of Landfilling Works 12
2.3.5 Intake Capacity and Expected Lifespan 14
2.3.6 Landfill Volume 14
2.3.7 Rate of Waste / Material Intake 14
2.3.8 Development Lifespan 15
2.3.9 Working Hours 16
2.3.10 Employment 16
2.3.11 Site Access 17
2.3.12 Traffic Movements 18
2.3.13 Site Restoration 19
C&D Waste Recovery Facility 20
3 Description of the Natura 2000 Sites 23
3.1 Designated Sites 23
4 Stage 1: Assessment Criteria 31
4.1 Elements of the Project Likely to Impact on the Natura 2000 Sites 31
4.1.1 Direct Habitat Loss 31
4.1.2 Indirect Habitat Loss or Deterioration 31
4.1.3 Likely Significant Effects: Conclusion 33
4.2 Likely Impacts of the Project on the Natura 2000 Sites 33
4.2.1 Size, Scale & Land-take 33
4.2.2 Distance from or Key Features of the Natura 2000 Sites 33
4.2.3 Resource Requirements (water abstraction *etc.*) 33
4.2.4 Excavation Requirements 34
4.2.5 Emission (disposal to land, water or air) 34
4.2.6 Transportation Requirements 34
4.2.7 Duration of Operations 34
4.2.8 Cumulative and In-combination Effects 34
4.3 Likely Changes to the Natura 2000 Sites 35
4.3.1 Reduction of Habitat Area 35
4.3.2 Disturbance to Key Species 35
4.3.3 Habitat or Species Fragmentation 35
4.3.4 Reduction in Species Density 35
4.3.5 Changes in Key Indicators of Conservation Value (water quality *etc.*) 36
4.4 Likely Impacts on the Natura 2000 Sites as a Whole 36
4.4.1 Interference with the Key Relationships that Define the Structure and Function of the Natura 2000 Sites 36

4.5 Indicators of Significance as a Result of the Identification of Effects Set Out Above 36
4.5.1 Loss 36
4.5.2 Fragmentation 36
4.5.3 Disruption 36
4.5.4 Disturbance 36
4.5.5 Change to Key Elements of the Site 37
4.6 Elements of the Project Likely to Significantly Impact on the Natura 2000 Sites or where the Scale or Magnitude of Impacts are Unknown 37
5 Natura Impact Statement 38
5.1 Impact Assessment 49
5.1.1 Characterising Impacts 49
5.1.2 Potential Effects from the Proposed Development to Qualifying Habitats and Species of Natura 2000 Sites within the Project Zone of Influence 50
5.2 Best Practice Design and Mitigation Measures 50
5.2.1 Mitigation Strategy 51
5.2.2 Mitigation measures and design elements 51
5.3 NIS Summary and Conclusion 59
5.3.1 Integrity Of The Site 59
5.3.2 Integrity of the Natura 2000 Sites within the Project Zone of Influence 59
5.4 Conclusion 63
6 References 64

Appendix A – Site Synopsis & Conservation Objectives

Appendix B – Mitigation Commitments

Executive Summary

This Natura Impact Statement (NIS) is presented as part of the appropriate assessment process to identify whether significant impacts on a Natura 2000 site are likely to arise from the proposed development of an Materials Recovery / Recycling Facility and Inert Landfill at the former Ballinclare Quarry site in Co. Wicklow. The application 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 included extraction of diorite bedrock using blasting techniques; processing (crushing and screening) of the fragmented rock to produce aggregates for on-site concrete (readymix) and asphalt production for road construction and related site development works.

The existing quarry development at Ballinclare extends across approximately 24 hectares (c. 59.3 acres), of which the existing quarry extraction area extends to c. 9.3 hectares (c. 22.9 acres). 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 above 90mOD at the highest point along the northern boundary where the main quarry face cuts into a rock slope which rises northwards. Typical levels along the northern quarry boundary range from 50mOD to 70mOD.

Kilsaran Concrete Unlimited Company intend to establish and operate a materials recovery / recycling facility and inert landfill at Ballinclare Quarry, Kilbride, Co. Wicklow. The proposed development comprises three key elements

- a soil washing plant to win aggregate from imported soil and stone;
- a construction and demolition (C&D) waste recycling facility to produce aggregate from construction and demolition waste (principally concrete); and
- an engineered (i.e. lined) landfill to facilitate backfilling and restoration of the existing quarry void with inert waste (principally soil and stone).

The proposed development will provide for the importation, re-use, recovery and/or disposal of by-product materials and inert wastes generated by construction and development projects in Counties Wicklow, Dublin and Wexford as well as the backfilling and long-term restoration of the former quarry to native woodland habitat.

Having carried out the Stage 1 Appropriate Assessment Screening, the competent authority may determine that a Stage 2 Appropriate Assessment of the Proposed Development is required as it cannot be excluded, on the basis of objective scientific information following screening under this Regulation 42 of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended, that the Proposed Development, individually or in combination with other plans or projects, will have a significant effect on any European site.

The proposed development site has potential hydrological connectivity to one European designated site, Buckroney-Brittas Dunes & Fen SAC and potential for significant effects during the operational phase up to closure cannot be discounted without the implementation of best practice design and control measures. Therefore, it cannot be concluded, that the proposed project will not have a significant effect on this Natura 2000 site, without the consideration and analysis of further information. Therefore Stage 2 NIS (AA) is required. This is consistent with the findings of a Screening Assessment prepared as part of a

previous related infilling application at this site as confirmed by the ABP Inspector (Ref. No.ABP-309991-21).

A Natura Impact Statement (NIS) is presented to provide scientific examination of the project to enable the competent authority to undertake an AA. The NIS examines potential effects to Natura 2000 sites screened in as part of this Screening for Appropriate Assessment, i.e., Buckroney-Brittas Dunes & Fen SAC. Having taken into consideration the details of the proposed project and the site preparation, operational and decommissioning phase mitigation measures, it is concluded that this development will not give rise to any significant effects to designated sites. The construction and operation of the proposed development will not impact on the conservation objectives or features of interest of Natura 2000 sites. Detailed field and desktop surveys were carried out to inform the accompanying Biodiversity Assessment (Chapter 5 of the accompanying EIAR) and the NIS.

The integrity of Buckroney-Brittas Dunes and Fen SAC will not be affected by the proposed development. Based on the available scientific information and project details, we submit that the competent authority has sufficient information to allow them to determine that the proposed development, individually or in combination with other plans or projects, will not have an adverse effect on the integrity of BuckroneyBrittas Dunes and Fen SAC.

It can be objectively concluded that no significant effects arising from the proposed development are likely to occur in relation to the Natura 2000 sites (i.e., Buckroney-Brittas Dines & Fen SAC) or indeed any other Natura 2000 site in the wider hinterland.

1 Introduction

Ecology Ireland Wildlife Consultants Ltd. (Ecology Ireland) were commissioned by Kilsaran Concrete Unlimited Company (Kilsaran), to undertake an appraisal of the potential impacts of a proposed development at the former Ballinclare Quarry site in Co. Wicklow on designated conservation sites in the wider area. This assessment was undertaken as part of an application by the client for planning permission, where European designated conservation sites are present in the wider surrounding area.

The application 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 included extraction of diorite bedrock using blasting techniques; processing (crushing and screening) of the fragmented rock to produce aggregates for on-site concrete (readymix) and asphalt production for road construction and related site development works.

Kilsaran intend to establish and operate a materials recovery / recycling facility and inert landfill at Ballinclare Quarry, Kilbride, Co. Wicklow. The proposed development comprises three key elements

- a soil washing plant to win aggregate from imported soil and stone;
- a construction and demolition (C&D) waste recycling facility to produce aggregate from construction and demolition waste (principally concrete); and
- an engineered (i.e. lined) landfill to facilitate backfilling and restoration of the existing quarry void with inert waste (principally soil and stone).

The proposed development will provide for the importation, re-use, recovery and/or disposal of by-product materials and inert wastes generated by construction and development projects in Counties Wicklow, Dublin and Wexford as well as the backfilling and long-term restoration of the former quarry to native woodland habitat.

A screening assessment is part of an appropriate assessment process that consists of up to four stages, where each stage follows on from the preceding one. In Stage 1, a screening process is undertaken to identify whether significant impacts on a Natura 2000 site are likely to arise from the project or plan in question. If significant impacts are likely to occur, then the process moves on to Stage 2 where an appropriate assessment (AA) considers potential mitigation measures for adverse impacts. If it is considered that mitigation measures will not be able to adequately minimise potential adverse impact on a Natura 2000 site, then an assessment of alternative solutions is considered in Stage 3. This may then be followed by Stage 4 of the process in the event that adverse impacts remain, and the proposed activity or development is deemed to be of Imperative Reasons of Overriding Public Interest (IROPI), allowing an assessment of compensatory measures to be considered. The outcome of a Stage 2 and higher assessment is presented in a report known as a Natura Impact Statement (NIS).

The first part of the assessment is a screening process to identify whether significant[1] effects on a Natura 2000 site are likely to arise from the project or plan in question, in view of best scientific knowledge and in light of the conservation objectives of any relevant European sites, when considered as an individual project or in combination with other plans and projects. If significant effects are likely to occur or if it is unclear whether significant effects are likely to occur, then the process moves onto the next phase where the project is subject to an appropriate assessment (AA) to determine whether the plan or project would directly affect the integrity of a European site. At this stage, potential mitigation measures for adverse impacts identified in Screening are considered. Typically, a Natura Impact Statement (NIS) is prepared by consultants on behalf of the promoter/developer of a plan or project, and this is part of the information used by the competent authority in carrying out an Appropriate Assessment of the proposed plan or project. If the competent authority is satisfied that the plan or project will not adversely affect the integrity of the site concerned, it may approve the project. If it is considered that mitigation measures will not be able to satisfactorily reduce potential adverse impact on a Natura 2000 site, then an assessment of alternative solutions is considered in third phase of the assessment process. If adverse impacts remain and the proposed activity or development is deemed to be of Imperative Reasons of Overriding Public Interest (IROPI), the final assessment step permits consideration of permission for development with consideration of compensatory measures.

While a screening assessment appraisal or NIS may be provided by the advocate of the plan or project in question, the AA itself is undertaken by the competent authority (*e.g.,* the planning authority and An Bord Pleanála). So, in this case, the Appropriate Assessment for the project, described herein, is undertaken by An Bord Pleanála; informed by this Screening for AA and NIS and any other relevant information provided to the statutory body.

It is noted that there was a previous planning application to infill the quarry basin was made to ABP (Ref. No. ABP-309991-21) which was ultimately refused permission in October 2023, principally on account of perceived deficiencies in baseline ecological surveys around the application site. The perceived deficiencies were related to lack of dedicated surveys for key species. However, sufficient information was presented to allow the ABP inspector to carry out an AA.

It was concluded within the Appropriate Assessment "***that the proposed development, individually or in combination with other plans or projects would not adversely affect the integrity of Buckroney-Brittas Dunes and Fen SAC or any other European site, in view of the site's Conservation Objectives. It has been established that there are no sources of impact associated with any pollution or hydrological changes to Potters River that could adversely affect the maintenance or restoration of the favourable conservation condition of any of the habitats and species for which the Buckroney-Brittas Dunes and Fen SAC is designated***".

[1] A European Court of Justice ruling in 2013 (Case C‑258/11) has stated the following regarding significant effect: "Where a plan or project not directly connected with or necessary to the management of a site is likely to undermine the site's conservation objectives, it must be considered likely to have a significant effect on that site."

1.1 Methodology

This report presents in brief the outcome of a Screening for AA. The subsequent Natura Impact Statement (NIS) is prepared to identify whether the proposed development, in view of best scientific knowledge and in light of the conservation objectives of any relevant European sites, when considered as an individual project or in combination with other plans and projects, will have an adverse effect on the integrity of any European Site. It is important to emphasise that a screening assessment does not have to ascertain the existence of a significant effect or impact on a Natura 2000 site as such; it only has to establish whether a significant effect or impact is possible or may occur (as per judgement by Ms. Justice Finlay Geoghegan; see guidelines below). At the NIS stage, all mitigation measures necessary to avoid, reduce or offset negative effects are considered.

The conservation objectives of Natura 2000 sites have been compiled by the National Parks & Wildlife Service (NPWS) in relation to the habitats and species (*i.e.,* qualifying interests) for which the sites are selected. These conservation objectives are referred to when carrying out appropriate assessments for plans and projects that might impact on these sites.

1.1.1 Guidance

Documents associated with the proposed development and relevant ecology databases were consulted as part of this assessment. Field assessments were also completed at the proposed development site from December 2023 to September 2024 in order to inform the Biodiversity Impact Assessment (Chapter 5 of the EIAR) and Screening Assessment. The following guidelines and legal judgements were used in the completion of this assessment;

- Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites – European Commission Methodical Guidance on the provisions of Article 6(3) and 6(4) of the 'Habitats' Directive 92/43/EEC (European Commission 2001)
- Office of the Planning Regulator (OPR) Practice Note PN01, Appropriate Assessment Screening for Development Management (2021).
- Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (DoEHLG 2009)
- Integrated Biodiversity Impact Assessment – Streamlining AA, SEA and EIA Processes: Practitioner's Manual (EPA 2013)
- European Court of Justice Ruling 11th April 2013 Case C‑258/11 Peter Sweetman and Others v An Bord Pleanála - Criteria to be applied when assessing the likelihood that N6 Galway City Outer Bypass Road scheme will adversely affect the integrity of Lough Corrib SAC
- High Court Ruling 25th July 2014 by Ms. Justice Finlay Geoghegan; Neutral Citation [2014] IEHC 400; High Court Record No. 2013 802 JR; Kelly -v- An Bord Pleanála – Judicial review of grant of planning by An Bord Pleanála for two wind farm phases in County Roscommon
- High Court Ruling 24th November 2014 by Mr. Justice Hedigan; Neutral Citation [2014] IEHC 557; High Court Record No. 2014 320 JR; Rossmore Properties Limited & Anor -v- An Bord Pleanála
- High Court Ruling 25th February 2016 by Mr. Justice Barton. Neutral Citation [2016] IEHC 134; High Court Record No. 2013 450 JR; Balz & Anor -v- An Bord Pleanála.

- European Court of Justice ruling 12th April 2018 in respect of Case C-323/17 (People Over Wind & Sweetman) - it is not appropriate for the purposes of Appropriate Assessment (AA), at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of a plan or project.
- European Court of Justice ruling 19th April 2018 in respect of Case C-164/17, Compensation vs Mitigation, Grace & Sweetman Vs ABP.
- High Court Ruling 8th February 2019 by Justice Barniville in respect of Kelly -v- An Bord Pleanála & anor. The Court concludes "*as a matter of fact and law, that SUDS are not mitigation measures which a competent authority is precluded from considering at the stage 1 screening stage*". The Irish High Court ([2019] IEHC 84)
- Heather Hill Management Company CLG v An Bord Pleanála (Burkeway Homes Limited as Notice Party) [2019] IEHC 450. Mr. Justice Garrett Simons granted an order of certiorari setting aside the decision of the BoÁrd to grant permission for a residential development of 197 units at Bearna Co. Galway, on the basis that it was a material contravention of the Galway County Development Plan (the CDP), it failed to carry out a 'justification test' as required and failed to carry out proper Appropriate Assessment screening.
- European Commission. *Managing Natura 2000 Sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC*, (21-11-18) C (2018) 7261 Final. Commission Notice Brussels.

1.1.2 Information Consulted for this Report

This assessment has been informed by the following sources of data:

- Desk based surveys and site surveys of the proposed development site;
- The Ecological Impact Assessment completed for the proposed development;
- Information on the location, nature and design of the proposed project as provided by the client;
- Department of Housing, Planning, Community and Local Government (DHPCLG) online land-use mapping (www.myplan.ie/en/index.html);
- Office of Public Works (OPW) National Flood Hazard Mapping website (www.floodmaps.ie)
- Environmental Protection Agency (EPA) geoportal mapping tool (https://gis.epa.ie/EPAMaps/);
- National Parks and Wildlife Service protected site and species information and data (https://www.npws.ie/protected-sites);
- National Biodiversity Data Centre (www.biodiversityireland.ie); and
- Ordnance Survey of Ireland mapping and aerial photography (www.osi.ie).
- Previous planning applications and associated reports and assessments from this site.
- The EIAR that accompanies the planning application for the current development.

2 Stage 1: Screening for Appropriate Assessment

2.1 Brief Description of the Site & Project

2.1.1 Site Location & Infrastructure

The application site comprises a bedrock quarry located in the townlands of Ballinclare and Carrigmore, near the village of Kilbride, Co. Wicklow (Figure 2.1). The existing quarry development at Ballinclare extends across approximately 24 hectares (c. 59.3 acres), of which the existing quarry extraction area extends to c. 9.3 hectares (c. 22.9 acres). 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 above 90mOD at the highest point along the northern boundary where the main quarry face cuts into a rock slope which rises northwards. Typical 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 activity was suspended in 2016, the two 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 and extends to approximately 22mOD where a third bench had been commenced. This area effectively 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. The former concrete batching plant, aggregate plant and asphalt plant were all located in the south-eastern corner of the quarry holding, to the 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 remain in place to the west of the site access road. The farm buildings comprise a stone barn and two concrete walled barns, each with a corrugated tin roof. A more modern two-storey brick clad building is also present in this location.

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 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. There was also provision for occasional off-site discharge of surplus water via a surface water treatment system (a number of settlement lagoons in series) to a drainage channel which falls to the Ballinclare Stream immediately beyond the north-western site boundary.

2.2 Existing Water Management System

At the present time, rainfall across the existing quarry site (including the former concrete / asphalt production yard) generates run-off which generally falls to the quarry void, while run-off across the western side of the quarry site falls to the drainage channel leading off-site to the Ballinclare Stream.

Given that the diorite bedrock is a poor aquifer, there is relatively little infiltration to ground or recharge to the underlying groundwater table.

After extraction and production activities were suspended in 2016, quarry dewatering ceased in the absence of any on-site outlet or end use for the water collecting in the quarry sump. In subsequent years, the quarry void was flooded by surface water run-off from surrounding ground and (relatively minor) groundwater inflows and water levels within the quarry rose gradually over time.

In November 2019, Wicklow County Council issued a discharge licence (Ref. No. WPL116) which provided for off-site discharge of water collecting in the quarry void to the Ballinclare Stream (and Potters River further downstream) and some proposed small-scale soil / C&D waste recovery activity under a Local Authority waste facility permit (which ultimately never progressed).

The current discharge licence provides for pumping of water from the quarry void (using a rising main pipe) to an existing on-site treatment unit located at a former storage area upstream of a series of existing settlement ponds. The approved water treatment system was installed and commissioned in October 2022 and comprises a bespoke Siltbuster treatment system which reduces naturally-elevated concentrations of arsenic which were identified in the water within the quarry void, as well as also removing suspended solids.

Following treatment at the Siltbuster plant, surface water run-off flows under gravity towards the settlement ponds for further polishing and sediment removal. The settlement ponds provide approximately 16 hours retention time which is generally sufficient, as the treatment plant removes suspended solids in the discharged water. All off-site discharges are sampled and tested at this point in accordance with licence requirements. Test results to date have been consistently compliant with the emission limit values set by the discharge licence.

Thereafter, the treated run-off flows under gravity along the channel which drains to the Ballinclare Stream. Approximately 400m north and downstream of the discharge point, the Ballinclare Stream flows into the much larger Potters River (Figure 2.1).

The background normal pumping volume from the quarry, based on groundwater inflows and surface water run-off is of the order of 860m^3/day, while the maximum permitted discharge volume is of the order of 1,730m^3/day. The quarry was substantially dewatered by the end of summer 2024 and at the present time, pumping and treatment is being undertaken on the basis of maintaining the water level within the final bench / large sump at a relatively constant (low) level above the deepest point on the quarry floor.

2.3 Development Overview

The proposed development at Ballinclare Quarry provides for the establishment and operation of a licensed, integrated material recovery / recycling facility and inert landfill which comprises three key elements

- a soil washing plant to win aggregate from imported soil and stone;
- a construction and demolition (C&D) waste recycling facility to produce aggregate from construction and demolition waste (principally concrete); and
- an inert engineered (i.e. lined) landfill to facilitate backfilling and restoration of the existing quarry void.

In essence, it will provide for the importation, re-use, recovery and/or disposal of by-product materials and inert wastes generated by construction and development projects in Counties Wicklow, Dublin and Wexford as well as the backfilling and long-term restoration of the former quarry to native woodland habitat.

The existing quarry site / weighbridge office is located on an elevated platform in the centre of the existing access road leading into the quarry. This office will be refurbished internally and will be the designated site office where the site manager and site staff will be based and where all site records will be held. There is an established canteen / changing room and toilet facilities located at the end of the access road into the quarry, around the existing garage / workshop. Effluent from the toilet facilities will be treated by way of a proprietary effluent treatment system (an Aeration Treatment Unit for secondary treatment and a two module Puraflo unit for tertiary treatment), previously approved by way of Planning Ref. 14/2118) and will be augmented by a sub-surface concrete wastewater tank which will be emptied on a regular basis

The proposed soil washing plant will be installed at the former concrete and asphalt production yard in the south-eastern corner of the quarry and will be capable of recovering sand and gravel aggregate from excess soil and stone (managed both as waste and non-waste by-product) which has been imported from construction and application sites across the surrounding region.

The proposed construction and demolition (C&D) waste recovery facility will be established across the footprint of an existing paved area immediately west of the existing internal access road. The principal wastes to be imported to the facility and used to produce recycled aggregates will include concrete (ready-mixed, reinforced, blocks and/or pavement slabs), bricks and bituminous mixtures (hardened asphalt returns and road plannings). Most of these wastes will be sourced from off-site clearance and demolition projects across the surrounding region.

Any aggregates produced from waste materials at either the soil washing plant or the C&D waste recovery facility will be of construction grade and will comply with an engineering specification and the End of Waste criteria for recycled aggregates recently published by the EPA[2].

It is proposed to backfill the existing quarry void to a final ground level of approximately 80mOD and to leave the upper rock face exposed for a height of up to 15m to facilitate continued nesting by peregrine falcons. Backfilling will be progressed by way of inert landfilling activity on an ongoing and progressive basis in discrete cells with an engineered (natural clay) liner at the base and sides. The final completed landform will substantially, though not entirely, re-establish the former landform that existed at the application site prior to commencement of historical quarrying activities.

As part of the proposed inert landfill development, suitable uncontaminated, undisturbed, natural soil by-product (i.e. non-waste) which conforms to an engineering specification will also be imported for re-use in the construction of the required basal and side liners.

Some uncontaminated topsoil waste and/or topsoil by-product will also be imported for use in the final restoration of the backfilled landform. Topsoil will be temporarily stockpiled at the inert landfill facility as required, pending its re-use as cover material.

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[2] EPA National End-of-Waste Decision EoW-N001/2023 of 12th September 2023 establishing criteria determining when recycled aggregate ceases to be waste under Regulation 28 of the European Union (Waste Directive) Regulations 2011 – 2020

The current planning application provides for the routing of all traffic to and from the proposed development at Ballinclare Quarry along the L1157 Local Road. It also includes provision for a comprehensive road improvement scheme along the entire length of the L1157 leading up to the application site, including road widening to 6.0m everywhere along its length, with road strengthening and repair overlay and road markings where required. Further details in respect of consultations with the Roads Authority and the proposed road upgrade works to be undertaken in advance of any waste or by-product intake to the facility, are presented in Chapter 14 (Traffic) of the EIAR.

A full and detailed description of the proposed development is provided in Chapter 2 of the EIAR which accompanies this planning application. The following sections of this report describes the key characteristics aspects of the proposed materials recovery/recycling facility and inert landfill at Ballinclare Quarry, sufficient to inform this report in support of the AA process.

