Ecological Impact Assessment (EcIA)

Further Quarrying Operations, Tromman Quarry, Co. Meath

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DOCUMENT CONTROL

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STATEMENT OF AUTHORITY

Woodrow APEM Group (hereafter known as Woodrow) is an established and accomplished environmental consultancy committed to delivering robust ecological assessment services for clients in the private and public sectors. Woodrow provides an in-house team of ecologists and environmental professionals whose primary specialisms include botany, habitats, birds, bats, mammals, invertebrates and aquatic ecology. Woodrow's investment in high-technology field equipment and software, and the use of Survey123 forms throughout all survey types ensures reliability and confidence in our work. Woodrow staff are fully conversant with wildlife legislation in both Ireland and the UK, and work to exacting standards, according to established guidelines issued by the Chartered Institute of Ecology and Environmental Management (CIEEM).

This report has been authored by James O'Connor with assistance from Louise Gannon.

James O'Connor is an Ecologist with Woodrow, who has a PhD in aquatic sciences and a primary technical specialism in freshwater ecology. James has prior experience in monitoring wild bird populations with Birdwatch Ireland and is heavily involved in ornithological work as part of his role with Woodrow. Here, he regularly carries out mammal surveys and also performs a supporting role as Ecological Clerk of Works (ECoW). James is first author on several peer-reviewed academic research papers and has helped draft reports to disseminate key research findings to state agencies such as the Irish Environmental Protection Agency (EPA) as well as Irish county councils.

Louise Gannon is an Assistant Ecologist with Woodrow. Louise has completed a B.Sc. in Environmental Science. Her main experience lies in carrying out protected species surveys for bats (preliminary roost assessments, emergence/re-entry survey and activity transect surveys) as well as the deployment of static bat detectors and reporting on the same. She also carries out bat call analysis using Kaleidoscope and BatExplorer, the analysis software used to assess bat calls and activity. She also has experience in carrying out otter, badger and red squirrel surveys. Louise is a licenced bat surveyor (DER/BAT 2023-25) and a Qualifying member of CIEEM.

This report has been reviewed and approved by Mike Trewby, Associate Director with Woodrow. Mike is the company's lead ornithologist and field work manager. Mike worked for

Birdwatch Ireland from 2003 to 2010 conducting research on red-billed chough, red grouse and breeding seabirds. Prior to joining Woodrow in 2016, Mike worked as an independent ornithological consultant and has over 20 years fieldwork and research experience in the field of ecology. Mike regularly undertakes impact assessments for large scale developments and is a full member of CIEEM.

QUALIFICATIONS:

James O'Connor – Qualifications:

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1 INTRODUCTION

1.1 Background

Woodrow was appointed to undertake this Ecological Impact Assessment (EcIA) on behalf of Quarryplan and their client Keegan Quarries Ltd. This report provides a detailed ecological assessment to inform the production of the Environmental Impact Assessment Report (EIAR), which will accompany the Section 37L (s.37L) planning application seeking permission for the continuation of development at lands at Tromman Quarry. The EIAR is to be read in conjunction with the recently submitted substitute consent (SC) application and the associated rEIAR which seeks to regularise the unauthorised structures erected in the manufacturing (northern) part of the site since 2013 and the unauthorised quarrying operations undertaken at the quarry post 05 August 2018. In short, the application that this report accompanies, seeks consent for further quarrying activity and an assessment of the continued use of the site's ancillary structures for the life of the quarrying activities, prior to the restoration of the entire site.

1.2 Site Location

The neighbouring enterprises of Keegan Quarries Ltd., including Tromman Quarry and the pre-cast concrete manufacturing facility (totalling 22.5 ha), are located in the townland of Tromman, Rathmolyon, Co. Meath. The site is situated *c*. 2.2 km north-west of Rathmolyon Village and some 6.4 km south of Trim. The site is bounded to the west by Kilsaran's Tromman Quarry, to the south by the regional road R156 and to the north and east by agricultural fields. The location of the quarry site in relation to the wider landscape is presented in **Figure 1.**

1.3 Description of the Proposed Development

The evolution of activities that have occurred within the Tromman Quarry site have a well-documented planning history. The original consent for quarrying activity dates back to 1998 and was followed by ancillary consents in 2001 and 2003, which provided consent for the mobile blockmaking plant and pre-cast concrete manufacturing facility in the northern part of the site. In 2004, approval was provided for the bulk of what is currently the operational quarry (*c*. 13.94 ha). Permission was granted to enlarge the extraction area of the quarry further (*c*. 2.85 ha) and since 2012 quarrying activities have expanded into the south-eastern corner of the site.