2.3.1 Site Preparation / Establishment Works

Prior to commencement of the recycling / recovery and inert landfilling activities at the application site, the following site preparation works will be required:

- Securing existing site perimeter with additional fencing / planting as required; (including deer fence);
- Completing the dewatering of the quarry void in advance of engineering (lining) works and inert waste landfilling activities;
- Felling of a small number of mature trees along the western side of the existing internal access road to facilitate its widening and construction of 2 internal queuing lanes for HGVs;
- Modification / upgrade of existing drainage channel along the site access road to facilitate construction of additional queuing lane and the increase in paved area along site access road.
- Installation of silt trap and hydrocarbon interceptor to treat run-off and provision of additional pumping capacity to transfer it from existing surface water pond at site entrance to quarry sump;
- Installation of a silt trap and hydrocarbon interceptor at the proposed C&D waste recovery facility;
- Cutting and mulching of any existing scrub and vegetation across the proposed development footprint and off-site removal to authorised waste facilities (to be undertaken in phases prior to commencement of works in designated areas);
- Decommissioning and dismantling of any other legacy infrastructure from prior development (e.g. production plant, metal, WEEE, additives etc.) and removal off-site to other Kilsaran production sites or authorised waste facilities as required;
- Reconfiguration of existing site office and re-establishment of staff welfare facilities;
- Installation of new weighbridge at the northern end of inbound lane along internal access road;
- (Re-)commissioning the existing wheelwash facility on outbound lane of site access road and construction of an additional wheelwash facility on the eastern side of former concrete / asphalt yard (in the south-eastern corner of the site);
- Minor repair / maintenance / upgrading works to existing bunded fuel storage area and concrete slab with sub-surface drainage to hydrocarbon interceptor and soakaway area;

- Maintenance and continued use of previously approved septic tank and wastewater treatment facilities and installation of sub-surface concrete wastewater holding tank (to augment existing capacity);
- Maintenance and continued use of existing (Siltbuster) water treatment plant to treat off-site discharge from sump in quarry floor and/or water balancing ponds;
- Excavation, clearance and levelling of existing ground at proposed wetland area and construction of the wetland treatment area;
- Installation and commissioning of the soil washing plant in the former concrete / asphalt yard;
- Construction of the proposed concrete portal frame structure ~~(open on two sides)~~ at the C&D waste recovery facility at the paved area to the west of the access road;
- Construction / installation of surface water drainage infrastructure between the inert landfill area, recovery shed and C&D waste recovery area, existing settlement ponds and proposed wetland area;
- Upgrading of existing internal access roads across the site leading to the initial landfill cell (Phase 1A) on the western side of the quarry, the soil washing plant, C&D waste recovery facility and wetland area;
- Establishment of biodiversity enhancement features; and
- Establishment of environmental control and monitoring infrastructure.

It is likely that some or all of the proposed site establishment / pre-commencement works outlined above will be subject to prior agreement and oversight of the EPA, in accordance with standard conditions attaching to any EPA waste licence issued in respect of the proposed waste activities.

Figure 2.1 Site location and local watercourses.

2.3.2 Soil Washing / Aggregate Recovery Plant

At the outset of the project, a soil washing plant will be set up and commissioned in the former concrete / asphalt production yard in the south-eastern corner of the application site. This plant will effectively recover sand and gravel and recycled (secondary) aggregates from selected, more granular soil intake (managed both as waste and non-waste by-product) and claybound C&D waste intake imported to the facility.

The soil washing plant comprises a loading hopper, a number of soil screens in series with connecting conveyor systems, a primary wastewater treatment tank (thickener), a buffer tank holding sludge and recycled water, an elevated plate press and filter cake discharge area.

Top-up water for the plant will be provided by capturing run-off from the surrounding paved area in a sump beside the wash plant and pumping it to the recycling tank. This will be further supplemented by run-off captured by the on-site water management system at other waste areas around the facility.

There will be no surface water / groundwater emissions or off-site discharges arising from the proposed soil washing and aggregate recovery activities as all process water will be re-circulated within a closed loop system. As such, there is no requirement to make provision for treatment for any process water associated with the soil washing activity.

All elements of the washing plant are either mobile or largely self-standing and can be readily lifted into place, assembled in-situ, and relocated / removed as required. Most of the plant will be supported on the existing concrete slab which extends across the former production yard. Shallow concrete foundations will likely be required to support the elevated plate press which dewaters the thickened sludge to form a filter cake.

2.3.3 C&D Waste Recovery Shed

It is proposed to construct a large, roofed portal frame structure, open on two sides at the existing paved concrete area to the west of the site access road. All future C&D waste processing, crushing and recovery activities will take place within this structure in order to reduce noise and fugitive dust emissions.

The proposed structure will be of portal frame steel construction and will have a plan footprint area of approximately 42m long by 36m wide, with the long axis orientated in an east-west direction. The structure height will vary from 10m at the haunch (top of sidewall

It is envisaged that once C&D waste recovery infrastructure is established at Ballinclare Quarry, mobile crushing plant will be brought to the facility periodically (when sufficient quantities of solid recyclable C&D materials have accumulated in external stockpiles).

During recycling campaigns, the crushing plant will be set up on the paved concrete floor within the open-sided waste recovery shed. The recyclable C&D wastes will be transferred from external stockpiles to the mobile crusher within the shed to produce recycled (secondary) aggregates.

Once crushed and processed, the recycled materials will be moved from inside the shed to external stockpiles pending testing (to confirm compliance with recently published EPA End of Waste criteria) and/or subsequent sale and export off site, most likely for re-use in pavement or road construction.

2.3.4 Phasing of Landfilling Works

Final formation levels on completion of the landfilling and restoration works will vary on account of the sloped nature of the surrounding original, pre-quarrying landform. Rather than restore the site to its original pre-development landform however, it is proposed to backfill it to a maximum level of 80mOD along the northern boundary and to leave approximately 15m of existing rock face exposed to facilitate continued nesting by peregrine falcons at this location.

Backfilling at other areas around the former quarry area will extend up to the surrounding (original) ground level which typically falls from north to south, to a level of approximately 55mOD to 60mOD along the southern boundary.

The final, restored landform at Ballinclare Quarry will comprise a very slightly domed / sloping plateau which extends across the northern quarry area and falls from a ground level of 80mOD to surrounding undisturbed ground levels of between 55mOD and 60mOD, as shown in the site restoration plan in Figure 2.2.

It is envisaged that the existing quarry will be restored in three distinct phases. The landfilling Phase 1 works will initially progress cross the deeper quarry void from the existing quarry floor to approximately 60mOD in four sub-phases (identified as Phases 1A to 1D). Of the 4 sub phases,

- Phase 1A comprises the initial inert landfilling cell at the western end of the quarry,
- Phase 1B comprises an inert landfill cell at the eastern end of the quarry;
- Phase 1C comprises a landfill cell extending eastward from Phase 1A toward the quarry sump. While this cell is under construction, the deeper quarry area between 22mOD and 37mOD (which will function up to this stage as a sump for surface water run-off and groundwater inflows) will be backfilled using a combination of site-sourced materials and imported non-waste (by-product) materials;
- Phase 1D will comprise one further inert landfill cell in the centre of the quarry (constructed over the deeper quarry area backfilled during Phase 1C).

Each inert landfill cell will be initially developed by placing a 1m thick layer of low permeability material across the quarry floor to form the basal liner.

Low rise clay bunds will be constructed at the base of active (lined) landfilling areas / cells to permit localised capture and management of any surface water run-off (which may be impacted or lightly contaminated by contact with the inert soil waste) in temporary sumps / ponds behind them. Surface water run-off collecting in these sumps will be managed separately to surface water run-off and groundwater inflows from non-landfill areas which will collect in the deeper sump area.

In addition to preventing surface water run-off water from flowing over exposed bedrock on the quarry floor, the collection of surface water run-off in temporary sumps within landfill cells will also facilitate some initial settling out of suspended solids before it is fed to the on-site water management system for subsequent treatment and off-site discharge if required.

The installation of the basal liner will progress in line with the importation of suitable low permeability by-product materials as landfilling with inert waste extends laterally and/or progresses upwards Once

the basal extent of each landfill cell has been reached, the installation of the steepwall liner against the existing quarry side walls will progress upward and the open front face of the landfilled inert waste will be sloped back at a suitable (i.e. safe) gradient.

Although the proposed approach reduces the volume of low permeability clay by-product material to be imported to the facility for engineering (lining) purposes at the outset, it is expected that suitable soil by-product material will be imported on an ongoing basis over the operational life of the facility as it becomes available from construction and application sites. The imported soil by-product will either be used immediately for engineering (lining) purposes at the landfill cells or alternatively, could be stockpiled, to be placed on a campaign basis at a later date (either by site-based personnel or by an appointed earthwork Contractor).

The deeper quarry excavation area (extending to 22mOD) will serve as a large sump to drawdown groundwater levels and capture surface water run-off for the duration of landfilling Phases 1A and 1B. Over the course of Phase 1C, temporary storage (balancing) ponds will also be constructed at a higher level in areas backfilled previously (during Phases 1A and/or 1B). These balancing ponds will hold and retain water which has not come into contact with backfilled waste materials which has been captured separately and pumped up from the quarry floor. Balancing ponds are required after Phase 1C to manage and address a potential deficit which might otherwise arise in the volume of run-off available to supply the soil wash plant (were it to be immediately discharged off-site).

Following completion of Phase 1 landfilling to 60mOD, a sloped landform will be constructed above it, rising north and eastwards against the existing rock face to a maximum of around 80mOD. As for the Phase 1 landfilling, a steepwall liner will be constructed against the quarry face and low-rise clay bunds will be constructed at the base of active landfilling areas / cells to permit localised capture and management of any surface water run-off in contact with the inert waste.

In Phase 3, landfilling will progress southwards across the former concrete / asphalt production area, following decommissioning of the soil washing plant. Landfilling will progress from the existing floor level of approximately 50mOD to a final restored level which falls from approximately 80mOD in the north to 55mOD in the south, as indicated. A sump to collect surface water run-off in contact with the inert waste will be provided throughout this phase, at the existing low point in the south-eastern corner of this area.

The area around the existing aggregate storage shed on the southern limit of the landfilling area (which will be re-used as a waste inspection and quarantine shed for the duration of the on-site waste activities) will be last area to be landfilled and restored.

Once landfill cells have been backfilled and capped to the proposed final level, they will be progressively restored to a native woodland habitat. As well as improving the landscape and visual characteristics of the site, the establishment of vegetation across completed landfill cells will also reduce soil erosion and the potential volume of suspended solids carried in surface water run-off.

The phasing plan outlined above is indicative and will need to be reviewed based upon anticipated input rates of inert soil and stone waste and the availability of low permeability by-product material for engineering (lining) purposes.

2.3.5 Intake Capacity and Expected Lifespan

The only materials required to backfill and restore the former quarry are inert soil, stone, and rock (and other particulate soil-like / sludge wastes). At the present time, it is envisaged that the principal sources of these materials over the lifetime of the proposed development will be construction sites in Counties Wicklow, Dublin, and Wexford.

2.3.6 Landfill Volume

The total volume of soil required to create the final (restored) landform is approximately 3,600,000m^3. The basal liner and landfill materials will be subject to a degree of compactive effort (by earthworks plant and a tracked bulldozer respectively) and materials placed at the bottom of the landfill will be further compacted by the weight of overlying materials.

If an average target compaction density of 1.8 tonnes/m^3 is assumed for tonnage assessment purposes, this suggests an import requirement for approximately 6,500,000 tonnes of soil and stones. The overall volume will comprise a mix of

i. natural soil and/or non-waste by-product to be used in engineering works (principally the construction of basal and side liners and separation berms);

ii. low permeability filter cake materials produced by the on-site soil washing activities; and

iii. imported inert soil and stone waste (and other permitted particulate wastes).

The inert landfill facility will be developed in 3 separate phases as follows:

i. Phase 1 (comprising sub-phases 1A to 1D) will extend across the existing quarry void area from a lower quarry floor level of 22mOD to approximately 60mOD (and has a total intake capacity of approximately 2,900,000 tonnes);

ii. Phase 2 will extend above the central / eastern quarry void area from approximately 60mOD up to 80mOD (and has a total intake capacity of 2,750,000 tonnes); and

iii. Phase 3 will extend across the former concrete yard to south-east of the quarry void (and has a total intake capacity of 850,000 tonnes).

2.3.7 Rate of Waste / Material Intake

It is envisaged that the combined (cumulative) intake of (i) inert soil / C&D waste for on-site disposal and recovery and (ii) non-waste by-product material required for on-site landfill engineering works or supplied to the soil wash plant, will not exceed 600,000 tonnes per annum.

Within this overall intake, the annual intake of soil and stone (waste and by-product) is likely to be of the order of 550,000 tonnes per annum. Where suitable, inert soil and stone waste will be imported and processed at the soil washing plant to recover construction grade aggregates. If not, it will be placed directly at the engineered (lined) landfill facility.

While any by-product intake will principally comprise soil and stone sourced from greenfield (i.e. previously undeveloped) construction sites, it could possibly evolve to include other prospective by-

product materials as other regulatory decisions in respect of by-products are made and/or enacted by the EPA over time.

The annual intake of inert, construction and demolition waste will be of the order of 50,000 tonnes per annum and will principally comprise concrete (ready-mixed, reinforced, blocks and/or pavement slabs), bricks and bituminous mixtures / hardened asphalt.

The expected throughput at the soil washing plant is likely to average around 300,000 tonnes per annum and feedstock will comprise a mix of waste and by-product soil materials, albeit these would have to be processed and managed separately to ensure full and appropriate waste traceability. Processing this volume of soil would generate approximately 225,000 tonnes of construction grade aggregate for off-site export and 75,000 tonnes of filter cake material for disposal at the adjoining inert landfill facility.

Within this development application, flexibility is required to vary the quantities of inert soil and stone waste and by-product materials which may be imported and managed on-site in any given calendar year. Given the phased nature of the proposed landfill development and likely fluctuations in the level of activity within the construction and development sector over the projected life of the facility, the requirements for (and availability of) soil by-product material could vary considerably from year to year, with more materials being required in some years and near none in others.

In recognition of this and for the purposes of this EIAR therefore, application is made for a maximum intake of 600,000 tonnes of inert soil / C&D waste to this facility per annum. Although it is unlikely that this scenario will arise over the operational life of the proposed facility, it is conservative and will at least ensure that all relevant planning and waste licencing decisions are robust and provide the required degree of operational flexibility required at the facility. This approach will also ensure that any technical studies which inform regulatory decision making are equally robust.

2.3.8 Development Lifespan

The duration of landfilling activities at the application site will largely be dictated by the rate at which approximately 6,500,000 tonnes of externally sourced soil and stone intake and the natural / by-product soils required for landfill engineering works are imported to the facility. Several factors which will influence this, including, but not restricted to the:

Volume of inert soil waste and/or soil by-product materials generated at construction / application sites in the surrounding region.

- Prevailing economic climate and related construction industry output;
- Distance of construction projects from the facility (and scale of activity);
- Logistical / programming constraints at sites generating inert materials;
- Climatic conditions (reduced construction activity in wet weather); and
- Disruptions along the existing local and national road network.

In light of these and other variables, prediction of intake rates and volumes and timing of activities is not an exact science.

Were the combined clay liner (non-waste by-product) and inert waste intake of 6,500,000 tonnes to be imported at a projected maximum (combined) intake rate of 550,000 tonnes per annum and the entirety of such intake was directed to the inert landfill, landfilling activities could be complete in a minimum of 10.5 years.

Given the focus on maximising materials recovery and re-use, this scenario is unlikely to occur, and it is envisaged that, on average, between imported inert waste, filter cake material generated on site and soil by-product materials used for landfill engineering purposes, the average intake to the landfill will be of the order of 300,000 to 350,000 tonnes per annum. This in turn suggests an operational lifespan of between and 18.5 and 21.5 years for the proposed landfill facility.

It is anticipated that the construction and demolition (C&D) waste recovery activities will continue for as long as the inert landfilling activities are ongoing across the former quarry void / footprint, particularly in view of the economies of scale achieved in undertaking both activities at the one location. The rate of C&D waste recovery is expected to be a maximum of 50,000 tonnes per annum. As previously noted, any soil washing, and aggregate recovery activities will cease in advance of the final landfill phase across the former concrete / asphalt yard (Phase 3).

This application provides for a cessation of C&D waste recovery activities at the waste recovery shed / paved area to the west of the access road on completion of landfilling activities and for any associated infrastructure to be decommissioned and materials removed off site.

In light of the above, making allowance for a degree of uncertainty around the rate of material intake to the facility and provision for post-landfill restoration and aftercare works, it is projected that the overall life of this facility could extend to 25 years. Accordingly, this planning application seeks permission for a 25-year period to facilitate completion of landfilling and restoration works at the former quarry site.

2.3.9 Working Hours

Weekday operating hours for proposed development activities will be the same as those in the planning permission previously granted for quarrying at the application site (Wicklow County Council Planning Ref. 14/2118), between 08:00 hours and 18:00 hours, Monday to Friday. In line with the previous planning permission, it is envisaged that that loading and unloading of lorries will take place from 7am each working day.

In response to feedback from public consultations, Kilsaran has given a commitment that no work other than general housekeeping (site management) activities and plant maintenance will take place on site on Saturdays. The facility will be closed on Sundays and Public / Bank Holidays.

2.3.10 Employment

The proposed backfilling operations will require a minimum of six personnel to be based at the facility at all times during working hours. When operating at full capacity, up to 15 people could be employed at the facility (depending on the number of ongoing activities).

One member of staff will be nominated as the facility / site manager and will be required to

i. check that the soil and stone / C&D waste being imported to the facility for landfilling or recovery has been pre-approved for intake and/or complies with waste acceptance criteria;

ii. collate and maintain records of waste intake; and

iii. manage the environmental monitoring and reporting programme.

Other staff will be required to

i. be in attendance at the weighbridge office to weigh HGVs in and out of the facility.

ii. operate the site plant and equipment at the inert landfill facility on a full-time basis (such as a bulldozer or mechanical excavator) as required;

iii. visually inspect and monitor the suitability of the inert soil and stone waste being accepted and placed at the facility;

iv. oversee the intake and processing of soil and stone at the soil wash plant on an ongoing basis;

v. manage the processing, handling, and C&D recovery activities on an intermittent, campaign basis, as required; and

vi. oversee the dispatch of recycled aggregates off-site, to an ultimate end-use which is sanctioned by the EPA's National End of Waste Decision criteria in respect of recycled aggregates.

In addition to the full-time site-based staff, it is envisaged that operatives and drivers travelling to and from the proposed waste facility will also share the established staff welfare facilities at the site.

2.3.11 Site Access

Under the existing quarry planning permission(s) (Planning Ref 07/45 and 14/2118), HGVs travelling to and from Ballinclare Quarry were directed to use a dedicated one-way haul route. Inbound HGVs approaching the quarry from M11 Junction 18 (at the Beehive Inn) travelled approximately 4km along the L1113 Local Road, then turned left onto the L1157 Local Road and travelled a further 600m up to the junction with the existing quarry access road.

Outbound traffic departing the quarry turned left and travelled along the L1157 for approximately 2km, up to its junction with the R772 Regional Road (the former N11 National Primary Road) at the Green Angel Skincare / Junction 18 Café premises (formerly the Tap Restaurant) and, from there, proceeded north (or south) to access the M11 Motorway and the National Road network.

As part of pre-application consultations undertaken with Wicklow County Council in respect of the earlier (2021) planning application, a walkover survey of the existing local road network around the application site was undertaken and an assessment made of aspects such as road geometry, pavement condition, traffic flows and travel speeds.

Based on these assessments and having regard to local traffic flow characteristics and the changes which arose after the M11 motorway opened in 2015, Wicklow County Council advised that it would be preferable to avoid using the previous (established) haul route to the quarry and that HGVs should avoid using the L1113 Local Road. It proposed that HGVs should instead travel the shorter distance between the quarry and the R772 Regional Road in both directions along the L1157 Local Road. In more recent follow-up discussions with Council officials in September 2024, in advance of submitting this planning application, it was confirmed that this remains the Council's view / recommendation.

In light of this feedback, this planning application provides for the routing of all traffic to and from the proposed development at Ballinclare Quarry along the L1157 Local Road. It also includes provision for a comprehensive road improvement scheme along the entire length of the L1157 leading up to the application site, including road widening to 6.0m everywhere along its length, with road strengthening and repair overlay and road markings where required.

Under the routing proposal, it is expected that the majority of the HGVs travelling to the proposed development from Dublin and North Wicklow will use the M11 Motorway, exiting at Junction 18 and joining the R772 Regional Road southbound. After travelling south for approximately 4km, traffic heading for the facility will turn right, off the R772, and onto the L1157 at the ghost island junction beside the Junction 18 Coffee Shop and Green Angel premises at Kilbride. The access junction to the quarry and proposed development is located along the L1157, approximately 2km north-west of the R772 junction.

It is expected that only a minor proportion of HGV traffic will arrive from the direction of Arklow and North Wexford to the south. This traffic will use the M11 Motorway, exiting at Junction 19 to turn onto the R772 Regional Road at Jack Whites Pub. It will then travel north for approximately 5km, turn left off the R772 and onto the L1157, and continue thereafter up to the quarry and proposed development.

The proposed haul route requires all HGV traffic (with the exception of that travelling west to Rathdrum or to local sites) to turn left when departing the proposed facility and follow the upgraded L1157 back to the junction with the R772 Regional Road, and from there continue toward the national motorway network.

2.3.12 Traffic Movements

As previously noted, the maximum annual intake of soil and stone (waste and by-product) at the proposed Materials Recovery / Recycling Facility and Inert Landfill at Ballinclare Quarry will be 550,000 tonnes per annum, while that of construction and demolition (C&D) waste will be 50,000 tonnes per annum.

When averaged out over a year, the combined maximum intake of 600,000 tonnes per annum is equivalent to an average of

- 12,000 tonnes per week (assuming 50 weeks in a working year)
- 2,400 tonnes per day (assuming 5 days in a working week)
- 240 tonnes per hour (assuming 10 hours in a working day)

If it is conservatively assumed that the average HGV / truck consignment travelling to the waste facility at Ballinclare has a carrying capacity of 25 tonnes, this suggests that at a projected maximum intake rate of 600,000 tonnes per annum, there will be 9 to 10 HGV / truck trips generated every hour by on-site activities. This is equivalent to 18 to 20 individual HGV / truck movements in or out of the site every hour.

In order to minimise HGV traffic across the existing public road network, recycled aggregates generated by soil washing and C&D waste recovery activities will be dispatched off-site using a ‘backloading’ system whereby HGVs which have previously delivered inert / C&D waste or by-product to the facility will pick up a consignment of recycled aggregate before departing the site. As previously noted, recycled aggregates

will be dispatched off-site either directly to a construction / application site or to one of Kilsaran's other production locations or facilities.

Reducing the total number of trips and unladen HGV / truck movements from the facility offers clear financial and environmental benefits. These are considered sufficiently strong to incentivise the implementation of a backloading system at the proposed development and to minimise any additional HGV movements across the public road network.

For traffic assessment purposes therefore, it is assumed that the off-site export of recycled aggregates from the facility will be on the return (outbound) leg of a round trip which brought soil / C&D waste to the proposed facility import trips and, as a consequence, the activity will not generate any additional traffic movements over the local road network.

Based on the figures indicated previously, production of recycled aggregates for off-site dispatch and backloading is likely to average 225,000 tonnes /annum from the soil wash plant and 50,000 tonnes per annum from the C&D waste recovery facility (assuming 100% recovery rate), equivalent to 275,000 tonnes in total. This would mean that a significant proportion of HGV's journeys to and from the proposed facility at Ballinclare Quarry will be fully laden on both legs of their return journey.

In order to facilitate the proposed development, it will be necessary for some road upgrade and improvement works to be undertaken along the L1157 Local Road leading to the application site. These works will comprise junction improvements around the existing site access gates and road widening to 6m along the entire route (with the elimination of any requirement for passing bays) so as to facilitate safe opposed passage of HGVs / lorries. Pavement strengthening, drainage improvements and re-surfacing works will also be required locally along the road.

2.3.13 Site Restoration

Inert Landfill Facility

The principal activity which will be undertaken at the application site at Ballinclare Quarry is the landfilling and restoration of the lands within the former bedrock quarry. As previously noted, the site will be restored to a landform which will substantially reinstate that which existed prior to quarry development at the site and will better merge the site into the surrounding rural landscape.

As working areas are progressively landfilled toward the final ground level envisaged by the proposed landfill / site restoration scheme, a cover layer comprising 150mm of topsoil and up to 500mm of subsoil will be placed above the inert soil and stone waste. The soil cover layer will initially be seeded with a grass mix in order to promote stability and minimise soil erosion and dust generation.

Thereafter native woodland planting will be established on a progressive / phased basis. Details of the proposed final landform and the native woodland planting scheme are provided on the long-term restoration plan presented in Figure 2.2.

Topsoil and subsoil will be imported to the site on a continual basis and shall not be used immediately in landfilling / restoring the former quarry. The topsoil and subsoil shall be stockpiled separately within the former quarry footprint, away from the active landfilling area and in such location and manner as not to create any temporary adverse visual impact or dust nuisance. These materials will then be used on an

ongoing basis in the progressive restoration of the former quarry, as the upper surface of the landfill body approaches the proposed final ground level.

On completion, any rainfall over the landfill footprint will either

i. percolate directly into the backfilled soil mass (depending on the permeability and/or degree of saturation of the soil at the ground surface); or

ii. run-off over the restoration surface (without coming into contact with the underlying inert waste) and be collected by surface water channels which will carry it to the settlement ponds and/or wetland area (or to the separate swale / attenuation pond feature on the western flank of the backfilled quarry). It will then be discharged off-site to the Ballinclare Stream and the Potters River approximately 450m further downstream).

Locally, in the southeastern 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, it is envisaged that once restored, 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 sale 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.

C&D Waste Recovery Facility

At the present time, it is anticipated that C&D waste recovery activities will end at Ballinclare Quarry following cessation of landfilling and completion of restoration works at the adjoining inert landfill facility.

On cessation of C&D waste recovery activities, 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.

The waste recovery shed will be dismantled to ground / foundation level and, insofar as possible, all structural elements (steelwork, wall cladding wall panels etc.) will be recycled and/or recovered. 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 paved or hardstanding surfaces around the C&D waste recovery area will be excavated in phases as space is freed up and will be processed / recovered on-site and sold as recycled aggregate to the 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 to another C&D waste recovery facility off-site.

As the paved or hardstanding surfaces are excavated and recycled, a replacement cover layer comprising a combined 150mm of topsoil and up to 500mm of 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. This area will then be seeded with a native grass mix and will most likely evolve to a seasonal grassland habitat over time.

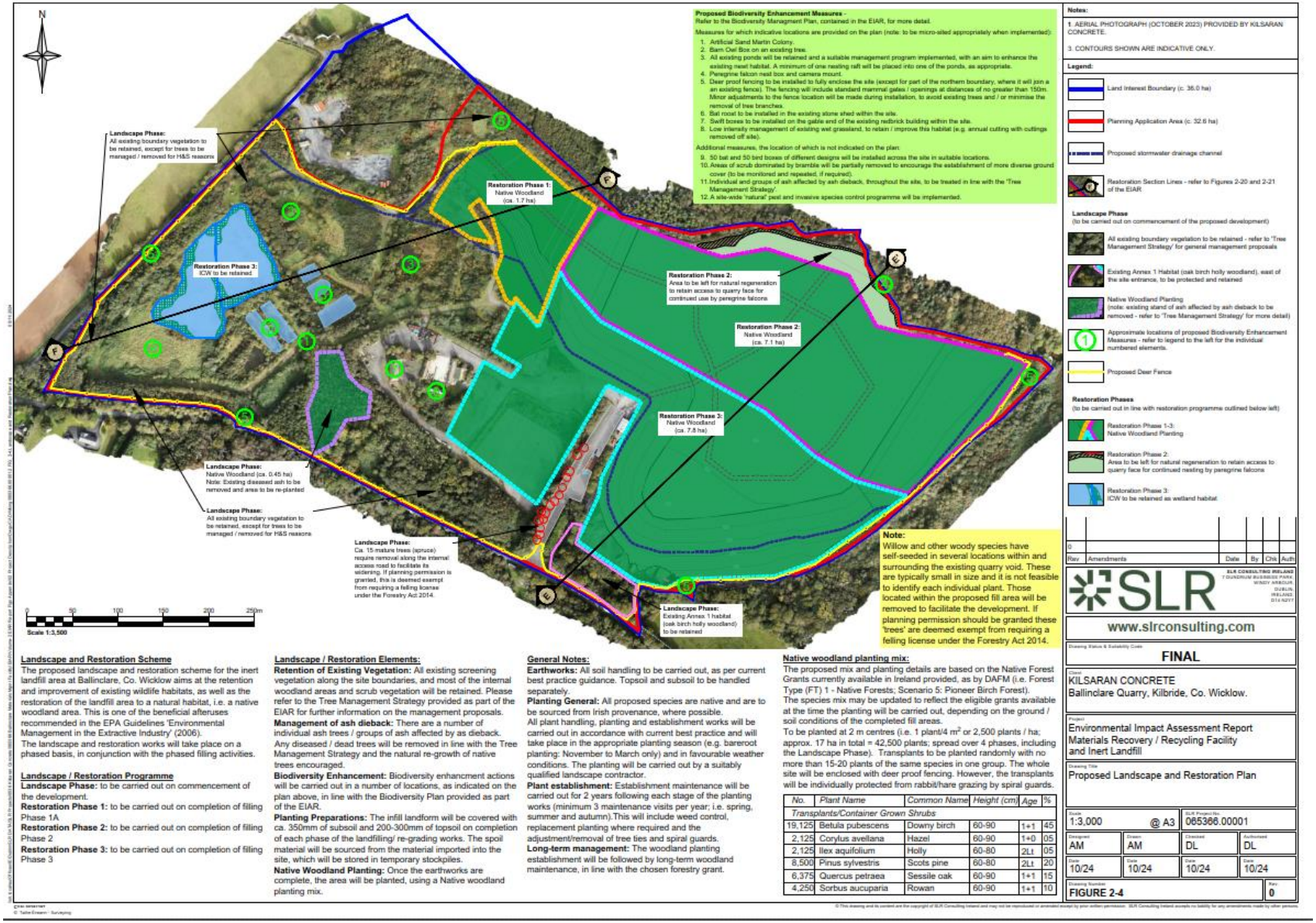

Figure 2.2 Site restoration plan (reproduced from EIAR Figure 2.4)

3 Description of the Natura 2000 Sites

3.1 Designated Sites

The proposed development site does not lie within any EU Natura 2000 site or nationally designated site (Table 3.1). the closest of the European designated sites is Deputy's Pass Nature Reserve SAC (000716) located a minimum of 1.6km from the application site. It is the only such site located within 5km of the proposed development. In all there are three SPAs located within 15km of the application site boundary (Figure 3.1).

The closest of the nationally designated sites is Glenealy Woods pNHA (001756) located 1.1km distant from the application site. There is a total of six pNHAs (and no NHAs) located within 15km of the site boundary (Figure 3.2).

All potential pathways for impact on designated sites have been evaluated in the impact assessment both within and outside of the nominal 15km buffer area around the site. This buffer area is an arbitrary distance used to display the sites most proximate to the proposed development site. However, all sites within and outside of this 15km area are considered when assessing the potential for ecological impacts arising from the proposed development. The potential for ecological effects on sites at all distance from the proposed development are evaluated using the Source-Pathway-Receptor (S-P-R) model.

A summary of the qualifying and special conservation interests of the Natura 2000 sites located in the wider hinterland is provided in Table 3.2.

Potential impacts of the proposed inert landfill/C&D Waste Recovery facility on biodiversity are discussed below. The potential impacts are assessed based on the desktop and field surveys carried out as part of this assessment and the descriptions provided of the proposed operation-phase and post-closure phase of the proposed development.

Post-closure the site will have low levels of traffic (human and vehicles) and the landscaped features will continue to mature. There is no risk of significant negative effects on habitats and species within the site or in the wider area in the post closure period. Woodland habitats will continue to become more diverse and attractive for biodiversity.

The development site is not part of any designated site, nor does it require any resources from them; thereby ruling out any direct habitat loss at the designated sites in question (Table 3.1). Direct disturbance/displacement effects in relation to noise and/or visual cues on fauna associated with designated sites can be discounted in this case given the separation distance between the proposed development and European designated sites.

The Glenealy Woods pNHA and Deputy's Pass Nature Reserve SAC are located c. 1.1km and 1.6km north-west of the application site. However, as both are at a higher ground level, in different aquifers and upstream of the discharge to the Potters River, they will not be impacted by any site-based activities. There is no hydrological pathway from the Proposed Development Site to Glenealy Woods pNHA and Deputy's Pass Nature Reserve SAC.

Indirect habitat loss or deterioration of designated sites within the surrounding area could occur from the effects of run-off or discharge into the aquatic environment through impacts such as increased siltation,

nutrient release and/or contamination. This requires connectivity between the site and the designated site in question through watercourses and/or drainage ditches. The site is located within the Ovoca-Varty catchment and Redcross_SC_010 subcatchment. The Potters River (IE_EA_10P010500) is located to the north and east of the Proposed Development site. It flows in an easterly direction initially and then turns to flow in a south-easterly direction. It is located c. 300m from the site at its closest point. The Kilmacurra Stream [EPA name: Ballinameesda lower stream (IE_EA_10P010300)] is located c. 200m to the south of the application site and flows in an easterly direction, to its confluence with the Potters River.

Of the European designated sites indicated in Table 3.1 above, only the Buckroney-Brittas Dunes and Fen SAC is located downstream of the surface water discharge from the quarry. It is located at the coast, a distance of over 11.5km downstream and it is located on lands overlying a different aquifer (GWDTE-Buckroney-Brittas Fen) than that which occurs at the proposed development site.

There are no aspects of the proposed development that are likely to give rise to significant effects on any of the other Natura 2000 sites that lack hydrological connectivity with the proposed inert landfill/waste recovery facility at Ballinclare. The only SAC located within the wider hinterland with mobile faunal qualifying interests is Wicklow Mountains SAC, situated 11.4km distant. This site has Otter as a QI, however it is located in an upland area, remote from the proposed development site and there is no pathway by which any significant effects are likely to arise in relation to this qualifying interest. The other SACs are also distant from the proposed development and do not have mobile faunal QIs and there is no likelihood of significant effects arising in relation to their QI habitats.

Two of the SPA sites located in the wider area are coastal in nature and designated for the protection of waterbirds. The Murrough SPA (7.6km distant) comprises a coastal wetland complex that stretches for 13km from Kilcoole Station, east of Kilcoole village in the north to Wicklow town in the south and extends inland for up to 1km in places. The site includes an area of marine water to a distance of 200m from the low water mark. A shingle ridge runs along the length of the site and carries the Dublin-Wexford railway line. It is designated for the protection for a range of wintering waterbirds as well as breeding Little Tern, Sternula albifrons. There is no hydrological connectivity between the proposed development site and the Murrough SPA. There is no likelihood of significant effects arising on the Murrough SPA in relation to the proposed development. The site is coastal in nature, with no evidence of the habitats within the proposed development site playing an important role in the support of the Special Conservation Interest (SCI) species. Wicklow Head SPA (8.3km distant) is designated for the protection of a colony of breeding Kittiwake, Rissa tridactyla. It is a cliff-nesting seabird that rarely occurs inland. There is no likelihood of significant effects arising on Wicklow Hd. SPA as a result of the proposed development.

One upland SPA, Wicklow Mts. SPA (12.9km) is designated for the protection of two raptor species, Peregrine Falcon and Merlin, *Falco columbarius*. The SPA is an extensive upland site, comprising a substantial part of the Wicklow Mountains. It supports a relatively stable breeding population of both raptor species (NPWS Conservation Objectives). It is highly unlikely that Peregrine Falcons breeding in the SPA forage in the vicinity of the proposed development site. The 'core foraging range' of peregrine is likely to be in the region of 2km from the nest (Pendlebury *et al*., 2011) with hunting trips rarely extending beyond 6km from the nest (Hardey *et al*., 2013). Whilst Peregrine Falcons are not considered to have home ranges they do defend nesting territories which are typically 2km to 9km in size. There is no likelihood that the proposed development will lead to significant effects on the breeding population of Peregrine Falcons within the Wicklow Mts. SPA. Merlin is predominantly an upland nesting species. It was not recorded on-

site and is unlikely to occur within the proposed development site. There is no likelihood of significant effects arising on the Merlin population in Wicklow Mts. SPA in relation to the proposed development.

In summary, in agreement with the ABP Inspector's report for the previous application at this site there is only one European site, Buckroney-Brittas Dunes & Fen SAC (000729) for which there is a likelihood of significant effects arising in the absence of adequate design and environmental controls. The QIs of this SAC are a range of dune, saltmarsh and alkaline fen habitats. It is possible that an uncontrolled release of contaminants from the site, along the Potters River to the SAC (c. 12km downstream) could lead to significant effects on the protected habitats. The Conservation Objectives document includes mapping of the QI habitats within the designated site and shows that the Potters River outfalls to the sea through an area with Fixed Coastal Dunes with herbaceous vegetation at the northern end of the SAC.

The remainder of Natura 2000 sites are screened out from further consideration because of the scale and location of the proposed development site, the nature of the QIs/SCIs and Conservation Objectives of these sites, distances involved and lack of credible ecological pathway for significant effects to be transmitted.

At the NIS stage the potential impacts of the proposed development, on its own and in combination with other plans and projects to result in significant impacts on Buckroney-Brittas Dunes & Fen SAC is considered. .

Table 3.1 Minimum distances to designated sites from the application site boundary.

Site Name	Site Code	Minimum Distance (km)
European Sites		
Deputy's Pass Nature Reserve SAC	000717	1.6
Vale of Clara SAC	000733	5.5
Magherabeg Dunes SAC	001766	6.1
Buckroney-Brittas Dunes & Fen SAC	000729	6.8
The Murrough SPA	004186	7.6
The Murrough Wetlands SAC	002249	7.7
Wicklow Hd. SPA	004127	8.3
Wicklow Reef SAC	002274	9.5
Wicklow Mts. SAC	002122	11.4
Wicklow Mts. SPA	004040	12.9
Nationally Designated Sites		
Glenealy Woods pNHA	001756	1.1
Vale of Clara pNHA	000733	5.5
Avondale pNHA	002093	5.8
Magherabeg Dunes pNHA	001766	6.1

Site Name	Site Code	Minimum Distance (km)
Buckroney-Brittas Dunes & Fen pNHA	000729	6.8
Wicklow Town Sites pNHA	001929	7.7
The Murrough pNHA	000730	7.7
Devil's Glen pNHA	000718	8.2
Wicklow Hd. pNHA	000734	8.2
Ballincor Wood pNHA	001749	10.4
Avoca River Valley pNHA	001748	10.5
Vartry Reservoir pNHA	001771	12.9
Arklow Sand Dunes pNHA	001746	13.1
Arklow Town Marsh pNHA	001931	14.3

Table 3.2 Summary of the qualifying and special conservation interests of the European sites in the hinterland area.

Site Name & Code	Conservation Summary	Minimum Distance from Site (km)
Deputy's Pass Nature Reserve SAC (000717)	The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following qualifying interests; • Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Conservation Objectives updated in 2021	1.6
Vale of Clara SAC	The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following qualifying interests; • Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Conservation Objectives updated in 2021	5.5
Magherabeg Dunes SAC	The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following qualifying interests; • Annual vegetation of drift lines [1210] • Embryonic shifting dunes [2110] • Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120] • Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] • Petrifying springs with tufa formation (Cratoneurion) [7220] Conservation Objectives updated in 2017	6.1

Site Name & Code	Conservation Summary	Minimum Distance from Site (km)
Buckroney-Brittas Dunes & Fen SAC	The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following qualifying interests; • Annual vegetation of drift lines [1210] • Perennial vegetation of stony banks [1220] • Mediterranean salt meadows (Juncetalia maritimi) [1410] • Embryonic shifting dunes [2110] • Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120] • Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] • Atlantic decalcified fixed dunes (Calluno-Ulicetea) [2150] • Dunes with Salix repens ssp. argentea (Salicion arenariae) [2170] • Humid dune slacks [2190] • Alkaline fens [7230] Conservation Objectives updated in 2017	6.8
The Murrough SPA	The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following special conservation interests; • Red-throated Diver (*Gavia stellata*) [A001] • Greylag Goose (*Anser anser*) [A043] • Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] • Wigeon (*Anas penelope*) [A050] • Teal (*Anas crecca*) [A052] • Black-headed Gull (*Chroicocephalus ridibundus*) [A179] • Herring Gull (*Larus argentatus*) [A184] • Little Tern (*Sterna albifrons*) [A195] • Wetland and Waterbirds [A999] Conservation Objectives updated in 2024	7.6
The Murrough Wetlands SAC	The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following qualifying interests; • Annual vegetation of drift lines [1210] • Perennial vegetation of stony banks [1220] • Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] • Mediterranean salt meadows (Juncetalia maritimi) [1410] • Calcareous fens with Cladium mariscus and species of the Caricion davallianae [7210] • Alkaline fens [7230] Conservation Objectives updated in 2021	7.7
Wicklow Hd. SPA	The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following special conservation interests; • Kittiwake (*Rissa tridactyla*) [A188]	8.3

Site Name & Code	Conservation Summary	Minimum Distance from Site (km)
	Conservation Objectives updated in 2024	
Wicklow Reef SAC	The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following qualifying interests; • Reefs [1170] Conservation Objectives updated in 2013	9.5
Wicklow Mts. SAC	The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following qualifying interests; • Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110] • Natural dystrophic lakes and ponds [3160] • Northern Atlantic wet heaths with *Erica tetralix* [4010] • European dry heaths [4030] • Alpine and Boreal heaths [4060] • Calaminarian grasslands of the Violetalia calaminariae [6130] • Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230] • Blanket bogs (* if active bog) [7130] • Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) [8110] • Calcareous rocky slopes with chasmophytic vegetation [8210] • Siliceous rocky slopes with chasmophytic vegetation [8220] • Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] • *Lutra lutra* (Otter) [1355] Conservation Objectives updated in 2017	11.4
Wicklow Mts. SPA	The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following special conservation interests; • Merlin (*Falco columbarius*) [A098] • Peregrine (*Falco peregrinus*) [A103] Conservation Objectives updated in 2024	12.9

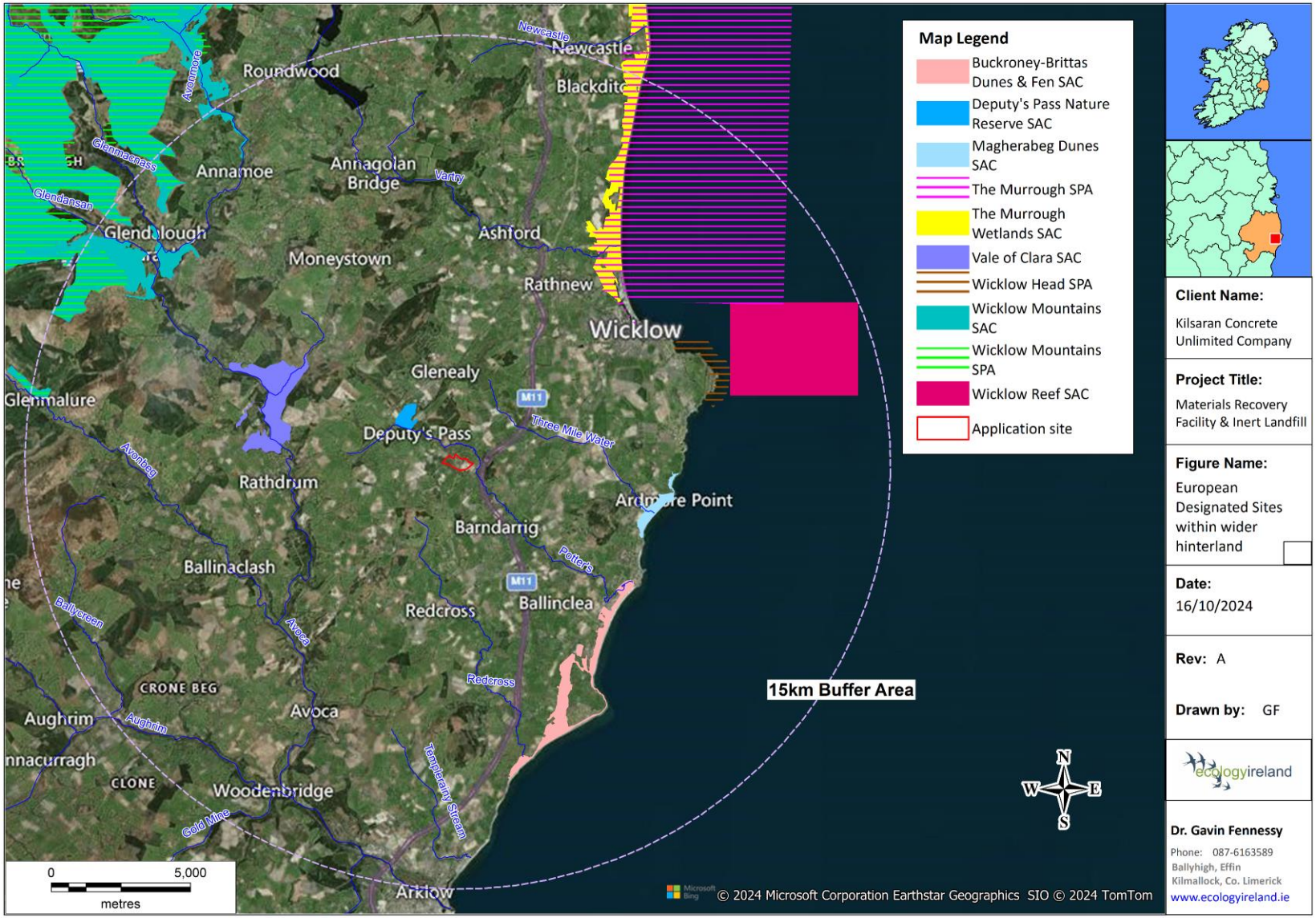

Figure 3.1 European designated sites within 15km of the proposed site boundary.