The general approach to operations has not varied substantially since this first approval with activities having been confined to the main quarry sinking and storage of overburden in the central part of the site and along the southern boundary to create a landform for tree planting.

The proposed development has been prepared to maximise the resource within the confines of the existing site footprint, and in doing so remove the existing overburden landform in the central part of the site. Additionally, upon completion of the proposed development, measures will be taken to entirely eliminate the external visual impacts of the operation. The plans illustrating this phased development are provided on an aerial photographic base in **Figure 2**, while the following paragraphs detail the activities comprised within each phase.

Phase 1 – Extraction in the quarry will be focussed primarily in the southern part of the site. The development of quarry faces in this part of the quarry void will require the removal of the head office building located on the eastern side of the access route into the quarry.

Initially, development of the upper benches will be undertaken to progress the quarry faces to their final face position. The current benches will be split to a more manageable height, introducing a 64 m AOD bench and ensuring that the 43 m AOD and 28 m AOD benches are progressed to their final face positions. Appropriate bench widths will apply to ensure that rock fall can be captured on each bench.

In the northern margin of the quarry, a new access route, able to accommodate haulage vehicles passing, will be constructed into the sinking along the eastern boundary, from the north-eastern margin of the site at 67 m AOD level to the 42 m AOD level. Due to a limitation on space, this has been designed at a gradient of 1v:7h. A second ramp will also be introduced by way of a continuation along the eastern margin of the quarry from the 43 m AOD level down to the 28 m AOD. This has been designed at a gradient of 1v:8h.

Phase 2 – Continued working of the southern part of the quarry void, increasing the depth of the quarry to 13 m AOD. An access ramp is proposed to be installed covering a corner on the eastern margin of the quarry excavation. Of note, an access road is also retained on the 28 m AOD level to ensure that load and haul vehicles and drill rigs can access the crest of the quarry faces to progress the quarry in a northerly direction in the future.

Phase 3 – The northern overburden landform will be systematically removed and placed into the recently excavated void in the southern part of the site. It is estimated that around 338,000 m³ of material will have to be lifted from the existing overburden store and moved to its new location in the quarry void. It is proposed that the majority of the 13 m AOD bench will be filled up with the repositioned overburden up to the 28 m AOD level.

In the northern margin of the overburden store formed during Phase 2 a slope will be constructed to the base of the 13 m AOD level at a minimum gradient of 1v:3h, for geotechnical safety purposes. On this slope, an access ramp is to be constructed to allow access into the northern margin of the 13 m AOD sinking. This ramp has been designed at a gradient of 1v:8h.

During the removal and placement of the overburden, the 67 m AOD, 52 m AOD and 40 m AOD levels will be progressed in a northerly direction, to achieve their maximum lateral extents and therefore the maximum designed footprint of the quarry.

Phase 4 – Extraction continues to progress along the lower benches of the quarry in a southerly direction.

Site restoration –Following the completion of mineral extraction at the site, the site will be restored to provide a range of biodiverse habitats, primarily in the form of a water body. The site restoration will result in the following (approximate) areas for the site as a whole (i.e. includes restoration of the pre-cast concrete manufacturing facility):

- Floating islands to include planting of a wet woodland mix (0.507 ha)
- Dry woodland 2.08 ha
- Calcareous grassland 2.25 ha
- Hazel copse 0.125 ha
- Ponds x 8 No.

In terms of the restoration of the quarry void, it is understood that the quarry consents provide for bench and margin treatment and planting, with placement of some overburden resources

around the quarry and then for the quarry void to be allowed to flood with anticipated water rebound levels of the order of 62 m AOD (± 2 m), though this is more likely to be in the region of 65 m AOD. This will result in cliffs of 13-23 m surrounding the quarry following restoration.