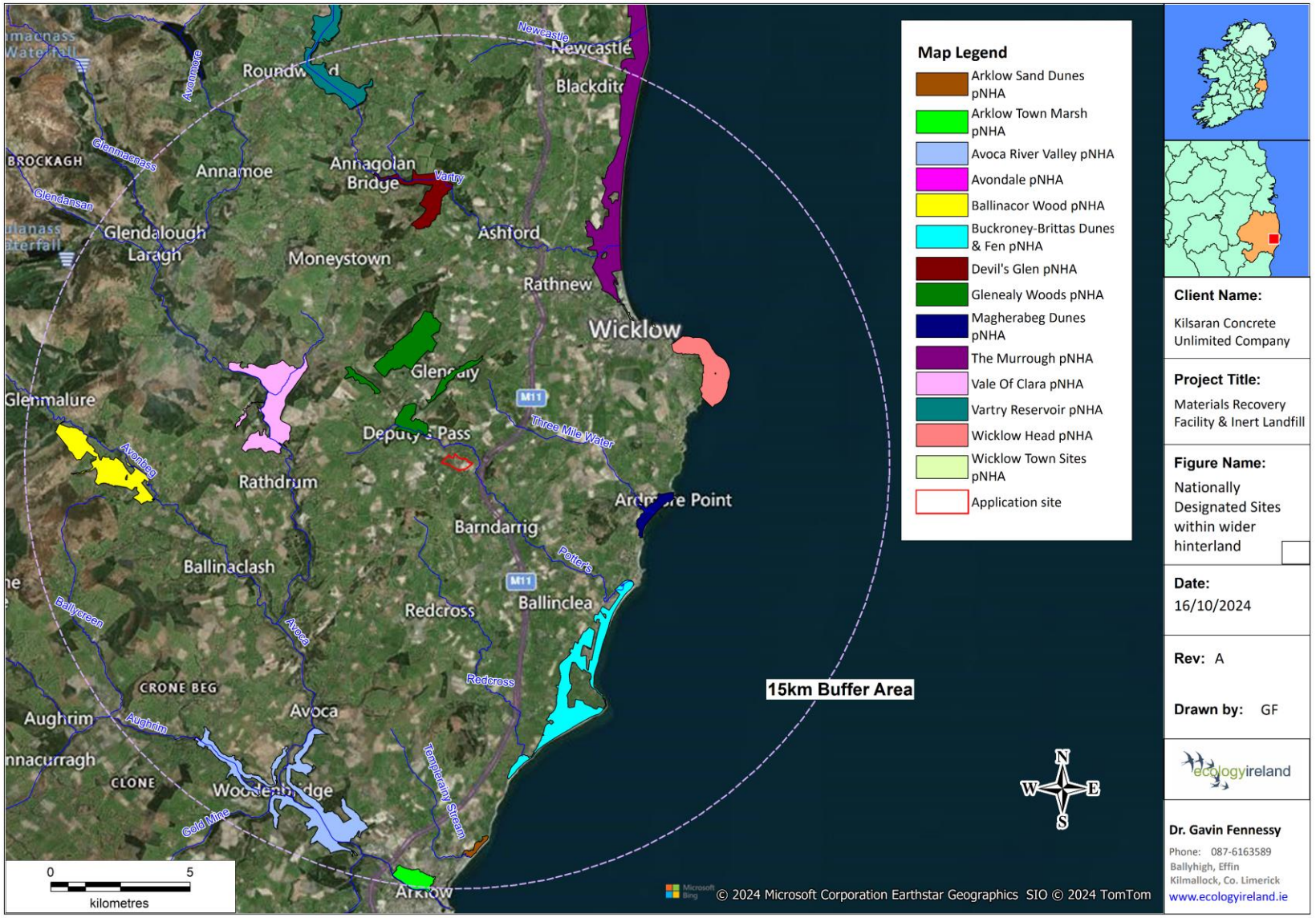

Figure 3.2 Nationally designated sites within 15km of the proposed site boundary.

4 Stage 1: Assessment Criteria

4.1 Elements of the Project Likely to Impact on the Natura 2000 Sites

Consideration of the following potential impacts is assessed here in respect of the Natura 2000 sites identified as requiring further consideration in this screening assessment;

- Buckroney-Brittas Dunes & Fen SAC

4.1.1 Direct Habitat Loss

The development site is not part of any designated site, nor does it require any resources from them; thereby ruling out any direct habitat loss at the conservation sites in question.

4.1.2 Indirect Habitat Loss or Deterioration

Indirect habitat loss or deterioration of designated sites within the surrounding area could occur from the effects of run-off or discharge into the aquatic environment through impacts such as increased siltation, nutrient release and/or contamination. This requires connectivity between the site and the designated site in question through watercourses and/or drainage ditches. As outlined in Section 3, there is a potential hydrological link, between the proposed development site and Buckroney-Brittas Dunes & Fen SAC and therefore an impact-receptor-pathway exists between these designated sites and the proposed development site.

Baseline conditions

The riverine watercourses in the vicinity of Ballinclare Quarry, namely the Potters River and its tributaries the Ballinclare Stream and Ballinameesda Lower Stream, are small channels which have been historically modified, resulting in poorer hydromorphology and habitat quality. A detailed desktop and field survey of aquatic habitats and species was conducted as part of the ecological assessment (see Chapter 5 of the EIAR).

Whilst some good instream recovery was noted on the Potters River, significant siltation and hydromorphological pressures were evident in other parts of the catchment. Most notably, gross siltation was present on the Ballinameesda Lower Stream. Nevertheless, all three local watercourses supported high conservation aquatic species, namely brown trout (*Salmo trutta*), lamprey (*Lampetra* sp.), European eel (*Anguilla anguilla*) and or smooth newt (*Lissotriton vulgaris*). Smooth newt also recorded from the settlement ponds within the site boundary. The Red-listed (vulnerable) moss bladder snail was recorded from the Ballinclare Stream, the first Co. Wicklow record since 1968 (NBDC data). Furthermore, the nationally scarce water-stick insect was recorded from one of the settlement ponds on-site, a fourth record for Co. Wicklow (NBDC data). Highly significant siltation pressures were observed on the Ballinameesda Lower Stream, causing a considerable reduction in the quality of fisheries and aquatic habitats. This short watercourse rises near Kilmacurragh Arboretum and drains (often intensive) pasture, through which it has been historically deepened and straightened. Compromised hydromorphology and livestock poaching resulted in gross siltation locally. Siltation pressures, whilst less severe, were also evident on the Potters River. Agriculture, afforestation, extractive industries and hydromorphology (channelisation) are known to be the primary threats to water quality in the wider survey area (EPA, 2020).

Indirect effects

The excavation and storage of soil during the preparation, operation and decommissioning phases has the potential to cause temporary siltation of watercourses in the event of prolonged heavy rain where excavated areas and spoil heaps are unprotected or sited in close proximity to watercourses. Eventual decommissioning of the facility could result in run-off of contaminants e.g. as a result of movement and operation of plant and run-off from 'capped' areas e.g. prior to the revegetation of these areas.

Construction machinery and associated equipment will be the principal sources of pollutants such as oil, lubricants, fuel and hydrocarbons. The accidental release of fuel, oil spills or harmful chemicals, particularly close to drains and minor watercourses could result in adverse water quality impacts. Construction pollutants such as fuel or oil will be stored in secure bunded impermeable containers within the site compound, away from the watercourse and drainage ditches. Taking this into account along with the setback buffers from such features greatly reduces the likelihood of an accidental pollution event resulting in significant impacts to water quality.

Fugitive dust leaving the site has the potential to wash into watercourses. This could lead to negative effects on water quality and sensitive aquatic habitats and species.

Wastewater from the 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 and was previously approved by way of the (2016) quarry planning permission and will continue in service for the duration for the life of the proposed waste management facility. The existing wastewater system does not have the full capacity for the proposed loading arising when the envisaged maximum numbers of personnel are based on site during the operation of the Proposed Development. Provision is therefore made for excess effluent to be stored in a holding tank, and tankered off site (by a licenced haulier) on a monthly basis. The excess effluent will be transferred to a licenced wastewater treatment plant for off-site treatment and disposal.

Uncontrolled discharge of water from the quarry void has the potential to create increased Arsenic concentrations in downstream surface water bodies (Potters River). Arsenic is toxic to fish and invertebrates, even at low concentrations. It can disrupt enzyme function and interfere with energy production, leading to reduced growth, altered behaviour, and mortality. Fish, such as brown trout and Atlantic salmon, can accumulate arsenic in their tissues, which can cause long-term health issues, reduce reproductive success, and impair survival rates. Arsenic at higher concentrations can disrupt the food web, affecting predator-prey relationships as invertebrate populations (e.g., insects) decline. bioaccumulates in aquatic organisms and magnifies up the food chain, impacting predators like birds and mammals. This bioaccumulation can also pose a risk to aquatic plants and algae. Arsenic binds to sediments, and future riverbed disturbances can release it back into the water column. High levels of arsenic in sediment can also degrade habitat quality, affecting species that rely on the riverbed for spawning or foraging, such as lampreys and eels.

Discharge of poor-quality surface water from the proposed development site has the potential to affect the water quality downstream in the Potters River, which has the further potential to have secondary adverse effects on the Buckroney-Brittas Dunes and Fen SAC (and pNHA). However, the potential consequences for the designated site(s) are limited as they are primarily designated primarily for habitats associated with the

sand dune and saltmarsh environment. The Buckroney Fen (part of the SAC), which could be considered more hydrologically dependent, is not hydrologically connected to the Potters River, and is fed by rivers/streams further south. As such, the potential effects from poor quality water in the Potters River are limited, but must be considered in further detail at the NIS stage.

In the absence of adequate mitigation (*e.g*. standard environmental controls and implementation of buffer zones to watercourses) there is some likelihood of significant effects arising from run-off of contaminants from the site. In the absence of appropriate mitigation, the potential for indirect habitat loss or deterioration cannot be discounted at this stage and therefore a NIS is required.

Disturbance/Displacement

Activities associated with the construction (and eventual decommissioning) of the proposed facility are not likely to disturb and/or displace faunal species associated with any designated conservation sites in the wider area. Direct disturbance/displacement effects in relation to noise and/or visual cues on fauna associated with designated sites can be discounted in this case given the separation distance between the proposed development and European designated sites in the wider receiving environment. This is described further in Section 3.1 above.

4.1.3 Likely Significant Effects: Conclusion

The development site is not part of the Natura 2000 sites under consideration here and does not require any resources from them – thereby ruling out any direct habitat loss impacts.

However, it is considered that construction/decommissioning phase elements of the project (in particular potential contamination of watercourses hydrologically linked to Buckroney-Brittas Dunes & Fen SAC have the potential to impact on this Natura 2000 site (i.e., without the implementation of best practice measures or site-specific mitigation measures during the project).

4.2 Likely Impacts of the Project on the Natura 2000 Sites

As outlined in Section 3.1 above, it is deemed that operational/decommissioning phase elements of the project, in particular potential discharge of silt/pollutants to the watercourses present within or in the vicinity of the proposed development has the potential to impact Buckroney-Brittas Dunes & Fen SAC, without the implementation of best practice measures, a CEMP or site-specific mitigation measures during the project.

4.2.1 Size, Scale & Land-take

The development site is c. 24 hectares in area with the quarry void accounting for c. 9.3ha.

4.2.2 Distance from or Key Features of the Natura 2000 Sites

As described in Table 3-1 above.

4.2.3 Resource Requirements (water abstraction *etc.*)

Not applicable.

4.2.4 Excavation Requirements

The site preparation (e.g. for the constructed wetland area) will require excavation and temporary storage of excavate. In addition, large volumes of imported material will be processed within the facility, some of which will be infilled to the inert landfill. The progressive restoration of the proposed facility will also see the movement and reprofiling of material.

The excavation and storage of soil (in particular) has the potential to cause temporary siltation of watercourses in the event of prolonged heavy rain where excavated areas and spoil heaps are unprotected or sited in close proximity to watercourses.

4.2.5 Emission (disposal to land, water or air)

Chapter 8 of the EIAR describes an evaluation of the risks arising from airborne dust to sensitive receptors concluding no potential for any significant effects on any of the EU designated sites. On a precautionary basis it is considered that there is some potential for cumulative effects arising from uncontrolled release of contaminated surface-water and any dust reaching or ultimately washing off into the hydrologically connected watercourses.

It is considered that construction/operation as well as decommissioning phase elements of the project (in particular discharge of contaminants to the Potters River have the potential to impact Natura 2000 sites (i.e., Buckroney-Brittas Dunes & Fen SAC) within the project Zone of Influence. Such impacts cannot be discounted without detailed design and environmental mitigation measures commitments (e.g. the commitments provided to protect water quality throughout the operation and post-closure phases of the project) being implemented. Such mitigation cannot be considered as part of the Screening stage and therefore a Natura Impact Statement is required.

4.2.6 Transportation Requirements

If it is conservatively assumed that the average HGV / truck consignment travelling to the waste facility at Ballinclare has a carrying capacity of 25 tonnes, this suggests that at a projected maximum intake rate of 600,000 tonnes per annum, there will be 9 to 10 HGV / truck trips generated every hour by on-site activities. This is equivalent to 18 to 20 individual HGV / truck movements in or out of the site every hour. This traffic will be routed along the strengthened and widened section of the L1157 ro the R772 junction.

4.2.7 Duration of Operations

Making allowance for a degree of uncertainty around the rate of material intake to the facility and provision for post-landfill restoration and aftercare works, it is projected that the overall life of this facility could extend to 25 years. Accordingly, the planning application seeks permission for a 25-year period to facilitate completion of landfilling and restoration works at the former quarry site. The operational lifespan of the solar farm will be 40 years after which time the development will be decommissioned.

4.2.8 Cumulative and In-combination Effects

In order to fully assess the potential impact of the proposed development on the receiving environment including on Natura 2000 sites, the project must be assessed alone or in combination with existing activities and proposed plans for the region.

Other plans and projects proposed or permitted in this area were reviewed using online resources including Wicklow County Council website, myplan.ie and An Bord Pleanála website.

In addition, relevant policies such as the National Biodiversity Plan (2023-2030) were considered when evaluating the potential for significant cumulative or in-combination effects arising in relation to the proposed development. The project is consistent with local and national planning policy as set out in the accompanying planning report. Cognisance has been taken in relation to European legislation such as the Water Framework Directive.

Recent planning applications in the local area relate to minor developments of one-off houses or modifications to agricultural or residential properties.

No potential for significant cumulative or in-combination effects in relation to biodiversity were identified as part of this process.

Taking the above into consideration, along with the proposed environmental management and controls integrated into the project design and for other projects in the area, no potentially negative cumulative and in-combination ecological effects have been identified. There is some potential for positive cumulative effects on local biodiversity associated with complementary landscaping commitments included as part of this progressive restoration plan for the facility.

4.3 Likely Changes to the Natura 2000 Sites

As outlined in Section 4.1 above, it is deemed that elements of the project (in particular potential discharge of silt/pollutants to the local watercourses) have the potential to impact Buckroney-Brittas Dunes & Fen SAC, without the implementation of best practice measures, a CEMP or site-specific mitigation measures during the project construction phase and during eventual decommissioning.

4.3.1 Reduction of Habitat Area

Habitat area will not be impacted by the proposed development. There is some potential for indirect habitat deterioration of Buckroney-Brittas Dunes & Fen SAC from the effects of run-off or discharge into the aquatic environment through impacts such as increased siltation, nutrient release and/or contamination, particularly in the operational phase.

4.3.2 Disturbance to Key Species

Given the distance from and location of designated sites with faunal SCIs/QIs there is no likelihood for any direct disturbance of these species associated with the proposed development.

4.3.3 Habitat or Species Fragmentation

Not applicable.

4.3.4 Reduction in Species Density

There is no likelihood that the proposed development will significantly effect the species abundance or density of any SCI/QI species associated with any of the European sites in the wider receiving environment.

4.3.5 Changes in Key Indicators of Conservation Value (water quality *etc*.)

There is some potential for the proposed project to contribute towards changes in water quality in watercourses hydrologically connected to Buckroney-Brittas Dunes & Fen SAC. This is related to the potential for run-off or discharge into the aquatic environment contributing to downstream impacts such as increased siltation, nutrient release and/or contamination.

4.4 Likely Impacts on the Natura 2000 Sites as a Whole

It is considered that in the absence of adequate mitigation that elements of the project project (in particular potential discharge of silt/pollutants to the local watercourses), have the potential to impact Buckroney-Brittas Dunes & Fen SAC, without the implementation of best practice measures, a CEMP or site-specific mitigation measures particularly during the operational phase (pre-closure).

4.4.1 Interference with the Key Relationships that Define the Structure and Function of the Natura 2000 Sites

Without the implementation of best practice measures, a CEMP or site-specific mitigation measures it is considered that run-off or contamination of watercourses during the the project may have the potential to contribute towards significant effects that may interfere with the structure and function of Buckroney-Brittas Dunes & Fen SAC.

4.5 Indicators of Significance as a Result of the Identification of Effects Set Out Above

As outlined above, it is deemed that construction (and decommissioning) phase elements of the project, in particular water quality impacts associated with the discharge or mobilisation of silt/pollutants to the local watercourses, have the potential to impact the Natura 2000 site, Buckroney-Brittas Dunes & Fen SAC. Without the implementation of best practice measures, a CEMP or site-specific mitigation measures during the project, these effects could occur.

4.5.1 Loss

There is the potential for indirect habitat deterioration in hydrologically connected Natura 2000 sites (Buckroney-Brittas Dunes & Fen SAC) associated with the effects of run-off or discharge into the aquatic environment (through increased siltation, nutrient release and/or contamination).

4.5.2 Fragmentation

Not applicable.

4.5.3 Disruption

There is the potential for indirect habitat disruption at Buckroney-Brittas Dunes & Fen SAC from the effects of run-off or discharge into the aquatic environment through impacts such as increased siltation, nutrient release and/or contamination, particularly during the project construction/decommissioning phases.

4.5.4 Disturbance

There is no likelihood of any significant disturbance or displacement effects in relation to the faunal QI/SCI species.

4.5.5 Change to Key Elements of the Site

It is considered that in the absence of adequate mitigation that elements of the project (in particular potential discharge of silt/pollutants to the local watercourses), have the potential to impact the European designated site Buckroney-Brittas Dunes & Fen SAC, without the implementation of best practice measures, a CEMP or site-specific mitigation measures.

4.6 Elements of the Project Likely to Significantly Impact on the Natura 2000 Sites or where the Scale or Magnitude of Impacts are Unknown

The proposed development site is not located in close proximity to Buckroney-Brittas Dunes & Fen SAC (>11.5km upstream when measured along drainage routes). However, given that there are hydrological connections from watercourses that drain the application site and/or are crossed by the primary haul route, significant effects during the project cannot be discounted without the implementation of best practice construction design measures and the implementation of a detailed mitigation measures which are designed by specialists in line with the best practice in the industry and shown to work.

Therefore, it cannot be concluded, that the proposed project, individually or in combination with other plans or projects, will not have a significant effect on a Natura 2000 sites, without the consideration and analysis of further information. Therefore Stage 2 NIS (AA) is required.

A Natura Impact Statement (NIS) is presented in **Section 5**, to provide scientific examination of the project to enable the competent authority to undertake an AA. The NIS will examine potential effects to Natura 2000 sites screened in as part of this Screening for Appropriate Assessment; Buckroney-Brittas Dunes & Fen SAC.

5 Natura Impact Statement

This section of the report provides the necessary information to inform the AA process to be completed by the competent authority, An Bord Pleanála. This NIS provides the relevant scientific information to enable the competent authority in carrying out its AA to determine whether or not the proposed development would adversely affect the integrity of Natura 2000 sites.

The NIS assesses whether or not the proposed development would adversely affect the integrity of Natura 2000 site identified as within the project Zone of Influence (ZoI), for which effects could not be excluded during the Screening for AA (see Section 3 & 4 for details).

As outlined in Section 4, the proposed development site has hydrological connectivity with Buckroney-Brittas Dunes & Fen SAC. This Natura 2000 site is located 6.8km overland and >11.5km downstream of the proposed development. Impacts through run-off of contaminants to the SAC were identified in the screening process as requiring further consideration and appropriate mitigation.

Table 5-1 summarises the qualifying interests of Buckroney-Brittas Dunes & Fen SAC. The detailed site synopsis and Conservation Objectives of this site are provided in Appendix A to this NIS. The Conservation Objectives and the Conservation Objectives supporting document for coastal habitat (NPWS 2017) were considered when carrying out this assessment.

The conservation objectives of this site relate to maintaining and restoring the favourable conservation condition of the following qualifying interests;

- Annual vegetation of drift lines [1210]
- Perennial vegetation of stony banks [1220]
- Mediterranean salt meadows (Juncetalia maritimi) [1410]
- Embryonic shifting dunes [2110]
- Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120]
- Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]
- Atlantic decalcified fixed dunes (Calluno-Ulicetea) [2150]
- Dunes with Salix repens ssp. argentea (Salicion arenariae) [2170]
- Humid dune slacks [2190]
- Alkaline fens [7230]

The distribution of the qualifying interest habitats is mapped as part of the Conservation Objectives (see Map 2, Appendix A). A photo of the Potters River Estuary is shown in Plate 5.1. Potters River discharges at Potter's Point, at Brittas Bay beach, to the northern end of Buckroney-Brittas Dunes & Fen SAC.

Plate 5.1 Aerial image of the Potters River Estuary, at Brittas Bay Beach (Photo: Google Maps).

Table 5-1 Details of Conservation Objectives of Buckroney-Brittas Dunes & Fen SAC.