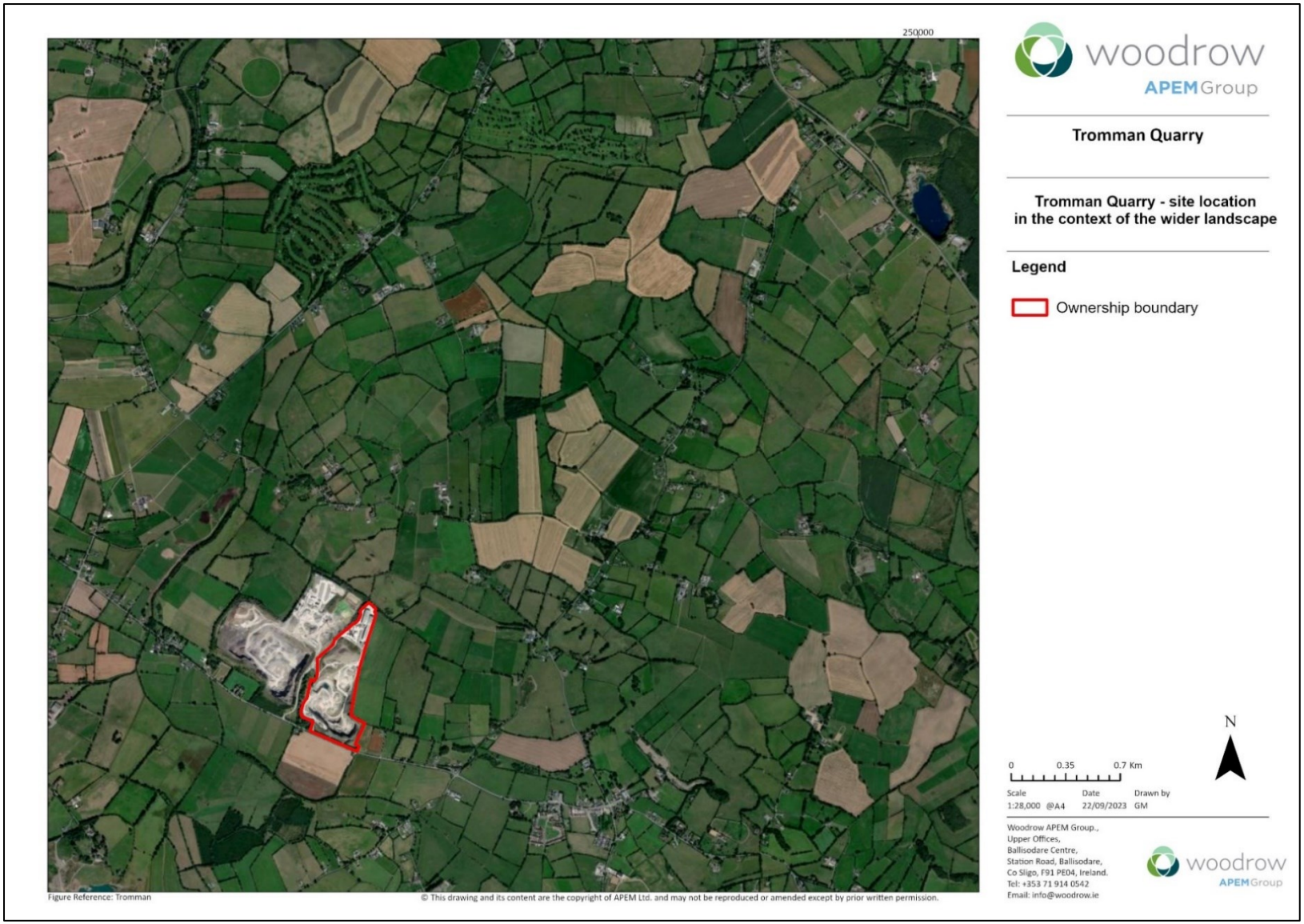

Figure 1. Site location in the context of the wider landscape.

Figure 2. Phased development plans for Tromman Quarry.

1.4 Purpose of Ecological Impact Assessment

The EcIA can be considered as having the following aims:

- Establish the ecological baseline for the development or activity and determine the ecological value of the features identified;
- Provide an objective and transparent assessment of the ecological impacts of the development or activity in terms of national, regional and local policies relevant to nature conservation;
- Recommend mitigation measures to avoid, reduce and remedy any ecological impacts identified;
- Identify any residual impacts of the development or activity post-mitigation;
- Demonstrate that a development or activity will meet the legal requirements relating to habitats and species.

1.5 Legislation, Policy and Guidance

A number of pieces of national and international legislation and policy are applicable to developments in Ireland that have the potential to impact on Ecological Features. This section aims to contextualise legislation with respect to the development.

The below legislation has been included to offer background information on the typical environmental legislation pertaining to such developments.

1.5.1 Legislation

EU Habitats Directive 92/43/EEC, European Communities (Natural Habitats) Regulations 1997, European Communities (Birds and Natural Habitats) Regulations 2011

The Habitats Directive provides the basis of protection for European Sites, namely Special Protection Areas ("SPAs") and Special Areas of Conservation ("SACs"). Article 6 of the EU Habitats Directive requires that any proposal that may have a significant effect on a European Site must be subject to an Appropriate Assessment. An Appropriate Assessment is required in order to ascertain the potential impact of a proposal on the reasons for which the site is designated, and thereby ascertain the potential for adverse impact on the integrity of the site. A proposal that may adversely impact the integrity of the site may not be consented except in the absence of Feasible Alternative Solutions and in the event of Overriding Public Interest. The Habitats Directive was transposed into Irish law by the European Communities (Natural Habitats) Regulations 1997 and subsequently amended in the European Communities (Birds and Natural Habitats) Regulations 2011. Regulation 42 of the 2011 regulations requires that any proposal likely to have a significant effect on a European Site, alone or in combination with other operations or activities, needs to be assessed with respect to its potential impact in the site's conservation objectives (an Appropriate Assessment) and that the decision-making authority should be furnished with a Natura Impact Statement (NIS) that incorporates a Screening Assessment and Appropriate Assessment as necessary.

The Habitats Directive also provides for the protection of species listed under Annex IV of the Directive wherever they occur. As such, member states must ensure that a strict protection regime is applied across their entire natural range within the European Union (EU), both within and outside European Sites. These species include otter (*Lutra lutra*) and all bat species. Otter and the lesser horseshoe bat (*Rhinolophus hipposideros*) are also listed under Annex II of the Directive which ensures that core areas of their habitat – designated as Sites of Community

Importance[1] - must be protected under the Natura 2000 Network and the sites managed in accordance with the ecological requirements of the species.

Moreover, Regulations 49 and 50 (not yet in effect) of the European Communities (Birds and Natural Habitats) Regulations 2011 prohibits the introduction and dispersal of certain species of flora and fauna that are included on the Third Schedule list of these regulations.

EU Birds Directive 79/409/EEC

'The Birds Directive' establishes a system of general protection for all wild birds throughout the EU. The full title of this Directive is 'Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds'. Annex I of the Birds Directive comprises 194 bird species that are rare, vulnerable to habitat changes or in danger of extinction within the EU. For these species, Member States must conserve their most suitable territories in number and size as Special Protection Areas ('SPAs'), which are considered to be European Sites. Similar actions should be taken by Member States regarding migratory species, even if they are not listed in Annex I.

Bern and Bonn Convention

The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982) exists to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was instigated to protect migrant species across all European boundaries.

EU Water Framework Directive 2000/60/EC

In response to the increasing threat of pollution and the increasing demand from the public for cleaner rivers, lakes and beaches, the EU developed the Water Framework Directive (WFD). The full title of this Directive is 'Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy'. This Directive is unique in that, for the first time, it establishes a framework for the protection of all waters including rivers, lakes, estuaries, coastal waters and groundwater, and their dependent wildlife/habitats under one piece of environmental legislation. The Water Framework Directive is linked to a number of other EU directives in several ways. These include Directives relating to the protection of biodiversity (Birds and Habitats Directives).

United Nations (UN) Convention on Biological Diversity (CBD)

The CBD entered into force on 29 December 1993. It has three main objectives:

- The conservation of biological diversity;
- The sustainable use of the components of biological diversity;
- The fair and equitable sharing of the benefits arising out of the utilization of genetic resources.

Parties to the CBD are required to submit a National Biodiversity Action Plan and report annually on the status of biodiversity and measures to address and reverse loss of biodiversity. Ireland's 4th National Biodiversity Action Plan (NBAP) (2023-2027) has been in development since October 2021, and succeeds the 3rd NBAP (2017-2021).