Qualifying Interest	Attribute	Measure	Target
Annual vegetation of drift lines	Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For the sub-site mapped: Pennycomequick - 0.48ha.
	Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes.
	Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
	Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities with typical species: sea rocket (*Cakile maritima*), sea sandwort (H*onckenya peploides*), prickly saltwort (*Salsola kali*) and oraches (*Atriplex* spp.)
	Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover
Perennial vegetation of stony banks	Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession
	Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes
	Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
	Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession

Qualifying Interest	Attribute	Measure	Target
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	Maintain the typical vegetated shingle flora including the range of subcommunities within the different zones
	Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover
Mediterranean salt meadows (Juncetalia maritimi)	Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession
	Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes
	Physical structure: sediment supply	Presence/absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions
	Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure, subject to natural processes including erosion and succession
	Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime
	Vegetation structure: zonation	Occurrence	Vegetation structure: zonation
	Vegetation structure: vegetation height	Centimetres	Maintain structural variation in the sward
	Vegetation structure: vegetation cover	Percentage cover at a representative number of monitoring stops	Maintain more than 90% of the area outside of creeks vegetated
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	Maintain range of subcommunities with typical species listed in McCorry and Ryle (2009)
	Vegetation composition: negative indicator species - *Spartina anglica*	Hectares	There is no record of common cordgrass (*Spartina anglica*) in the SAC and its establishment should be prevented

Qualifying Interest	Attribute	Measure	Target
Embryonic shifting dunes	Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For the sub-sites mapped: Brittas Bay - 2.02ha; Mizen Head - 0.22ha; Pennycomequick - 0.35ha.
	Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes.
	Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
	Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
	Vegetation composition: plant health of foredune grasses	Percentage cover	More than 95% of sand couch grass (*Elytrigia juncea*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present)
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities with typical species: sand couch grass (*Elytrigia juncea*) and/or lyme-grass (*Leymus arenarius*)
	Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover
Shifting dunes along the shoreline with Ammophila arenaria (white dunes)	Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For the sub-sites mapped: Brittas Bay - 3.64ha; Pennycomequick - 0.7ha.
	Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes.
	Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions

Qualifying Interest	Attribute	Measure	Target
	Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
	Vegetation composition: plant health of dune grasses	Percentage cover	More than 95% of marram grass (*Ammophila arenaria*) and/or lymegrass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present)
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities dominated by marram grass (*Ammophila arenaria*) and/or lymegrass (*Leymus arenarius*)
	Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover
Fixed coastal dunes with herbaceous vegetation (grey dunes)	Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For the sub-sites mapped: Brittas Bay - 52.03ha; Mizen Head - 46.4ha; Pennycomequick - 11.15ha.
	Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes.
	Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
	Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
	Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes
	Vegetation structure: sward height	Centimetres	Maintain structural variation within sward

Qualifying Interest	Attribute	Measure	Target
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stop	Maintain range of subcommunities with typical species listed in Delaney et al. (2013)
	Vegetation composition: negative indicator species (including *Hippophae rhamnoides*)	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover
	Vegetation composition: scrub/trees	Percentage cover	No more than 5% cover or under control
Atlantic decalcified fixed dunes (Calluno-Ulicetea)	Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For the sub-site mapped: Brittas Bay - 0.26ha.
	Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes.
	Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
	Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
	Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% of the dune habitat, subject to natural processes
	Vegetation structure: sward height	Centimetres	Maintain structural variation within sward
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stop	Maintain range of subcommunities with typical species listed in Delaney et al. (2013)
	Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover

Qualifying Interest	Attribute	Measure	Target
	Vegetation composition: scrub/trees	Percentage cover	No more than 5% cover or under control
Dunes with *Salix repens* ssp. *argentea*: (Salicion arenariae)	Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For the sub-sites mapped: Brittas Bay - 0.13ha; Mizen Head - 0.07ha.
	Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes.
	Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
	Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
	Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% cover, subject to natural processes
	Vegetation structure: sward height	Centimetres	Maintain structural variation within sward
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stop	Maintain range of subcommunities with typical species listed in Delaney et al. (2013)
	Vegetation composition: cover and height of *Salix repens*	Percentage cover; centimetres	Maintain more than 10% cover of creeping willow (*Salix repens*); vegetation height should be in the average range of 5-20cm
	Vegetation composition: negative indicator species (including *Hippophae rhamnoides*)	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover

Qualifying Interest	Attribute	Measure	Target
	Vegetation composition: scrub/trees	Percentage cover	For trees and scrub other than creeping willow (*Salix repens*), there should be no more than 5% cover or their presence should be under control
Humid dune slacks	Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For the sub-sites mapped: Brittas Bay - 0.34ha; Mizen Head - 4.76ha; Pennycomequick - 0.10ha.
	Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes.
	Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
	Physical structure: hydrological and flooding regime	Water table levels; groundwater fluctuations (metres)	Maintain natural hydrological regime
	Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
	Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 5% of dune slack habitat, with the exception of pioneer slacks which can have up to 20% bare ground
	Vegetation structure: sward height	Centimetres	Maintain structural variation within sward
	Vegetation composition: typical species and subcommunities	Percentage cover at a representative number of monitoring stop	Maintain range of subcommunities with typical species listed in Delaney et al. (2013)
	Vegetation composition: cover of *Salix repens*	Percentage cover	Maintain less than 40% cover of creeping willow (*Salix repens*)
	Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover

Qualifying Interest	Attribute	Measure	Target
	Vegetation composition: scrub/trees	Percentage cover	No more than 5% cover or under control
Alkaline fens	Habitat area	Hectares	Area stable or increasing, subject to natural processes
	Habitat distribution	Occurrence	No decline, subject to natural processes
	Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range
	Ecosystem function: peat formation	Flood duration	Maintain active peat formation, where appropriate
	Ecosystem function: hydrology	Metres	Maintain appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat
	Ecosystem function: water quality	Water chemistry measures	Maintain appropriate water quality, particularly nutrient levels, to support the natural structure and functioning of the habitat
	Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes
	Vegetation composition: number of positive indicator species (brown mosses)	Number of species at a representative number of 2m x 2m monitoring stops	At least one brown moss species present at each monitoring stop
	Vegetation composition: number of positive indicator species (vascular plants)	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive vascular plant indicator species present at each monitoring stop is at least two for small-sedge flushes and at least three for black bog-rush (Schoenus nigricans) flush and bottle sedge (Carex rostrata) fen
	Vegetation composition: cover of positive indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of brown moss species and positive vascular plant indicator species at least 20% for small-sedge flushes and at least 75% cover for black bog-rush (Schoenus nigricans) flush and bottle sedge (Carex rostrata) fen

Qualifying Interest	Attribute	Measure	Target
	Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%
	Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%
	Vegetation composition: soft rush and common reed cover	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of soft rush (*Juncus effusus*) and common reed (*Phragmites australis*) less than 10%
	Vegetation structure: height	Percentage of leaves/shoots at a representative number of 2m x 2m monitoring stops	Proportion of live leaves and/or flowering shoots of vascular plants that are more than 5cm above the ground surface should be at least 50%
	Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%
	Physical structure: drainage	Percentage area in local vicinity of a representative number of monitoring stops	Area showing signs of drainage as a result of drainage ditches or heavy trampling less than 10%
	Physical structure: tufa formations	Percentage cover in local vicinity of a representative number of 2m x 2m monitoring stops	Disturbed proportion of vegetation cover where tufa is present is less than 1%
	Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat

The mitigation, designed-in and environmental control measures outlined in Section 5.2 have been designed to prevent any damaging run-off or pollution of Buckroney-Brittas Dunes & Fen SAC located downstream of the development during any phase of the proposed development.

5.1 Impact Assessment

5.1.1 Characterising Impacts

The methodology for the assessment of impacts is derived from the Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites (EC, 2002). When describing changes/activities and impacts on ecosystem structure and function, the types of impacts that are commonly presented include the following:

- direct and indirect effects,
- short- and long-term effects,
- construction, operational and deconstruction / demolition effects, and
- isolated, interactive and cumulative effects.

Impacts that could potentially occur through the implementation of the project can be categorised under a number of impact categories as outlined in the EC 2002 document as follows:

- Loss/Reduction of habitat area,
- Disturbance to key species,
- Habitat or species fragmentation,
- Reduction in species density, and
- Changes in key indicators of conservation value such as decrease in water quality and quantity.

As described the only European site that was 'screened in' as having likely significant effects from the proposed development in the absence of appropriate mitigation is Buckroney-Brittas Dunes & Fen SAC. Using the Source-Pathway-Receptor (S-P-R) model the mechanism whereby such an effect would occur would be the uncontrolled release of contaminants to the Potters River (c. 12km upstream of the SAC). The river outfalls to the sea at the north of the coastal SAC, through an area of Fixed Dune habitat.

Meaning of 'Adversely Affect the Integrity of the Site'

The concept of the 'integrity of the site' is explained in the EU publication Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, as follows;

'It is clear from the context and from the purpose of the directive that the 'integrity of the site' relates to the site's conservation objectives. For example, it is possible that a plan or project will adversely affect the integrity of a site only in a visual sense or only habitat types or species other than those listed in Annex I or Annex II. In such cases, the effects do not amount to an adverse effect for purposes of Article 6(3), provided that the coherence of the network is not affected. On the other hand, the expression 'integrity of the site' shows that focus is here on the specific site. Thus, it is not allowed to destroy a site or part of it on the basis that the conservation status of the habitat types

and species it hosts will anyway remain favourable within the European territory of the Member State.

As regards the connotation or meaning of 'integrity', this can be considered as a quality or condition of being whole or complete. In a dynamic ecological context, it can also be considered as having the sense of resilience and ability to evolve in ways that are favourable to conservation. The 'integrity of the site' has been usefully defined as 'the coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of species for which the site is or will be classified'

A site can be described as having a high degree of integrity where the inherent potential for meeting site conservation objectives is realised, the capacity for self-repair and self-renewal under dynamic conditions is maintained, and a minimum of external management support is required. When looking at the 'integrity of the site', it is therefore important to take into account a range of factors, including the possibility of effects manifesting themselves in the short, medium and long-term.

The integrity of the site involves its ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the site's conservation objectives.

5.1.2 Potential Effects from the Proposed Development to Qualifying Habitats and Species of Natura 2000 Sites within the Project Zone of Influence

Potential effects associated with the proposed development to the QIs of Buckroney-Brittas Dunes & Fen SAC are as follows:

- Operational phase elements of the project (in particular those that could result in pollution of watercourses) have the potential to impact the hydrologically connected Natura 2000 sites (i.e. Buckroney-Brittas Dunes & Fen SAC). Such effects could result in indirect habitat loss or deterioration. Given the route of the Potters River, the only qualifying habitat potentially negatively affected by water-quality effects is *Fixed coastal dunes with herbaceous vegetation* (grey dunes; 2130). Thereafter, the river outfalls to the sea and the dilution and dispersal effects are such that there is no-likelihood whatsoever that the other QIs, remote from Potters River would show significant adverse impacts.

- Likewise, it is reasonable to infer that in the absence of adequate environmental controls during the decommissioning phase that there could be similar effects on Buckroney-Brittas Dunes & Fen SAC.

5.2 Best Practice Design and Mitigation Measures

There is some potential (albeit limited) for a pollution event, or prolonged deterioration in water quality in the Potters River to measurably impact upon the Fixed Dune habitat. From the Conservation Objectives it is not considered likely that a mechanism exists by which a negative effect on the water quality in Potters River could measurably affect many of the attributes of the Fixed Dune system (e.g. Habitat Area or Distribution).

On a precautionary basis the possibility of pollution of the Potters River negatively impacting Vegetation Structure (Sward height) and Vegetation Composition attributes is considered further.

The measures outlined below will be implemented to ensure that any impacts on the receiving environment will be avoided during the project's operational and decommissioning phases.

5.2.1 Mitigation Strategy

A detailed mitigation strategy has been prepared for the proposed development which has drawn upon the recommendations of the various specialists that prepared the accompanying EIAR (See Appendix B). The key environmental commitments will be incorporated into a live Construction and Environmental Management plan by the contractor at the development stage.

The proposed mitigation measures contain commitments designed to minimise risks related to the potential surface water run-off and contamination of watercourses from water (and other potential sources of emissions) and any associated risks to the hydrologically connected Natura 2000 site. In addition, it captures the more general ecological and environmental commitments as a whole, including mitigation to minimise the potential disturbance to non-qualifying interests and non-special conservation interests.

A suitably qualified Ecological Clerk of Works (ECoW) for the project will be appointed and supervise and monitor the delivery of the mitigation (and enhancement measures; see Chapter 5 of the EIAR) throughout the operation of the facility.

5.2.2 Mitigation measures and design elements

Some mitigation measures were previously/are currently in place at the existing quarry to prevent any reduction in the quality of the local aquatic environment. These measures are in accordance with the "best practice / possible remedial measures" set out in Chapter 3.4 of the DoEHLG (2004) Quarries and Ancillary Activities: Guidelines for Planning Authorities.

The following measures will be implemented at the site to prevent leaks and/or spills, these are mitigation by prevention:

- The discharge water to the Potters River will comply with the conditions in the discharge licence (WPL116), or any required revision to the licence resulting from conditions associated with this application;
- The discharge water will be treated in a water treatment plant and will pass through the settlement lagoons / attenuation pond at the site;
- No refuelling of plant / machinery, maintenance or repairs will take place in the quarry void to prevent accidental spillages reaching the ground or being washed off in surface water;
- A refuelling pad with connection to hydrocarbon separator is provided at the application site, beside the workshop. All mobile plant and machinery refuelling will take place on the refuelling pad.
- Drip trays will be used for all other refuelling activities;
- All refuelling will be completed by competent / trained operatives;

- All plant / machinery maintenance and repairs will take place under cover in the existing workshop at the site or on the hardstand refuelling pad;
- All plant will be regularly maintained and inspected daily for leaks of fuels, lubricating oil or other contaminating liquids;
- Fuel storage will continue at the existing bunded storage facility at the site;
- All petroleum-based products (lubricating oils, waste oils, etc.) will be stored on drip trays under cover in the workshop to prevent pollution due to accidental leakages;
- Waste oil and grease containers will be stored under cover in the workshop. Waste containers will be collected and disposed of by a suitably licenced contractor;
- An emergency spill response kit (with containment booms, absorbent materials and drip tray) will be provided on-site to contain/ stop the migration of any accidental spillages, should they occur;
- Plant operators will be briefed during 'toolbox' talks and site induction on where the spill kit is kept and how and when it is deployed;
- Regular visual inspection and testing will be undertaken of the integrity of tanks, drums, bunded pallets and double skinned containers;
- Traffic management systems at the site will reduce potential conflicts between vehicles, and the potential risk of collisions and associated fuel spills or oil leaks; and
- Site speed limits will be implemented across the site to further reduce the likelihood and significance of collisions and the possibility of a fuel leak from such a collision.

Water in the quarry void will be pumped to the treatment plant and will then be routed to the settlement / attenuation ponds for further treatment (settlement) prior to discharge at the Potters River. Should the capacity of the settlement ponds be exceeded then additional ponds will be constructed.

All surface water discharges to the Potters River will comply with the emission limits set by the discharge licence [WPL116] (or those which may supersede them in any waste licence issued by the EPA). The volume of water discharged from the site compared to flood flows in the Potters River is negligible and therefore the discharge water will not result in increased flood risk in the river. The proposed mitigation measures outlined above for the construction stage will also be implemented for the operational stage particularly in relation to accidental fuel leaks and spillages of any hydrocarbons and the settlement / attenuation ponds for the removal of suspended solids.

The following additional mitigation measures will also be implemented:

- Suitable uncontaminated natural, undisturbed soil waste and/or soil by-product (i.e. non-waste) which conforms to an engineering specification will be imported for re-use in the construction of the 1m thick basal and side clay liners required for the inert landfill at the application site. This clay liner will be of sufficiently low permeability (less than or equal to

$1x10^{-7}$m/s) to provide an appropriate level of protection to groundwater and the surrounding aquifer, in line with accepted inert landfill design standards. The proposed clay liner is intended to have the following functions:

- Prevent discharge through the base of the backfilled quarry void.
- Prevent discharge through the sidewalls of the backfilled quarry void.
- Ensure that the wider aquifer and underlying groundwater system and groundwater quality is physically protected by a pathway/flow barrier.

- A separate drainage system will be provided to reduce pressures and dewater groundwater beneath the basal liner. Dewatered groundwater and storm runoff from the inert landfilling activities will be collected at a sump and pumped up to the approved (Siltbuster) treatment plant and from there to the proposed on-site (passive) wetland treatment system before being discharged off-site to the Potters River. The sizing and design of the wetland treatment system has been developed having regard to the likely contaminants (and concentrations thereof) which could be present in the inert soil / C&D waste intake source from construction sites.

- The effectiveness of the proposed wetland treatment systems can be enhanced by the temporary addition of various, more active treatment systems, such as chemical dosing, aeration or other such processes. This can allow a wetland system to handle higher contaminant loads or flows for periods of time (should it be necessary) before reverting to more standard (passive) modes of operation, therefore providing flexibility should leachate generation rates and chemical constituents change over time.

- Based on the initial assessment and design, the proposed wetland treatment system at Ballinclare Quarry will comprise the existing approved treatment system in addition to:

  (i) A wetland treatment system : comprising the following elements in series
    (a) Anaerobic (biochemical reactor) wetland;
    (b) Iron Sequestering Unit (ISU);
    (c) Aerobic wetland
  (ii) A leachate reception tank : up to $50m^3$, self-bunded storage tank with level controls.
  (iii) A pump house : housed is a standard shipping container (6.0m x 2.4m x 2.6m) containing feed, discharge and chemical dosing pumps;
  (iv) Off-site discharge via existing ditch / drainage channels to the Ballinclare Stream and the Potters River further downstream.

- All inert soil / C&D waste materials will be transported to the proposed materials recovery / recycling facility and inert landfill at Ballinclare Quarry using heavy goods vehicles (HGVs) comprising a mix of rigid body lorries and articulated trucks. All HGVs importing inert wastes (or by-product) to the facility will be required to pass over the new weighbridge which is to be installed at the northern end of the existing access road into the site.

- On arrival, HGV drivers carrying the waste intake materials will identify themselves to staff at the site / weighbridge office before proceeding to the active backfilling / landfilling area or

the C&D waste recovery / recycling facilities (as appropriate). Staff will record the time and date of arrival, the nature, origin and weight of the imported materials (whether waste or by-product / engineering materials), the customer / Client name, the truck licence plate number, any relevant waste collection permit details and any further details which may be required by the EPA waste licence. All records of by-product and waste intake will be maintained on site for tracking and auditing purposes.

- Only soil and stone waste and C&D material carried by authorised waste collectors will be accepted at the proposed waste facility at Ballinclare Quarry. All waste intake and acceptance will be subject to regulation and control by way of any EPA Waste Licence issued in respect of the proposed facility.

- The source of each large consignment of soil imported to site for landfilling purposes shall be identified in advance and subject to basic characterisation testing to confirm that it is inert according to the criteria set by Council Decision 2003/33/EC and complies with site acceptance criteria. A site investigation report of other detailing the characterisation testing undertaken and results of testing will be submitted for approval in advance by customers, clients or sub-contractors intending to forward soil and stone materials to the facility. A suitably qualified person shall review the Site Investigation Report and determine if the material is suitable for acceptance. All HGVs transporting waste to the site must hold a valid Waste Collection Permit. Details of the hauliers permit shall be issued in advance. A letter of suitability shall be issued to the source site. Specific conditions if required will be outlined and agreed by the source site. Onsite CCTV cameras at the weighbridge will be fitted with vehicle recognition software to ensure the vehicle is pre-approved and carries a waste collection permit.

- Operating procedures at the proposed facility will require all wastes forwarded for landfilling and/or recovery purposes to be pre-sorted at source, inert and free any non-hazardous / hazardous domestic, commercial or industrial wastes. Any waste consignment arriving at the facility which is identified with intermixed non-hazardous / hazardous wastes on foot of a CCTV / visual inspection at the weighbridge will be deemed unacceptable, will be immediately rejected and re-directed off-site to an alternative authorised (i.e. permitted or licensed) waste facility.

- All inert soil and stone imported to the facility will be unloaded (end-tipped) from HGV's at the active landfilling areas. In addition to visual / CCTV inspection at the weighbridge, it will be inspected again by site-based personnel at the landfilling area to ensure that there is no non-hazardous or hazardous waste intermixed with it. Should any intermixed, non-inert waste be identified at this point, the entire consignment will be rejected and reloaded back onto the HGV / tipper truck and the haulier directed to remove it off-site to another authorised (ie. permitted or licensed) waste facility.

- Similarly, should any non-inert or non-C&D waste be identified amongst incoming waste consignments at the soil / C&D waste recovery areas, the entire waste consignment will also be rejected and reloaded onto the HGV / tipper truck and the haulier directed to remove it off-site to another authorised waste facility.

- If, following its acceptance at the facility, there is any subsequent grounds for concern about the nature of the wastes imported to and/or handled on site, it will be segregated and transferred to the covered waste inspection and quarantine shed for closer inspection and classification testing to establish whether it can be accepted at the facility or not. Suspect waste will be identified on the basis of visual inspection (unusual colour, intermixed wastes etc.) or by smell during waste placement, handling and/or processing / crushing. A detailed record will be kept of all such inspections.

- Should detailed inspection and/or any subsequent testing indicate that the quarantined materials are non-inert or cannot be accepted and used for landfilling or recovery / recycling purposes at the facility, they will be transferred off-site by to another appropriately authorised waste facility.

- It is proposed to designate the former aggregate storage shed at the southern site boundary (at the southern limit of the former concrete / asphalt production area) as the on-site waste inspection and quarantine facility. The shed is roofed, closed on three sides and has a concrete floor, thereby protecting any suspect waste which might be transferred and held there from incident rainfall and avoiding the potential to generate (suspect) contaminated surface water run-off (and a requirement for separate wastewater collection and storage infrastructure).

- Any significant volumes of intermixed non-inert C&D wastes (principally metal, timber, PVC pipes and plastic) inadvertently imported to the facility will be separated out and temporarily stored in skips or covered at the waste recovery area / shed or at the waste quarantine area prior to removal off-site to appropriately authorised waste facility. A representative sample will be taken (in accordance with waste licence requirements) of waste materials accepted at the inert landfill facility and subjected to compliance testing which focuses on key contaminant indicators. This data shall be used to confirm that the accepted soils are inert / acceptable (according to Council Decision 2003/33/EC) and/or comply with approved waste intake acceptance criteria. Compliance testing will be undertaken by the Applicant.

- Only operators and/or haulage firms holding valid current waste collection permits will be engaged to transfer waste streams off-site to other authorised waste disposal or recovery facilities as required.

Groundwater protection

Potential impacts on local groundwater wells can occur if the imported soil/stone material does not conform to its inert status. Mitigation measures have been outlined above (Testing and Inspection of Imported Material) which will prevent this.

Local domestic wells have been identified, which are listed above within the Receiving Environment section (Groundwater abstractions and wells). Due to the broadly unproductive hard Diorite bedrock aquifer, impacts on groundwater levels distal to the site will not occur. This is borne out from on-site information in the observation wells (GW1-GW3) and from monitoring in local domestic wells.

Groundwater will flow within the upper clay/overburden layer as detailed in Chapter 7 of the accompanying EIAR. Local domestic wells are either upgradient of the site or, where downgradient such as at CBDW1 and KHDW1, there is a surface watercourse (the Ballinameesda Lower [Kilmacurra] stream), which creates a hydraulic boundary between these local domestic wells and the site.

Local domestic wells also show no significant effect on groundwater levels due to the existing pumping from the site, at an average pumping rate of 72 m^3/hr. There is no response recorded in local wells from that pumping despite a water level change of ~13m.

A clay liner will be installed underlying the waste material being infilled in the quarry. This clay liner will have sufficient low permeability (at least $1x10^{-7}$m/s) so as to hydraulically isolate it from the underlying bedrock aquifer.

Groundwater quality testing will be completed (on a quarterly basis) in wells GW1-GW3 to ensure there is no change in groundwater quality and no effects from the importation of the inert soil and stone material.

The mitigation measures outlined in relation to waste material will ensure no impacts occur to local groundwater quality.

Proven and effective control measures to mitigate any risks to groundwater quality or groundwater levels at the Proposed Development site are outlined above. Application of these controls will break the pathway between the potential source and the receptor.

Water Management Measures

The operational phase of the Proposed Development includes for a phased infilling of the quarry void. During Phase 1A, surface water runoff from the infill area will be captured and recirculated (or supplied to soil wash plant). Any excess runoff will be tankered off site. Surface water runoff from the C&D recovery yard will be captured and supplied to the soil wash plant, while runoff from the soil processing area will be directed towards a sump behind the wash plant for use in the washing process. Any excess water in the sump on the quarry floor will be treated prior to discharge.

Following the capping and restoring oh the Phase 1A area, surface water runoff will be captured by a perimeter toe drain and discharged offsite. Before the end of Phase 1A, the construction of the Integrated Constructed Wetland will commence. During that construction phase, excess water from the construction area will be pumped back to the quarry void. In addition, a temporary cutoff drain and double line of silt fencing will be used to ensure separation between the wetland construction area and the Ballinclare stream. During the follow-on Phase 1 development, the discharge/runoff from the inert landfilling areas will be collected and treated in a Integrated Constructed Wetland. Runoff from the C&D waste recovery and soil processing area will be supplied to the soil wash plant. Any excess water collecting in the sump on the quarry floor will be treated by the Siltbuster system and settlement ponds prior to discharge.

During Phase 2 of the development, whereby the land surface will be raised to 80mOD, the runoff from active inert landfill areas will be collected and treated within the Integrated Constructed Wetland. Runoff from capped landfill areas and the C&D waste recovery facilities will be collected

and directed to temporary balancing ponds. Excess water in these balancing ponds will be treated by the Siltbuster system and settlement ponds prior to licensed discharge.

During Phase 3 of the Proposed Development, the water management system will mimic the Phase 2 operation outlined above.

Surface water quality testing of the discharge from the site will be completed on a quarterly basis (subject to any update of the existing discharge license and/or conditions within the Waste License). As such, runoff from the site will be managed during each phase of the proposed infilling, as well as management of surface water from the C&D waste recovery facility, in order to mitigate against any potential effects on downstream watercourses following discharge off-site.

Mitigation for the protection of surface water quality during all phases of the proposed development are outlined above to deal with sediment, hydrocarbons, and dissolved metals.

Post-closure

- The proposed mitigation measures outlined above for the will be implemented for the post-operational stage while site infrastructure is being decommissioned and the final landscaping works are being undertaken to restore the site to a native woodland habitat.
- In addition, appropriate seasonal timing of site restoration works, soil subsoiling and grass seeding will reduce the any adverse impacts of soil erosion across the site.
- Once the site is backfilled, it will become vegetated and runoff and drainage will either percolate to ground or runoff and drain passively from the site via the wetland area. A small area of the southeastern corner of the site will drain locally to a suitably sized swale /attenuation pond and will discharge following treatment to the Kilmacurragh Stream.
- The long-term surface water management regime for the backfilled landform (described in more detail in Chapter 2 of the accompanying EIAR) will be established incrementally over time, as landfill and restoration work proceeds. On completion of the quarry backfilling and restoration works, any outstanding long-term site drainage works will be completed.

In summary

There will be no significant change in flow discharging to the Potters River, and therefore flow (or volume) of water will not affect the functioning of the hydrology of the protected habitat.

- The operation of the proposed site will not affect groundwater quality for the reasons outlined above, therefore it will not affect the GWB or the GWDTE waterbody within which Buckroney-Brittas Dunes and Fen SAC/pNHA occurs.
- Once the site is backfilled, it will become vegetated and runoff and drainage will either percolate to ground or runoff and drain passively from the site via the wetland area. A small area of the southeastern corner of the site will drain locally to a suitably sized swale/attenuation pond and will discharge following treatment to the Kilmacurragh Stream.

- A WFD Compliance Assessment provided in the EIAR (see Chapter 7 of the EIAR) concluded that there will be no change in GWB or SWB status in the underlying GWB or downstream SWBs resulting from the proposed development. There will be no change in quantitative (volume) or qualitative (chemical) status, and the underlying GWB and downstream SWBs are protected from any potential deterioration. Mitigation proposed for the protection of protected areas during the construction, operation and post-operational stages of the proposed development will ensure the qualitative and quantitative status of the receiving ground and surface waters will not be altered by the proposed development and thereby limiting the potential for the proposed development to negatively impact upon any designated site.
- With the application of the design and mitigation measures outlined herein (and in the companying EIAR) there are no significant residual impacts with respect to groundwater and/or surface water during the construction, operational or post-construction stages of the proposed development. Detailed proven mitigation measures will be implemented at all stages of the development to ensure protection of downstream surface water quality in the Potters River.
- Examination of the identified potential impacts on the receiving environment, provided the appropriate identified mitigation measures are put in place, then there are no significant residual impacts with respect to groundwater and/or surface water during the construction, operational or post-construction stages of the proposed development.
- It is therefore considered that with the implementation of the mitigation measures outlined above, the proposed development will not result in any likely, significant effects on groundwater and/or surface water. As a result, there will be no significant potential to effect water quantity or water quality that flows through Fixed Dune habitat within Buckroney-Brittas Dunes and Fen SAC/pNHA.
- With the application of the mitigation and monitoring measures outlined in Chapter 5 (Biodiversity), Chapter 7 of the EIAR (Hydrology & Hydrogeology), Chapter 8 (Air Quality), Chapter 14 (Traffic & Transportation) and mitigation commitments compiled from the specialist EIAR Chapters (Appendix B) there is no residual risk of significant adverse impacts on Buckroney-Brittas Dunes & Fen SAC arising from the proposed development, or in combination with other projects and plans.

This conclusion is consistent with the ABP Inspector's AA determination in relation to the previous planning application.

5.3 NIS Summary and Conclusion

5.3.1 Integrity Of The Site

From the *Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC* (EC, 2002), the meaning of integrity is described as follows:

'*The integrity of a site involves its ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the site's conservation objectives'*.

The concept of the 'integrity of the site' is also explained in the EU publication Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2000), as follows:

'It is clear from the context and from the purpose of the directive that the 'integrity of the site' relates to the site's conservation objectives. For example, it is possible that a plan or project will adversely affect the integrity of a site only in a visual sense or only habitat types or species other than those listed in Annex I or Annex II. In such cases, the effects do not amount to an adverse effect for purposes of Article 6(3), provided that the coherence of the network is not affected. On the other hand, the expression 'integrity of the site' shows that focus is here on the specific site. Thus, it is not allowed to destroy a site or part of it on the basis that the conservation status of the habitat types and species it hosts will anyway remain favourable within the European territory of the Member State.

5.3.2 Integrity of the Natura 2000 Sites within the Project Zone of Influence

Potential for any significant adverse effects will be resolved through the implementation of the mitigation commitments contained in Appendix B and throughout the EIAR and as summarised above.

From the information gathered and the predictions made about the changes that are likely to result from the construction, operational and decommissioning stages of the project and the mitigation commitments proposed to avoid impacts on the two Natura 2000 sites within the zone of influence of the project, an Integrity of Site Checklist for the Natura 2000 site considered in this Natura Impact Statement is presented in Table 5.2 below.

Table 5-2: Integrity of Site Checklist for Natura 2000 Sites within the Project Zone of Influence

Conservation Objectives		
Does the project have the potential to:	**Yes or No**	**Comment**
Cause delays in progress towards achieving the conservation objectives of the site?	No	There will be no significant direct impacts to the QIs of Buckroney-Brittas Dunes & Fen SAC. Potential indirect effects to this site (and more specifically the Fixed Dune QI) e.g. via pollution or contamination of drains and watercourses hydrologically linked to the SAC have been considered in the above assessment. Works

Conservation Objectives		
Does the project have the potential to:	**Yes or No**	**Comment**
		practices and design measures have been proposed to address potential impacts which could be caused by uncontrolled run-off, or discharge of contaminants (see above and Appendix B. The proposed development will therefore not cause delays in achieving the conservation objectives of Natura 2000 sites within project ZoI.
Interrupt progress towards achieving the conservation objectives of the site?	No	The proposed development will not interrupt the achievement the site's Conservation Objectives or those factors that help maintain the favourable conditions of the site or interfere with the distribution and density of key indicator species. There will be no significant direct impacts to the QIs of Buckroney-Brittas Dunes & Fen SAC. Potential indirect effects to this site (and more specifically the Fixed Dune QI) e.g. via pollution or contamination of drains and watercourses hydrologically linked to the SAC have been considered in the above assessment. Works practices and design measures have been proposed (see above and Appendix B) to address potential impacts which could be caused by uncontrolled run-off, or discharge of contaminants. The proposed development will therefore not interrupt progress towards achieving the conservation objectives of this Natura 2000 site, disrupt the factors that maintain favourable conditions within the site, or interfere with the balance, distribution of density of key species that are the indicators of the favourable condition of the QIs of this SAC.
Disrupt those factors that help to maintain the favourable conditions of the site?	No	
Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?	No	
Other Objectives: Does the project have the potential to:	Yes or No	Comment
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or	No	There will be no significant direct impacts to the QIs of Buckroney-Brittas Dunes & Fen SAC (and more specifically the Fixed Dune QI) e.g. via pollution or contamination of drains and

Conservation Objectives		
Does the project have the potential to:	**Yes or No**	**Comment**
ecosystem?		watercourses hydrologically linked to the SAC which have been considered in the above assessment. Works practices and design measures have been proposed see above and Appendix B) to address potential impacts which could be caused by uncontrolled run-off, or discharge of contaminants. The proposed development will therefore not cause delays in achieving the conservation objectives of Buckroney-Brittas Dunes & Fen SAC. Potential indirect effects to this site (and more specifically the Fixed Dune QI) e.g. via pollution or contamination of drains and watercourses hydrologically linked to the SAC have been considered in the above assessment. Works practices and design measures have been proposed (see above and Appendix B) to address potential impacts which could be caused by uncontrolled run-off, or discharge of contaminants. The proposed development will not cause changes to the vital defining aspects (that determine how the site functions as a habitat or ecosystem or change the dynamics of the relationships that define the structure and/or function of the site.
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	No	
Interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?	No	The proposed development will not interfere with predicted or expected natural changes to Buckroney-Brittas Dunes & Fen SAC.
Reduce the area of key habitats?	No	The proposed development will not result in the loss, reduction or change of key features associated with Natura 2000 sites. The proposed development is located distant (6.8km overland; <11.5km measured along watercourses) from the designated conservation site and it does it require any resources from these sites; thereby ruling out any direct habitat loss at the SAC in question. Indirect deterioration of Fixed Dunes (QI) within the designated sites could potentially occur from the effects of damaging run-off or discharge into the aquatic environment through impacts such as
Reduce the population of key species?	No	
Change the balance between key species?	No	
Reduce diversity of the site?	No	

Conservation Objectives		
Does the project have the potential to:	**Yes or No**	**Comment**
		increased siltation, nutrient release and/or contamination. The possibility for such effects to be significant (in relation to the area of QI habitats, the population of any key species and the balance between such species, as well as the overall diversity present) are relatively unlikely given the nature of the habitat in question and limited interaction between Potters River and the QI habitat. However, works practices and design measures have been committed to (see above and Appendix B) to address all potential adverse impacts to these watercourses and by extension effects to the hydrologically connected Natura 2000 sites, their QIs and Conservation Objectives.
Result in disturbance that could affect population size or density or the balance between key species?	No	The proposed development will not result in disturbance that will affect population size or densities of any QI/SCI faunal species.
Result in fragmentation?	No	There will be no fragmentation of any Natura 2000 sites, including Buckroney-Brittas Dunes & Fen SAC as a result of the development.
Result in loss or reduction of key features (e.g., tree cover, tidal exposure, annual flooding, etc.)?	No	The proposed development will not result in the loss or reduction of key features of Buckroney-Brittas Dunes & Fen SAC.

5.4 Conclusion

The AA Screening (see **Section 3 & 4**) found that it could not be excluded, on the basis of objective scientific information that the proposed works, individually or in combination with other plans or projects, would have a significant effect on Buckroney-Brittas Dunes & Fen SAC. Therefore, a NIS (presented in **Section 5**) was required to ascertain whether the proposed works would have an adverse effect on the integrity of the Natura 2000 sites.

Best practice measures and mitigation measures (as outlined within **Section 5.2; see also Appendix B)**; see also the individual Chapters in the EIAR) have been identified to ensure that the risk of any significant residual effects on the water quality of watercourses hydrologically connected to Buckroney-Brittas Dunes & Fen SAC is minimised such that there is no risk of adverse effects on the relevant Qualifying Interests of that Natura 2000 site.

It has been objectively concluded that the proposed development individually or in combination with other plans or projects will not adversely affect the integrity of Natura 2000 sites, and there is no reasonable scientific doubt in relation to this conclusion.

6 References

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Appendix A

Site Synopsis & Conservation Objectives

Buckroney-Brittas Dunes & Fen SAC

SITE SYNOPSIS

Site Name: Buckroney-Brittas Dunes and Fen SAC

Site Code: 000729

Buckroney-Brittas Dunes and Fen is a complex of coastal habitats located about 10 km south of Wicklow town. It comprises two main sand dune systems, Brittas Bay and Buckroney Dunes, connected on the coast by the rocky headland of Mizen Head. The dunes have cut off the outflow of a small river at Mizen Head and a fen, Buckroney Fen, has developed. A further small sand dune system occurs south of Pennycomequick Bridge.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1210] Annual Vegetation of Drift Lines
[1220] Perennial Vegetation of Stony Banks
[1410] Mediterranean Salt Meadows
[2110] Embryonic Shifting Dunes
[2120] Marram Dunes (White Dunes)
[2130] Fixed Dunes (Grey Dunes)*
[2150] Decalcified Dune Heath*
[2170] Dunes with Creeping Willow
[2190] Humid Dune Slacks
[7230] Alkaline Fens

Along much of the higher parts of the beach at this site, typical annual strandline vegetation occurs. Species such as Sea Rocket (*Cakile maritima*), Prickly Saltwort (*Salsola kali*) and Spear-leaved Orache (*Atriplex prostrata*) are frequent in this zone, with the scarcer Yellow Horned-poppy (*Glaucium flavum*) present in places.

A shingle ridge occurs along the Buckroney dune system. The amount of exposed shingle is low, but it is likely that shingle underlies much of the sandy areas also. The vegetation on the shingle is similar in composition to that which occurs as part of the drift line and embryonic dune habitats. Sea Sandwort (*Honkenya peploides*) is characteristic, and other species include Sand Couch (*Elymus farctus*), Sand Sedge (*Carex arenaria*), Sea Rocket and Yellow Horned-Poppy.

An area of saline vegetation which conforms to 'Mediterranean salt meadows' occurs in the Buckroney dune system south of the inlet stream to the fen, and possibly in small areas elsewhere within the site. It is typically dominated by rushes (*Juncus* spp.), and of note is the presence of Sharp Rush (*J. acutus*). Sea Club-rush (*Scirpus*

maritimus) also occurs. The area is inundated by the tide only occasionally via the narrow inlet leading to Buckroney Fen.

Embryonic dune development occurs at the southern part of Brittas and more widely at Buckroney and Pennycomequick. Typical species are couch grasses (*Elymus* sp.), Sand Sedge and Sea Sandwort. The main dune ridges are dominated by Marram (*Ammophila arenaria*), with herbaceous species such Sea Spurge (*Euphorbia paralias*), Sea-holly (*Eryngium maritimum*) and Common Restharrow (*Ononis repens*) occurring throughout. The main dune ridges are well developed, reaching heights of 10 m at Brittas. The northern end of the Brittas system has fine examples of parabolic dunes.

Stable fixed dunes are well developed at Brittas and Buckroney. Marram is less frequent in these areas and is replaced by Red Fescue (*Festuca rubra*) as the most common grass species. A rich flora occurs, especially in the more open areas. Common species include Pyramidal Orchid (*Anacamptis pyramidalis*), Common Milkwort (*Polygala vulgaris*), Wild Pansy (*Viola tricolor* subsp. *curtisii*), Carline Thistle (*Carlina vulgaris*), Biting Stonecrop (*Sedum acre*), Wild Thyme (*Thymus praecox*) and Common Bird's-foot-trefoil (*Lotus corniculatus*). The mature areas of fixed dune also contain Burnet Rose (*Rosa pimpinellifolia*), Bracken (*Pteridium aquilinum*), Wood Sage (*Teucrium scordonia*) and Common Sorrel (*Rumex acetosa*). Mosses such as *Tortula ruralis* subsp. *ruraliformis, Rhytidiadelphus triquetris*, and *Homalothecium lutescens* are frequent, along with lichens (*Cladonia* spp., *Peltigera canina*).

This is one of the few Irish east coast sites to possess good examples of wet dune slacks and dunes with Creeping Willow (*Salix repens*). These areas of the dunes have a rich and varied flora, including species such as Creeping Willow, Water Mint (*Mentha aquatica*), Silverweed (*Potentilla anserina*), Meadowsweet (*Filipendula ulmaria*) and Meadow Thistle (*Cirsium dissectum*). The slacks are notably rich in rushes and sedges. Of particular interest is the presence of Sharp Rush (*Juncus acutus*), a scarce species in eastern Ireland and one that is indicative of a saline influence.

The site is also notable for the presence, at the back of the dunes, of areas of decalcified dune heath, a rare habitat type, and one which is listed with priority status in the E.U. Habitats Directive. Heath species present include Heather (*Calluna vulgaris*), Bell Heather (*Erica cinerea*) and Gorse (*Ulex europaeus*).

Buckroney Fen lies west of Mizen Head. It is backed to the west by a dense swamp of Common Reed (*Phragmites australis*). The fen is dominated by Tussock Sedge (*Carex paniculata*), with Water Mint, Purple Loosestrife (*Lythrum salicaria*), Marsh Pennywort (*Hydrocotyle vulgaris*), Greater Bird's-foot-trefoil (*Lotus uliginosus*), Water Horsetail (*Equisetum fluviatile*), small sedges (*Carex* spp.) and other flowering plants. An extensive stand of Blunt-flowered Rush (*Juncus subnodulosus*) is of note. Throughout this area the rare Marsh Fern (*Thelypteris palustris*) is frequent. There are also extensive areas of Rusty Willow (*Salix cinerea* subsp. *oleifolia*) scrub.

This site contains two rare plant species protected under the Flora (Protection) Order, 1999: Wild Asparagus (*Asparagus officinalis* subsp. *prostratus*), in its most northerly

Irish station, and Meadow Saxifrage (*Saxifraga granulata*). Other rare species which occur within the site include Green-flowered Helleborine (*Epipactis phyllanthes*), Bird's-foot (*Ornithopus perpusillus*) and Spring Vetch (*Vicia lathyroides*). All of these are Red Data Book species. The rare sedge hybrid *Carex riparia* x *C. vesicaria* (*Carex* x *csomadensis*) is only known from Mizen Head.

The invertebrate fauna of Buckroney fen has been investigated and some notable species have been recorded, including the beetle *Eurynebria complanata* and the following flies: *Machimus cowini, Anasimyia lunulata, Parhelophilus consimilis* and *Lejogaster splendia*.

Little Tern, a species listed on Annex I of the E.U. Birds Directive, has bred or attempted to breed at Buckroney strand in recent years. In 1992 between 7 and 10 pairs were present and in 1993 up to 8 pairs. Teal are regular in winter (119), as are Curlew (46), Lapwing (515) and Snipe (87). All figures are average peaks for 1994/95 - 1995/96.

The dune systems and beaches are subject to high amenity usage from day-trippers and several areas around the site have been developed as caravan parks, car parks and golf courses. The marginal areas of the fen have been reclaimed, especially at the south end, though these areas still flood in winter and attract waterfowl.

This site is important as an extensive sand dune/fen system with well developed plant communities. Several coastal habitats listed on the E.U. Habitats Directive, including two priority habitats - fixed dune and decalcified dune heath - are present. The area contains two legally protected plants, as well as a number of other rare or scarce plant species. The site provides habitat for some rare species of invertebrate and for the vulnerable Little Tern. A rich flora and fauna has persisted on this site despite extensive amenity use and adjacent farming. However, future land use practices will need to be managed to ensure the continued survival of this unique mosaic of coastal habitats.

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Conservation Objectives Series

Buckroney-Brittas Dunes and Fen SAC 000729

An Roinn Ealaíon, Oidhreachta,
Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta

Department of Arts, Heritage,
Regional, Rural and Gaeltacht Affairs

National Parks and Wildlife Service,
Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs,

7 Ely Place, Dublin 2, Ireland.

Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie

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Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

**** indicates a priority habitat under the Habitats Directive***

000729	Buckroney-Brittas Dunes and Fen SAC
1210	Annual vegetation of drift lines
1220	Perennial vegetation of stony banks
1410	Mediterranean salt meadows (Juncetalia maritimi)
2110	Embryonic shifting dunes
2120	Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)
2130	Fixed coastal dunes with herbaceous vegetation (grey dunes)*
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)*
2170	Dunes with *Salix repens* ssp. *argentea* (Salicion arenariae)
2190	Humid dune slacks
7230	Alkaline fens

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

Year :	1981
Title :	Ecological/hydrological report on Buckroney Marsh, Co. Wicklow
Author :	Cross, J. (ed.)
Series :	Unpublished report to NPWS
Year :	1999
Title :	National Shingle Beach Survey of Ireland 1999
Author :	Moore, D.; Wilson, F.
Series :	Unpublished Report to NPWS
Year :	2009
Title :	Coastal Monitoring Project 2004-2006
Author :	Ryle, T.; Murray, A.; Connolly, K.; Swann, M.
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Year :	2009
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Author :	McCorry, M.; Ryle, T.
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Year :	2012
Title :	Ireland Red List No. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2013
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Author :	Delaney, A.; Devaney, F.M.; Martin, J.M.; Barron, S.J.
Series :	Irish Wildlife Manual No. 75
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manual No. 79
Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red Lists series, NPWS
Year :	2017
Title :	Buckroney-Brittas Dunes and Fen SAC (site code: 729) Conservation objectives supporting document- coastal habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	2008
Title :	The phytosociology and conservation value of Irish sand dunes
Author :	Gaynor, K.
Series :	Unpublished Ph.D. Thesis, National University of Ireland, Dublin

Spatial data sources

Year :	2013
Title :	Sand Dune Monitoring Project 2011. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1210, 1220, 2110, 2120, 2130, 2150, 2170, 2190 (map 2)
Year :	2009
Title :	Coastal Monitoring Project 2004-2006. Version 1
GIS Operations :	QIs selected; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1210, 1220, 2110, 2120, 2130, 2150, 2170, 2190 (map 2)

1210 Annual vegetation of drift lines

To maintain the favourable conservation condition of Annual vegetation of drift lines in Buckroney-Brittas Dunes and Fen SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For the sub-site mapped: Pennycomequick - 0.48ha. See map 2	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009). Annual vegetation of drift lines was mapped at the sub-site Pennycomequick (CMP site ID: 019) to give a total estimated area of 0.48ha within Buckroney-Brittas Dunes and Fen SAC. The habitat is very difficult to measure in view of its dynamic nature which means that it can appear and disappear within a site from year to year. See the Buckroney-Brittas Dunes and Fen SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 2 for mapped locations	Based on data from Ryle et al. (2009). See the coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Based on data from Ryle et al. (2009). Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Accumulation of organic matter in tidal litter is essential for trapping sand and initiating dune formation. Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation, resulting in increased rates of erosion. See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009). See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities with typical species: sea rocket (*Cakile maritima*), sea sandwort (*Honckenya peploides*), prickly saltwort (*Salsola kali*) and oraches (*Atriplex* spp.)	Based on data from Ryle et al. (2009). See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover	Based on data from Gaynor (2008) and Ryle et al. (2009). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. See the coastal habitats supporting document for further details

1220 Perennial vegetation of stony banks

To restore the favourable conservation condition of Perennial vegetation of stony banks in Buckroney-Brittas Dunes and Fen SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession	The total current area of perennial vegetation of stony banks within Buckroney-Brittas Dunes and Fen SAC is currently unknown. During the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013) an area of 0.08ha of vegetated shingle was recorded in the sub-site Mizen Head (SDM site ID: 018) in Buckroney-Brittas Dunes and Fen SAC. NB further unsurveyed areas may be present within the SAC. See the Buckroney-Brittas Dunes and Fen SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 2 for mapped locations	The full distribution of perennial vegetation of stony banks in the SAC is unknown at present, although the habitat has been recorded in the Mizen Head sub-site by Delaney et al. (2013). NB further unsurveyed areas may be present within the SAC. See the coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Attribute and target based on data from Moore and Wilson (1999). See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Attribute and target based on data from Moore and Wilson (1999). See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the typical vegetated shingle flora including the range of sub-communities within the different zones	Attribute and target based on data from Moore and Wilson (1999). See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover	Attribute and target based on data from Moore and Wilson (1999). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. See the coastal habitats supporting document for further details

1410 Mediterranean salt meadows (Juncetalia maritimi)

To maintain the favourable conservation condition of Mediterranean salt meadows (Juncetalia maritimi) in Buckroney-Brittas Dunes and Fen SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession	Based on data from the Saltmarsh Monitoring Project (SMP) (McCorry and Ryle, 2009). The current area of Mediterranean salt meadows (MSM) in Buckroney-Brittas Dunes and Fen SAC is unknown. The SMP recorded 0.08ha of MSM habitat within the sub-site Buckroney (SMP site ID: SMP0037), but this area was subsequently re-classified as a fixed dune/humid dune slack mosaic by the Sand Dunes Monitoring Project (Delaney et al., 2013). It is important to note that there may be additional areas of unsurveyed saltmarsh present within the SAC. See the Buckroney-Brittas Dunes and Fen SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes	See notes on area above. NB further unsurveyed areas may be present within the SAC. See the coastal habitats supporting document for further details
Physical structure: sediment supply	Presence/absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions	Based on data from McCorry and Ryle (2009). See the coastal habitats supporting document for further details
Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure, subject to natural processes including erosion and succession	Based on data from McCorry and Ryle (2009). See the coastal habitats supporting document for further details
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime	Based on data from McCorry and Ryle (2009). Mediterranean salt meadow is found high up in the saltmarsh but requires occasional tidal inundation. See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from McCorry and Ryle (2009). See the coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation in the sward	Based on data from McCorry and Ryle (2009). See the coastal habitats supporting document for further details
Vegetation structure: vegetation cover	Percentage cover at a representative number of monitoring stops	Maintain more than 90% of the area outside of creeks vegetated	Based on data from McCorry and Ryle (2009). See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub-communities with typical species listed in McCorry and Ryle (2009)	Based on data from McCorry and Ryle (2009). See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species - *Spartina anglica*	Hectares	There is no record of common cordgrass (*Spartina anglica*) in the SAC and its establishment should be prevented	Based on data from McCorry and Ryle (2009). See the coastal habitats supporting document for further details

2110 Embryonic shifting dunes

To restore the favourable conservation condition of Embryonic shifting dunes in Buckroney-Brittas Dunes and Fen SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For the sub-sites mapped: Brittas Bay - 2.02ha; Mizen Head - 0.22ha; Pennycomequick - 0.35ha. See map 2	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009) and the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Embryonic shifting dunes habitat was mapped at three sub-sites, Brittas Bay (SDM site ID: 017), Mizen Head (SDM site ID: 018) and Pennycomequick (CMP site ID: 019), giving a total estimated area of 2.59ha within Buckroney-Brittas Dunes and Fen SAC. The habitat is very difficult to measure in view of its dynamic nature. See the Buckroney-Brittas Dunes and Fen SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 2 for known distribution	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Embryonic shifting dunes occur in the north-east of Brittas Bay and the north of the Mizen Head sub-site, where they have developed as a narrow strip in front of the eroding face of the fixed dunes. At Pennycomequick, the embryonic dunes occur as a narrow band along the front of the northern half of the dune system. See the coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: plant health of foredune grasses	Percentage cover	More than 95% of sand couch grass (*Elytrigia juncea*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present)	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities with typical species: sand couch grass (*Elytrigia juncea*) and/or lyme-grass (*Leymus arenarius*)	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. See the coastal habitats supporting document for further details

2120 Shifting dunes along the shoreline with Ammophila arenaria (white dunes)

To restore the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) in Buckroney-Brittas Dunes and Fen SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For the sub-sites mapped: Brittas Bay - 3.64ha; Pennycomequick - 0.7ha. See map 2	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009) and the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Shifting dunes along the shoreline with *Ammophila arenaria* was mapped at two sub-sites, Brittas Bay (SDM site ID: 017) and Pennycomequick (CMP site ID: 019), giving a total estimated area of 4.36ha within Buckroney-Brittas Dunes and Fen SAC. The habitat is very difficult to measure in view of its dynamic nature. See the Buckroney-Brittas Dunes and Fen SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 2 for known distribution	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Marram (*Ammophila arenaria*) dunes were mainly found in the north-east of the Brittas Bay sub-site. The mobile dunes at Pennycomequick occupy a narrow band at the front of the glacial cliffs and beyond the headland at the eroding face of the fixed dunes. See the coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Dunes are naturally dynamic systems that require continuous supply and circulation of sand. Marram grass (*Ammophila arenaria*) reproduces vegetatively and requires constant accretion of fresh sand to maintain active growth encouraging further accretion. See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: plant health of dune grasses	Percentage cover	More than 95% of marram grass (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present)	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities dominated by marram grass (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*)	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. See the coastal habitats supporting document for further details

2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)

To maintain the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation (grey dunes)* in Buckroney-Brittas Dunes and Fen SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For the sub-sites mapped: Brittas Bay - 52.03ha; Mizen Head - 46.4ha; Pennycomequick - 11.15ha. See map 2	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009) and the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Fixed coastal dunes with herbaceous vegetation was mapped at three sub-sites, Brittas Bay (SDM site ID: 017), Mizen Head (SDM site ID: 018) and Pennycomequick (CMP site ID: 019), giving a total estimated area of 109.58ha within the SAC. See the Buckroney-Brittas Dunes and Fen SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 2 for known distribution	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation structure: sward height	Centimetres	Maintain structural variation within sward	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub-communities with typical species listed in Delaney et al. (2013)	See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species (including *Hippophae rhamnoides*)	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. Bracken (*Pteridium aquilinum*) was recorded as widespread in the fixed dunes at Brittas Bay. Several non-native species were also present including sea buckthorn and cotoneaster (*Cotoneaster* sp.). The negative indicator species bracken, burnet rose (*Rosa spinosissima*) and common ragwort (*Senecio jacobaea*) were present in the Mizen Head sub-site. Negative indicator species in the Pennycomequick fixed dunes include common ragwort, common horsetail (*Equisetum arvense*) and bramble (*Rubus fruticosus* agg.), although none were as abundant as bracken. See the coastal habitats supporting document for further details

Vegetation composition: scrub/trees	Percentage cover	No more than 5% cover or under control	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Pine (*Pinus* spp.), sea buckthorn (*Hippophae rhamnoides*) and cordyline (*Cordyline* spp.) were all recorded in the Brittas Bay sub-site. Sea buckthorn represents the greatest threat to the fixed dunes due to its ability to colonise large areas in a short time. Burnet rose (*Rosa spinosissima*) is tall and quite dense in places in the fixed dunes in the Mizen Head sub-site. See the coastal habitats supporting document for further details

2150 Atlantic decalcified fixed dunes (Calluno-Ulicetea)

To restore the favourable conservation condition of Atlantic decalcified fixed dunes (Calluno-Ulicetea)* in Buckroney-Brittas Dunes and Fen SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For the sub-site mapped: Brittas Bay - 0.26ha. See map 2	Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Atlantic decalcified fixed dune habitat was mapped at the sub-site Brittas Bay (SDM site ID: 017) to give a total estimated area of 0.26ha within Buckroney-Brittas Dunes and Fen SAC. The habitat can be difficult to map as it occurs in a mosaic with fixed dunes. See the Buckroney-Brittas Dunes and Fen SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 2 for mapped distribution	Based on data from Delaney et al. (2013). See the coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% of the dune habitat, subject to natural processes	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation structure: sward height	Centimetres	Maintain structural variation within sward	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub-communities with typical species listed in Delaney et al. (2013)	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Brittas Bay is an important site for the very rare dune heath habitat and for its well-developed flora. See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. See the coastal habitats supporting document for further details
Vegetation composition: scrub/trees	Percentage cover	No more than 5% cover or under control	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details

2170 Dunes with Salix repens ssp. argentea (Salicion arenariae)

To maintain the favourable conservation condition of Dunes with *Salix repens* ssp. *argentea* (Salicion arenariae) in Buckroney-Brittas Dunes and Fen SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For the sub-sites mapped: Brittas Bay - 0.13ha; Mizen Head - 0.07ha. See map 2	Based on data from the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Dunes with *Salix repens* ssp. *argentea* (Salix arenariae) was mapped at two sub-sites, Brittas Bay (SDM site ID: 017) and Mizen Head (SDM site ID: 018), giving a total estimated area of 0.20ha within Buckroney-Brittas Dunes and Fen SAC. The habitat can be difficult to distinguish from 2190 Humid dune slacks. See the Buckroney-Brittas Dunes and Fen SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 2 for known distribution	Based on data from Delaney et al. (2013). Dunes with creeping willow (*Salix repens*) are well-developed in the Brittas Bay sub-site and occur as fragmented patches close to dune slacks in the Mizen Head sub-site. See the coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation resulting in increased rates of erosion. See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% cover, subject to natural processes	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation structure: sward height	Centimetres	Maintain structural variation within sward	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub-communities with typical species listed in Delaney et al. (2013)	See the coastal habitats supporting document for further details
Vegetation composition: cover and height of *Salix repens*	Percentage cover; centimetres	Maintain more than 10% cover of creeping willow (*Salix repens*); vegetation height should be in the average range of 5-20cm	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Cover of creeping willow (*Salix repens*) needs to be maintained (e.g. through an appropriate grazing regime) to prevent the development of a coarse, rank vegetation cover. See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species (including *Hippophae rhamnoides*)	Percentage cover at a representative number of monitoring stops	Negative indicator species (including non-native species) to represent less than 5% cover	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. See the coastal habitats supporting document for further details

Vegetation composition: scrub/trees	Percentage cover	For trees and scrub other than creeping willow (*Salix repens*), there should be no more than 5% cover or their presence should be under control	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). In the dunes with creeping willow (*Salix repens*) in the Mizen Head sub-site, scrub encroachment was recorded as a negative impact affecting 20% of the habitat. See the coastal habitats supporting document for further details

2190 Humid dune slacks

To restore the favourable conservation condition of Humid dune slacks in Buckroney-Brittas Dunes and Fen SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For the sub-sites mapped: Brittas Bay - 0.34ha; Mizen Head - 4.76ha; Pennycomequick - 0.10ha. See map 2	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009) and the Sand Dunes Monitoring Project (SDM) (Delaney et al., 2013). Humid dune slacks habitat was mapped at three sub-sites, Brittas Bay (SDM site ID: 017), Mizen Head (SDM site ID: 018) and Pennycomequick (CMP site ID: 019), giving a total estimated area of 5.2ha within Buckroney-Brittas Dunes and Fen SAC. See the Buckroney-Brittas Dunes and Fen SAC conservation objectives supporting document for coastal habitats for further details
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes. See map 2 for known distribution	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Two slacks occur in the Brittas Bay sub-site. In the Mizen Head sub-site, the occurrence of a range of slacks adds to the ecological significance of the dune system there. A single dune slack is located in a small depression in the centre of the Pennycomequick sub-site. See the coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Physical barriers can lead to fossilisation or over-stabilisation of dunes, as well as beach starvation, resulting in increased rates of erosion. See coastal habitats supporting document for further details
Physical structure: hydrological and flooding regime	Water table levels; groundwater fluctuations (metres)	Maintain natural hydrological regime	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Buckroney Fen is closely associated with the dune system in the Mizen Head sub-site and the dune slacks in particular. See the coastal habitats supporting document for further details
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 5% of dune slack habitat, with the exception of pioneer slacks which can have up to 20% bare ground	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward	Based on data from Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain range of sub-communities with typical species listed in Delaney et al. (2013)	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details
Vegetation composition: cover of *Salix repens*	Percentage cover	Maintain less than 40% cover of creeping willow (*Salix repens*)	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). Cover of creeping willow (*Salix repens*) may need to be controlled (e.g. through an appropriate grazing regime) to prevent the development of a coarse, rank vegetation cover. See the coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-native species) to represent less than 5% cover	Based on data from Ryle et al. (2009) and Delaney et al. (2013). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Sea buckthorn (*Hippophae rhamnoides*) should be absent or effectively controlled. See the coastal habitats supporting document for further details

Vegetation composition: scrub/trees	Percentage cover	No more than 5% cover or under control	Based on data from Gaynor (2008), Ryle et al. (2009) and Delaney et al. (2013). See the coastal habitats supporting document for further details

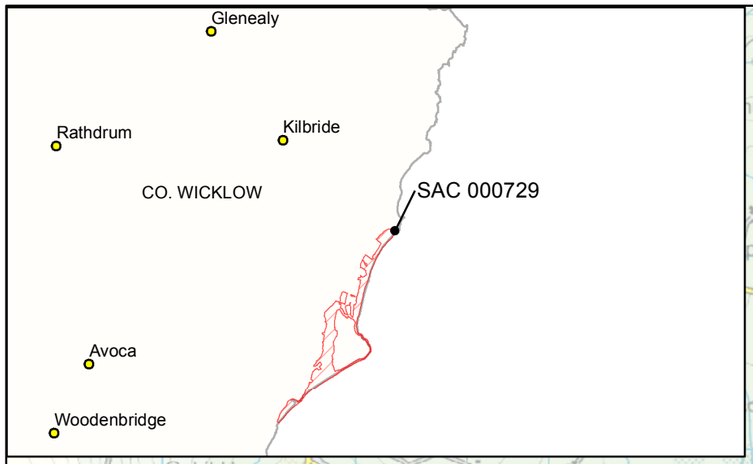
7230 Alkaline fens

To maintain the favourable conservation condition of Alkaline fens in Buckroney-Brittas Dunes and Fen SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Alkaline fens has not been mapped in detail for Buckroney-Brittas Dunes and Fen SAC and thus the total area of the qualifying habitat is unknown. The habitat occurs mainly within the centre of a fen complex in a shallow basin whose exit to the sea is partially blocked by a gravel and sand ridge south of Mizen Head and which is backed by a dense swamp of common reed (*Phragmites australis*). The fen is fed by a series of springs and seepage zones at the northern end, and from a stream at the southern end. The alkaline fen merges with wet grassland, reed beds and wet willow (*Salix*) scrub (NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes	See note on area above
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil nutrient status within natural range	Relevant nutrients and their natural ranges are yet to be defined. However, nitrogen deposition is noted as being relevant to this habitat in NPWS (2013)
Ecosystem function: peat formation	Flood duration	Maintain active peat formation, where appropriate	In order for peat to form, water levels need to be slightly below or above the soil surface for c.90% of the time (Jim Ryan, pers. comm.)
Ecosystem function: hydrology	Metres	Maintain appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	Maintenance of groundwater, surface water flows and water table levels within natural ranges is essential for this wetland habitat. The hydrological conditions of the southern part of the site are major factors in maintaining the continued existence of Buckroney Fen and the adjacent salt meadow/humid dune slacks in the dunes (Cross, 1981; NPWS internal files)
Ecosystem function: water quality	Water chemistry measures	Maintain appropriate water quality, particularly nutrient levels, to support the natural structure and functioning of the habitat	Fens receive natural levels of nutrients (e.g. iron, magnesium and calcium) from water sources. However, they are generally poor in nitrogen and phosphorus, with the latter tending to be the limiting nutrient
Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	Further information on the vegetation communities associated with alkaline fens (in upland areas) is presented in Perrin et al. (2014)
Vegetation composition: number of positive indicator species (brown mosses)	Number of species at a representative number of 2m x 2m monitoring stops	At least one brown moss species present at each monitoring stop	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. Mosses found in the habitat in the SAC include *Callliergon giganteum*, *Calliergonella cuspidata*, *Cratoneuron filicinum* and *Fissidens adianthoides* (NPWS internal files)

Vegetation composition: number of positive indicator species (vascular plants)	Number of species at a representative number of 2m x 2m monitoring stops	Number of positive vascular plant indicator species present at each monitoring stop is at least two for small-sedge flushes and at least three for black bog-rush (*Schoenus nigricans*) flush and bottle sedge (*Carex rostrata*) fen	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented. Greater tussock-sedge (*Carex paniculata*) and water mint (*Mentha aquatica*) dominate the fen in the SAC. Other vascular plants listed include blunt-flowered rush (*Juncus subnodulosus*), sharp-flowered rush (*J. acutiflorus*), small sedge species (*Carex* spp.), marsh pennywort (*Hydrocotyle vulgaris*), water horsetail (*Equisetum fluviatile*), purple loosestrife (*Lythrum salicaria*), greater bird's-foot trefoil (*Lotus pedunculatus*), bogbean (*Menyanthes trifoliata*), bog pimpernel (*Anagallis tenella*), yellow iris (*Iris pseudacorus*), tubular water-dropwort (*Oenanthe fistulosa*), meadowsweet (*Filipendula ulmaria*), fen bedstraw (*Galium uliginosum*) and orchid species (*Dactylorhiza* spp.) (Cross, 1981; NPWS internal files)
Vegetation composition: cover of positive indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of brown moss species and positive vascular plant indicator species at least 20% for small-sedge flushes and at least 75% cover for black bog-rush (*Schoenus nigricans*) flush and bottle sedge (*Carex rostrata*) fen	Attribute and target based on Perrin et al. (2014), where the list of positive indicator species for this habitat is also presented
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Total cover of negative indicator species less than 1%	Attribute and target based on Perrin et al. (2014), where the list of negative indicator species for this habitat is also presented
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Total cover of non-native species less than 1%	Attribute and target Perrin et al. (2014). Non-native species can be invasive and have deleterious effects on native vegetation. A low target is set as non-native species can spread rapidly and are most easily dealt with when still at lower abundances
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based Perrin et al. (2014). Scrub and trees will tend to invade if fen conditions become drier. In Buckroney-Brittas Dunes and Fen SAC, there are areas of scrub within the fen that are dominated by common sally (*Salix atrocinerea*) (NPWS internal files)
Vegetation composition: soft rush and common reed cover	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of soft rush (*Juncus effusus*) and common reed (*Phragmites australis*) less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: height	Percentage of leaves/shoots at a representative number of 2m x 2m monitoring stops	Proportion of live leaves and/or flowering shoots of vascular plants that are more than 5cm above the ground surface should be at least 50%	Attribute and target based on Perrin et al. (2014). Vegetation heights lower than these levels would indicate undesirable levels of grazing
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground less than 10%	Attribute and target based on Perrin et al. (2014). While grazing may be appropriate in this habitat, excessive areas of disturbed bare ground may develop due to unsuitable grazing regimes
Physical structure: drainage	Percentage area in local vicinity of a representative number of monitoring stops	Area showing signs of drainage as a result of drainage ditches or heavy trampling less than 10%	Attribute and target based Perrin et al. (2014). Drainage can result in loss of characteristic species and transition to drier habitats. Buckroney Fen has been subject to some drainage efforts in the past. Although no drains have been opened in more recent years, old drains within the site are still open and are continuing to drain the fen (NPWS internal files)
Physical structure: tufa formations	Percentage cover in local vicinity of a representative number of 2m x 2m monitoring stops	Disturbed proportion of vegetation cover where tufa is present is less than 1%	Attribute and target based on Perrin et al. (2014)

Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	This includes species on the Flora (Protection) Order, 2015 and/or the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016). The Near Threatened species (Wyse Jackson et al., 2016) marsh fern (*Thelypteris palustris*) is common throughout the fen in the SAC (NPWS internal files)



Legend

Buckroney-Brittas Dunes and Fen SAC 000729

An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta

Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

MAP 1:
BUCKRONEY - BRITTAS DUNES AND FEN SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 000729; version 3. CO. WICKLOW

0 0.55 1.1 1.65 2.2 km

N

Map Version 1
Date: Nov 2016

Legend

- Buckroney-Brittas Dunes and Fen SAC 000729
- Sand Dune Monitoring Project Survey Area
- Coastal Monitoring Project Area

Qualifying Interests

- 1210 Annual vegetation of drift lines
- 1220 Perennial vegetation of stony banks
- 2110 Embryonic shifting dunes
- 2120 Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)
- 2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)
- 2150 Atlantic decalcified fixed dunes (*Calluno-Ulicetea*)
- 2170 Dunes with *Salix repens ssp. argentea (Salicion arenariae)*
- 2190 Humid dune slacks
- OSi Discovery Series County Boundary

SDM Site Code: 017

SDM Site Code: 018

CMP Site Code: 019

An Roinn Ealaíon, Oidhreachta, Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta

Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs

MAP 2:
BUCKRONEY - BRITTAS DUNES AND FEN SAC
CONSERVATION OBJECTIVES
SANDDUNE HABITATS AND
PERENNIAL VEGETATION OF STONY BANKS

Map to be read in conjunction with the NPWS Conservation Objectives Document.

SITE CODE:
SAC 000729; version 3. CO. WICKLOW

0 0.25 0.5 0.75 1 km

N

Map Version 1
Date: Nov 2016

Appendix B

Mitigation Commitments

BALLINCLARE QUARRY : MATERIALS RECOVERY / RECYCLING FACILITY AND INERT LANDFILL

Schedule of Site-Specific Mitigation Measures to be Implemented

Mitigation Measure Proposed		Timeframe
General	Kilsaran will establish an environmental management programme to monitor and manage emissions from the proposed materials recovery / recycling facility and inert landfill at Ballinclare Quarry.	Throughout all activities of the applicant
Population and Human Health - **General**	The main potential for disturbance to the local population and human health is through the potential for environmental emissions associated with the topic areas that are assessed within other chapters of the EIAR, therefore the mitigation measures proposed in relation to those media are deemed appropriate to address population and human health issues.	Throughout development
Population and Human Health - **Radon**	Radon testing can be undertaken at on-site structures and, should elevated radon gas levels be detected, remedial measures such as enhanced ventilation or installation of a radon sump can be implemented by agreement with an EPA registered radon tester.	Following construction
Biodiversity - **EcoW**	A suitably qualified Ecological Clerk of Works (ECoW) will be appointed for the project and will supervise and monitor the implementation of the mitigation and enhancement measures over the operational life of the facility.	Throughout the development
Biodiversity – **Designated Sites and Protected Species**	Mitigation measures identified through the land, soils and geology, hydrology and hydrogeology, air quality, noise and transport assessments (set out below) will be implemented to safeguard designated nature areas.	Throughout the development
Biodiversity – **Pre Works Survey L1157**	A pre-works survey will be carried out at the proposed development site and along the L1157 to record and map the presence of any invasive or protected plant species or non-volant mammals. Any measures recommended to protect / enhance biodiversity along the L1157 corridor will be implemented as appropriate.	Prior to commencement
Biodiversity – **Deer Management**	A Deer Management Plan will be implemented throughout the operation of the facility and for three years after the completion of tree planting on site to minimise the negative effects of grazing pressure on newly established woodland.	Throughout operation and for 3 years following completion of tree planting
Biodiversity – **Protection of Non-volant Mammals**	• All trees to be felled on site will be left on the ground for at least 24 hours before being logged and removed to allow any mammals present to depart. • The lighting proposed as part of the development will be downward directed and cowled to minimise light spill. All site lighting that is not required for operation or security will be extinguished.	Throughout the development

Mitigation Measure Proposed		Timeframe
	• Any excavations on site will be fitted with an egress board and inspected prior to works. • All edible and putrescible wastes will be stored and disposed of in an appropriate manner. Similarly, all construction materials will be stored and stockpiled at planned locations. • Mammal gates or openings (as per TII Guidance) will be provided along the deer fence at locations chosen by the ECoW at separation distances of 150m or less. This will ensure free passage into and out of the site by species such as Badger. • Any roadkill along the length of the L1157 Local Road from the site access road to its junction with the R772 Regional Road will be recorded daily with a log held for inspection at the site office.	
Biodiversity – **Breeding Birds**	• The clear-zone between the edge of the proposed woodland and the retained cliff-face will be maintained by annual mowing outside of the bird breeding season. This will control the potential encroachment of scrub and woodland into this area. • No bioaccumulating pesticides will be used to control pest species on site. This will help protect the health of apex predators including Peregrine Falcon. • There will be no felling of trees, or clearance of vegetation, including along the margins of the L1157 during the bird breeding season (March 1st to August 31st inclusive). • Site traffic will be limited to approved routes in order to limit accidental damage to potential foraging or nesting habitats. • The lighting proposed as part of the development will be downward directed and cowled to minimise light spill. All site lighting that is not required for operation or security will be extinguished. • Peregrine Falcon activity will be monitored annually during the operational phase, with liaison maintained with NPWS to inform the local wildlife officials of the status of Peregrine and their nests at the site. • All edible and putrescible wastes will be stored and disposed of in an appropriate manner. Similarly, all construction materials will be stored and stockpiled at planned locations. • Bird species diversity and abundance will be monitored annually throughout the years of operation. A report on the species activity will be prepared and provided to the planning authority and NPWS.	Throughout the development
Biodiversity – **Bats**	• The lighting proposed as part of the development will be downward directed and cowled to minimise light spill. All site lighting that is not required for operation or security will be extinguished. All new site lighting will be provided in the colour temperature range of 2,700-	Throughout the development

Mitigation Measure Proposed		Timeframe
	3,000K to minimise disturbance to bats. This is a colour temperature that is less disruptive to bats (BCT 2010). • All trees to be felled on site will be left on the ground for at least 24 hours before being logged and removed to allow any bats present to depart. • Bat activity at the site will be monitored by deployment of passive detectors annually during the years of operation. A report on the species activity will be prepared and provided to the planning authority and NPWS.	
Biodiversity – **Aquatic Ecology**	• A survey of the quarry basin / sump will be carried out prior to commencement of works and any frogs or spawn present will be translocated under licence to the settlement ponds on site by a suitably qualified ecologist. • The quarry sump will be monitored each spring for any signs of frog spawn and this will be translocated under licence (if required) to the settlement ponds or constructed wetland on site. • A survey of species diversity at the constructed wetland and settlement ponds will be conducted every five years during the operational life of the facility. A report will be prepared and submitted for information to NPWS and the Planning Authority. • Biological water quality will be monitored annually upstream and downstream of the treated water discharge location. This information will be submitted as part of an annual report to the planning authority / EPA. • All requirements of an EPA waste licence in respect of discharge of treated water from the facility will be fully observed.	Throughout the development
Biodiversity - **Enhancement Measures**	A range of biodiversity enhancement measures are proposed to enhance the site's potential in combination with significant commitments to planting of native woodland as part of the progressive landscaping and restoration plan. Indicative locations of key biodiversity mitigation and enhancement commitments are shown on the Landscaping and Restoration Plan. • A permanent nesting box or ledge for Peregrine Falcon will be installed on the cliff-face that is to be retained post closure. It will be installed outside of the bird breeding season at a location chosen by and under the supervision of the ECoW. The ledge will be weatherproof and a camera mount will be provided to enable the nest-site to be easily monitored by NPWS. • An artificial Sand Martin nesting colony will be installed on-site at a location near the settlement ponds, or constructed wetland area. • Two of the existing buildings on site will be fitted with a heated maternity bat roost box	

Mitigation Measure Proposed		Timeframe
	• A cluster of four Swift boxes will be installed on the external wall of the unoccupied house on site. These will be fitted with a sound system to play a tape lure call (under licence from NPWS) to attract Swifts. • To encourage nesting birds and roosting bats at the site, a selection of bird nest boxes and bat boxes will be erected at the site. The boxes will be weather resistant (woodcrete/recycled plastic) and the designs and erection locations will be chosen by a suitably qualified ecologist and these will be erected under the supervision of the ECoW. A total of 50 bird and 50 bat boxes will be erected at the site. Nest box design will include boxes suitable for Kestrel and Barn Owl. • To encourage grassland species diversity the grassland areas at the west of the site will be managed according to the recommendations of the All-Ireland Pollinator Plan. The grassland areas will be mown, once a year (in September ideally) with all cuttings removed from the area. The area will not receive any fertiliser or pesticide input. In time this will enhance the floristic diversity present and encourage biodiversity. Permanent quadrats will be established and monitored by a suitably qualified botanist every three years during the operational phase of the facility. A monitoring report will be prepared and submitted for the information of the planning authority and NPWS.	
Land, Soil and Geology – **Control of Infill Materials**	A multiple level soil / C&D waste inspection and testing regime will be implemented which will test the material for intake compliance, in line with established EPA waste licence methodologies. Refer to Paras 2.178 to 2.288 of Chapter 2 of this EIAR.	During infilling
Land, Soil and Geology – **Soil Management**	Soils excavated in grassland areas in the south-western corner of the application site will be re-used where possible in the ICW area construction, with any excess soil stockpiled pending its re-use in restoration / landscaping works. Routine refueling of plant and machinery (and HGVs and lorries on occasion) will take place over a sealed concrete pavement which drains via a hydrocarbon interceptor to a soakaway area. Oils, greases and hydraulic fluids will be stored under cover, over fuel spill trays / bunded containers within the existing site workshop / garage. Good site management practices will be implemented to reduce risks of spills to ground, including regular monitoring and inspection of storage vessels and regular maintenance and servicing of construction plant and equipment. Contingency plans / procedures will be developed to deal with potential leaks and spills. An emergency spill response kit will be held on site.	During construction / site preparation works.

Mitigation Measure Proposed		Timeframe
Land, Soil and Geology – **Land Stability**	Temporary side slopes in landfilled soils / waste will generally be graded at an angle no steeper than 35° (approximately 1v:1.5h) and often much shallower, to ensure no large-scale instability arises over the short-term. Ongoing assessment of stability will be undertaken at the application site as landfilling progresses and recycled materials are stockpiled. Where necessary, slopes developed in these materials will be graded having due regard to safe systems of work. During inert landfilling activities, all temporary surfaces will be graded to facilitate overground run-off and its capture in surface water ponds developed in closed depressions at low points within the landfilled waste body, thereby minimising the volume of rainfall percolating through the landfilled materials.	During infilling
Land, Soil and Geology - **Soil Erosion**	In order to reduce the risk of localised erosion (and potential dust emissions) during the recovery, recycling, landfilling and restoration operations, areas of bare or exposed soils / wastes will be kept to a minimum, insofar as practicable, by ongoing progressive restoration of the restored landform and the establishment of native woodland in line with the proposed long-term restoration plan. Where required, consideration can also be given to establishing temporary vegetation cover over any stockpiled soils (pending re-use) or exposed surfaces (pending further backfilling to final ground level).	During infilling
	A minimum 150mm thick layer of topsoil will be placed over the landfilled materials.	On final restoration
Land, Soil and Geology – **Protection of Geological Resources**	The construction and installation of an engineered (natural clay) liner at the base and sides of the proposed landfill will afford protection to the ground and geological elements which would otherwise be in direct contact with the landfilled waste materials.	During infilling
Land, Soil and Geology – **General Management**	The Applicant will ensure that such plant and resources as are necessary will be deployed to ensure that the recovery / recycling and landfilling activities will be managed and operated in accordance with best waste management practice and that activities comply fully with environmental management systems, planning consents and waste licence conditions.	Throughout the development
Hydrology - **General**	Some mitigation measures were previously / are currently in place at the existing quarry to prevent any reduction in the quality of the local aquatic environment. These measures are in accordance with the “best practice / possible remedial measures” set out in Chapter 3.4 of the DoEHLG (2004) Quarries and Ancillary Activities: Guidelines for Planning Authorities.	Ongoing
Hydrology – **Spill / Leak Prevention / Groundwater Protection**	The discharge water to the Potters River will comply with conditions in the discharge licence (WPL116), or any required revisions arising from conditions set by the planning consent or EPA waste licence.	Throughout the development

Mitigation Measure Proposed		Timeframe
	• The discharge water will be treated in a water treatment plant and will pass through the settlement lagoons / attenuation pond at the site. • No refueling of plant / machinery, maintenance or repairs will take place in the quarry void to prevent accidental spillages reaching the ground or being washed off in surface water. • A refueling pad with connection to hydrocarbon separator is provided at the application site, beside the workshop. Most mobile plant and machinery refueling will take place on the refueling pad. • Drip trays will be used for all other refueling activities. • All refueling will be completed by competent / trained operatives. • All plant / machinery maintenance and repairs will take place under cover in the existing workshop at the site or on the hardstand refueling pad. • All plant will be regularly maintained and inspected daily for leaks of fuels, lubricating oil or other contaminating liquids. • Fuel storage will continue at the existing bunded storage facility at the site. • All petroleum-based products (lubricating oils, waste oils, etc.) will be stored on drip trays under cover in the workshop to prevent pollution due to accidental leakages. • Waste oil and grease containers will be stored under cover in the workshop. Waste containers will be collected and disposed of by a suitably licenced contractor. • An emergency spill response kit (with containment booms, absorbent materials and drip tray) will be provided on-site to contain/ stop the migration of any accidental spillages, should they occur. • Plant operators will be briefed during 'toolbox' talks and site induction on where the spill kit is kept and how and when it is deployed. • Regular visual inspection and testing will be undertaken of the integrity of tanks, drums, bunded pallets and double skinned containers. • Traffic management systems at the site will reduce potential conflicts between vehicles, and the potential risk of collisions and associated fuel spills or oil leaks. • Site speed limits will be implemented across the site to further reduce the likelihood and significance of collisions and the possibility of a fuel leak from such a collision.	
Hydrology – Water Management (Construction Phase)	Water in the quarry void will be pumped to the treatment plant and will then be routed to the existing settlement / attenuation ponds for further treatment (settlement) prior to discharge to Potters River.	Construction phase

Mitigation Measure Proposed		Timeframe
	All surface water discharges to the Potters River will comply with the emission limits set by the discharge licence [WPL116] (or those which may supersede them in an EPA waste licence). The volume of water discharged from the site compared to flood flows in the Potters River is negligible and therefore the discharge water will not result in increased flood risk in the river	
Hydrogeology – **Inert Landfill Clay Liner**	Suitable uncontaminated natural, undisturbed soil waste and/or soil by-product (i.e. non-waste) which conforms to an engineering specification will be imported for re-use in the construction of the 1m thick basal and side clay liners required for the inert landfill facility. The clay liner will be low permeability (less than or equal to 1x10-7 m/s) to provide an appropriate level of protection to groundwater and the surrounding aquifer, in line with accepted inert landfill design standards. The clay liner will have the following functions: • Prevent discharge through the base of the backfilled quarry void. • Prevent discharge through the sidewalls of the backfilled quarry void. • Ensure that the wider aquifer and underlying groundwater system and groundwater quality are physically protected by a pathway/flow barrier. A separate drainage system will be provided to reduce pressures and dewater groundwater beneath the basal liner	During infilling operations
Hydrology – **Passive Wetland Treatment System**	Dewatered groundwater and storm runoff from the inert landfilling activities will be managed separately to run-off which is not in contact with the imported wastes. Run-off in contact with waste bodies will be collected separately and directed for recycling / re-use at the soil wash plant and or water storage tanks. Any excess run-off in contact with imported waste will be pumped to the proposed on-site (passive) wetland treatment system before being discharged off-site to Potters River. The sizing and design of the wetland treatment system has been developed having regard to the likely contaminants (and concentrations thereof) which could be present in the inert soil / C&D waste intake source from construction sites. The effectiveness of the proposed wetland treatment systems can be enhanced by the temporary addition of various, more active treatment systems, such as chemical dosing, aeration or other such processes. This can allow a wetland system to handle higher contaminant loads or flows for periods of time (should it be necessary) before reverting to more standard (passive) modes of operation, therefore providing flexibility should leachate generation rates and chemical constituents change over time. Based on the initial assessment and design, the proposed wetland treatment system at Ballinclare Quarry will comprise the existing approved treatment system in addition to:	Throughout the development

Mitigation Measure Proposed		Timeframe
	(i) A wetland treatment system: comprising the following elements in series: a. Anaerobic (biochemical reactor) wetland; b. Iron Sequestering Unit (ISU); c. Aerobic wetland. (ii) A leachate reception tank: up to 50m^3, self-bunded storage tank with level controls. (iii) A pump house: housed in a standard shipping container (6.0m x 2.4m x 2.6m) containing feed, discharge and chemical dosing pumps; (iv) Off-site discharge via existing ditch / drainage channels to the Ballinclare Stream and the Potters River further downstream.	
Hydrology – **Testing and Inspection of Imported Materials**	A multiple level soil / C&D waste inspection and testing regime will be implemented which will test the material for intake compliance, in line with established EPA waste licence methodologies. Refer to Paras 2.178 to 2.288 of Chapter 2 of this EIAR.	During infilling
Hydrology - **Waste Quarantine and Compliance Testing**	If, following its acceptance at the facility, there is any subsequent grounds for concern about the nature of the wastes imported to and/or handled on site, it will be segregated and transferred to the covered waste inspection and quarantine shed for closer inspection and classification testing to establish whether it can be accepted at the facility or not. A detailed record will be kept of all such inspections. Should detailed inspection and/or any subsequent testing indicate that the quarantined materials are non-inert or cannot be accepted and used for landfilling or recovery / recycling purposes at the facility, they will be transferred off-site by to another appropriately authorised waste facility. It is proposed to designate the former aggregate storage shed at the southern site boundary (at the southern limit of the former concrete / asphalt production area) as the on-site waste inspection and quarantine facility. The shed is roofed, closed on three sides and has a concrete floor, thereby protecting any suspect waste which might be transferred and held there from incident rainfall and avoiding the potential to generate (suspect) contaminated surface water run-off (and a requirement for separate wastewater collection and storage infrastructure). Any significant volumes of intermixed non-inert C&D wastes (principally metal, timber, PVC pipes and plastic) inadvertently imported to the facility will be separated out and temporarily stored in skips or covered at the waste recovery area / shed or at the waste quarantine area prior to removal off-site to appropriately authorised waste facility.	Throughout operation

Mitigation Measure Proposed		Timeframe
	A representative sample will be taken (in accordance with waste licence requirements) of waste materials accepted at the inert landfill facility and subjected to compliance testing which focuses on key contaminant indicators. This data shall be used to confirm that the accepted soils are inert / acceptable (according to Council Decision 2003/33/EC) and/or comply with approved waste intake acceptance criteria. Compliance testing will be undertaken by the Applicant. Only operators and/or haulage firms holding valid current waste collection permits will be engaged to transfer waste streams off-site to other authorised waste disposal or recovery facilities as required.	
Hydrology – **Surface Water Quality**	The operational phase of the Proposed Development includes for a phased infilling of the quarry void. During Phase 1A, surface water runoff from the infill area will be captured and recirculated (or supplied to soil wash plant). Any excess runoff will be tankered off site. Surface water runoff from the C&D recovery yard will be captured and supplied to the soil wash plant, while runoff from the soil processing area will be directed towards a sump behind the wash plant for use in the washing process. Any excess water in the sump on the quarry floor will be treated prior to discharge. Following the capping and restoring of the Phase 1A area, surface water runoff will be captured by a perimeter toe drain and discharged offsite. Before the end of Phase 1A, the construction of the Integrated Constructed Wetland will commence. During that construction phase, excess water from the construction area will be pumped back to the quarry void. In addition, a temporary cutoff drain and double line of silt fencing will be used to ensure separation between the wetland construction area and the Ballinclare stream. During the follow-on Phase 1 development, the discharge/runoff from the inert landfilling areas will be collected and treated in an Integrated Constructed Wetland. Runoff from the C&D waste recovery and soil processing area will be supplied to the soil wash plant. Any excess water collecting in the sump on the quarry floor will be treated by the Siltbuster system and settlement ponds prior to discharge. During Phase 2 of the development, whereby the land surface will be raised to 80mAOD, the runoff from active inert landfill areas will be collected and treated within the Integrated Constructed Wetland. Runoff from capped landfill areas and the C&D waste recovery facilities will be collected and directed to temporary balancing ponds. Excess water in these balancing ponds will be treated by the Siltbuster system and settlement ponds prior to licensed discharge. During Phase 3 of the Proposed Development, the water management system will mimic the Phase 2 operation outlined above. Surface water quality testing of the discharge from the site will be completed on a quarterly basis (subject to any update of the existing discharge license and/or conditions within the Waste License).	Operational Phase

Mitigation Measure Proposed		Timeframe
	As such, runoff from the site will be managed during each phase of the proposed infilling, as well as management of surface water from the C&D waste recovery facility, in order to mitigate against any potential effects on downstream watercourses following discharge off-site.	
Hydrogeology – **Groundwater Quality and Groundwater Levels / Flows**	A clay liner will be installed underlying the waste material being infilled in the quarry. This clay liner will have sufficient low permeability (at least $1x10^{-7}$m/s) so as to hydraulically isolate it from the underlying bedrock aquifer. Groundwater quality testing will be completed (on a quarterly basis) in wells GW1-GW3 to ensure there is no change in groundwater quality and no effects from the importation and placement of the inert soil and stone material at the lined landfill facility. The mitigation measures outlined in relation to waste material will further ensure no impacts occur to local groundwater quality. Minor hydrocarbon detections were recorded at GW2 and in view of this, in-situ remedial works are proposed at GW2 to remove the minor hydrocarbon issue noted in that monitoring well during groundwater sampling (refer to section on Monitoring below).	Operational Phase
Hydrology – **Surface Water Management Systems**	Water management systems as described in EIAR Chapter 7 will be implemented to ensure all surface water discharges will continue to comply with the conditions in the existing discharge licence (WPL116), or any required revisions arising from conditions set by the planning consent or EPA waste licence.	Throughout the development
Hydrology – **Buckroney Brittas Dunes and Fen SAC / pNHA**	Mitigation for the protection of surface water quality during all phases of the proposed development are outlined above.	Operational Phase
Hydrology and Hydrogeology - **Monitoring**	A detailed monitoring programme for surface water and groundwater will be implemented. The monitoring programme includes monitoring of surface water and quarry discharge, and groundwater quality, including groundwater quality in local domestic wells.	Throughout the development
Hydrogeology – **Remedial Works at GW2**	In-situ remedial works are proposed at GW2 to remove the minor hydrocarbon issue noted in that monitoring well during groundwater sampling.	Prior to commencement
Hydrology – **Soil Erosion**	Appropriate seasonal timing of site restoration works, soil subsoiling and grass seeding will reduce adverse impacts of soil erosion across the site.	During final restoration

Mitigation Measure Proposed		Timeframe
Air Quality - Dust **Protection of Water Quality**	On top of inherent dust mitigation such as carrying out operations within the quarry void (behind faces and below ground level) and retention of existing screening berms, the following measures can be implemented: • Minimise drop heights when handling materials. • Minimise work in adverse / windy conditions. • Provide protection from the wind where possible. • Minimise distances of onsite haul routes. • Use water sprays / tractor and bowser to moisten surfaces during dry weather. • Restrict vehicle speeds through signage / staff training. • Locate haul routes away from sensitive receptors. • All HGVs exiting the facility to be routed through the wheelwash facility. • Use of road sweeper to reduce the amount of available material for re-suspension. • Minimise mechanical disturbance. • Consider paving additional length of access road leading to the recovery facility (if required to achieve emission limits). • Consider installation of fixed sprinkler system where materials consistently stockpiled (if required to achieve emission limits). • Carry out C&D processing activities within the proposed waste processing shed. • Provide training on dust management provided to staff. • Cover loads on vehicles delivering and dispatching materials from site. • Protect / reinforce perimeter vegetation screening around the application site. • Undertake regular plant and vehicle maintenance (cleaning). • Undertake regular monitoring and inspection of access and haul roads to identify and attend to accidental spillages (of particulate waste / by-product materials) and any structural defects (i.e. potholes) to minimise shearing and break-up of road materials. • Consider meteorological conditions (wind speed and wind direction) when deciding where to site / locate material stockpiles.	Throughout the development

Mitigation Measure Proposed		Timeframe
Climate Change - **Resilience**	• Consider changes / flexibility in construction / operations that allow for localized flooding and possible rise in water levels (and/or groundwater levels). • Consider weather warnings and create plans adequate to warning intensity. • Design / provide adequate surface water drainage. • Design / provide adequate procedures for wildfire scenarios. • Ensure design can withstand increases in high winds and storms. • Ensure the choice of equipment is weather efficient / resilient. • Secure insurance for damage of assets / site incidents.	Throughout the development and with experience of climate trends
Climate Change – **Mitigation / Reduction of GHG Emissions**	• Consider using renewable energy sources / suppliers. • Deploy clean energy production on site (e.g. solar roof panels on C&D recovery shed). • Use energy efficient machinery. • Unnecessary equipment / transport journeys to be avoided by managing transport and travel demands. • Equipment should not be left idling. • Use backloading to dispatch recycled aggregates off site (i.e. ensure inbound HGVs transport outbound materials on return leg of trip when required) Training programme on GHG mitigation to be provided for employees / contractors.	Throughout the development and as technology continues to develop
Noise – **Reduction through Management**	The Applicant intends to implement best practice construction noise and vibration management techniques throughout the construction phase in order to further reduce noise and vibration impact below predicted acceptable levels.	During construction / site preparation works
Noise – **Reduction through Management**	Prior to commencement, a Construction Noise and Vibration Management Plan (NVMP) will be prepared which will: • Outline management processes and mitigation measures to be utilised to remove or reduce significant noise impacts from the intended construction works • Define noise and vibration monitoring and reporting. • Include method statements for each phase of the works including associated specific measures to minimise noise and vibration in so far as is reasonably practicable for the specific works covered by the plan and a detailed appraisal of the resultant construction noise and vibration generated.	Reparation of plan prior to commencement

Mitigation Measure Proposed		Timeframe
Noise – **Local Community Engagement**	• Kilsaran will distribute information circulars informing the local community of the progress of site-based works during the construction phase. It will proactively engage with residents in potential noise / vibration sensitive properties before the commencement of any works which would be likely to generate any appreciable levels of noise or vibration, explaining the nature and duration of the works.	Prior to noise generating activities
Noise – **Plant and Traffic Management**	Kilsaran will manage plant and machinery during site operations as follows: • All plant and equipment will be properly and regularly maintained and operated to avoid causing excessive noise. • All vehicles delivering and operating on the site will have white noise reversing alarms fitted. • All plant will be fitted with effective exhaust silencers which are maintained in good working order to meet manufacturers' noise rating levels. Any defective silencers will be replaced immediately. • Access / internal haul roads will be kept clean and maintained in a good state of repair - specifically any uneven surfaces will be repaired, potholes filled, and large bumps removed. • Vehicles waiting within the application site will be prohibited from leaving their engines running and there will be no unnecessary revving of engines. • Care will be taken when unloading vehicles to reduce or minimise potential for noise disturbance. • HGVs / trucks accessing and egressing the proposed development will be required to adhere to a 60 kmph speed limit travelling along on the L1157. • All HGVs / trucks travelling to and from the application site will be required to be kept and maintained in good working order. • Any deliveries to the proposed development site will be programmed to arrive during daytime hours only.	Throughout the development
Cultural Heritage **Archaeological Protection**	Due to the possibility of the survival of previously unknown sub-surface archaeological deposits or finds within the proposed Integrated Constructed Wetland (ICW) area, any soil-stripping associated with future development works at the application site will be archaeologically monitored.	During site clearance works
Traffic – **Management during Construction**	A **Construction Traffic Management Plan** will be prepared, including measures to provide information to affected parties, including advising land and property owners in advance of any diversions. Local access shall be maintained at all times and temporary signage shall be put in place to minimise disruption and ensure all road users are aware of any construction works that are in progress.	Prior to commencement

Mitigation Measure Proposed		Timeframe
	A detailed '**Construction Environmental Management Plan'** (CEMP) sets out the allowable working day, construction traffic, parking arrangements and incorporates environmental protection measures.	
Traffic – **Road Strengthening and Widening**	Comprehensive road improvement works along the length of the L1157 Local Road from the site access junction to its junction with the R772 Regional Road are identified together with traffic management and speed control measures.	Throughout the development
Traffic – **Enforcement of Haul Route**	Acceptance of materials at the proposed development will be by pre-approval only. Haulage contractors will be assigned to a particular job / contract and so can be easily identified. Any individual driver associated with these hauliers who fails to adhere to the designated haul route along L1157 will be banned sanctioned and temporality / permanently restricted from making deliveries to the facility, depending on the frequency on any transgressions. This approach has proven effective in managing hauliers at other similar developments operated by Kilsaran.	Throughout the development
Traffic - **Safety**	Electronic driver feedback signing will be provided by the applicant as part of the road improvement works to L1157. Electronic Driver Feedback Signing (DFS) are equipped with digital displays that provide real-time information to drivers, usually regarding their speed or other relevant driving conditions.	Prior to infilling activities
Traffic -**Safety and Minimisation of Disturbance to Amenity**	When commencing the operational phase of the proposed development drivers using the facility will be required to attend a HGV driver induction training which the Applicant has initiated at other similar sites and considers a crucial tool for ensuring that all drivers are fully aware of the rules and expectations regarding safety, adherence to the haul route, speed limits, and courteous behavior towards other road users.	Prior to infilling activities
Traffic – **Advance warning signage and road cleaning**	If required, the Applicant will provide for these in accordance with any requests from the Roads Authority (Wicklow County Council) or An Bord Pleanála.	As requested by Planning Authority