[1] Once adopted by member states in the EU these '*Sites of Community Importance'* become designated areas known as Special Areas of Conservation (SACs).

The Wildlife Act (1976) and amendmentsThe Wildlife Act 1976 gives protection to a wide variety of birds, animals and plants in the Republic of Ireland (RoI). The Act also provides a mechanism to give statutory protection to Natural Heritage Areas (NHAs). The amendment in 2000 broadens the scope of the Wildlife Acts to include most species, including the majority of fish and aquatic invertebrate species which were excluded from the 1976 Act.

Planning and Development Act 2000, as amended

For the purposes of an application for planning permission certain protections for, and assessments of biodiversity are additionally provided for in the 2000 Act, as amended, and the Planning and Development Regulations 2001, as amended, which incorporate provisions of the Habitats and Birds Directives as well as the Wildlife Acts, the Water Framework Directive, and the biodiversity provisions of the County Development Plan.

Flora (Protection) Order (FPO), 2022

The Flora (Protection) Order, 2022 (S.I. 235 of 2022), supersedes orders made in 1980, 1987, 1999 and 2015.

It is illegal to cut, uproot or damage the listed species in any way, or to offer them for sale. This prohibition extends to the taking or sale of seed. In addition, it is illegal to alter, damage or interfere in any way with their habitats. This protection applies wherever the plants are found and is not confined to sites designated for nature conservation.

The European Communities (EC) Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272 of 2009)

The regulations establish legally binding quality objectives for all surface waters and environmental quality standards for pollutants for purposes of implementing provisions of EU. legislation on protection of surface waters. These regulations clarify the role of public authorities in the protection of surface waters and also concern the protection of designated habitats.

The European Communities (EC) (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293 of 1988)

These regulations were enacted to address water quality standards specifically aimed at protecting salmonid fish, such as Atlantic salmon (*Salmo salar*) and brown trout (*Salmo trutta*), and their habitats. The regulations likely set out criteria and standards for water quality in areas designated as salmonid waters, with the goal of maintaining suitable conditions for the survival and well-being of these fish species.

EU Environmental Objectives (Freshwater Pearl Mussel) (Amendment) Regulations 2009 to 2018

The purpose of these regulations is to support the achievement of favourable conservation status for freshwater pearl mussels. To that end, they:

a) Set environmental quality objectives for the habitats of the freshwater pearl mussel populations named in the First Schedule to these Regulations that are within the boundaries of a site notified in a candidate list of European Sites, or designated as a Special Area of Conservation, under the European Communities (Natural Habitats) Regulations, 1997 (S.I. No. 94 of 1997).
b) Require the production of sub-basin management plans with programmes of measures to achieve these objectives.

c) Set out the duties of public authorities in respect of the sub-basin management plans and programmes of measures.

1.5.2 Polices and plans

The following plans and policies were also reviewed:

- Meath County Development Plan 2021-2027;
- National Biodiversity Action Plan (NBAP) 2017-2021 (to be superseded by the 4th National NBAP 2023-2027)
- River Basin Management Plan (RBMP) for Ireland 2018-2021 (to be superseded by the 3rd cycle RBMP 2022-2027);
- All-Ireland Pollinator Plan 2021-2025;
- All-Ireland Species Action Plan – Bats.

1.5.3 Guidance and sources of information

The assessment had regard to the following guidance documents and sources of information:

- CIEEM (2018, updated 2022). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management (CIEEM);
- NRA (2009a). Guidelines for the Assessment of Ecological Impacts of National Road Schemes (Rev 2). National Roads Authority, Dublin;
- EPA (2022). Guidelines on the information to be contained in Environmental Impact Assessment Reports. May 2022. Environmental Protection Agency, Dublin;
- OSi Mapping[2];
- Google Earth Pro
- Google Maps[3]
- Environmental Protection Agency (EPA) Maps[4];
- National Parks and Wildlife Services Online Map Viewer[5];
- National Biodiversity Data Centre – Biodiversity Maps[6];
- NRA (2009b). Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (Rev 2). National Roads Authority, Dublin.

[2] OSI Mapping. Available at: http://map.geohive.ie/mapviewer/ [Accessed August 2023].

[3] Google Maps. Available at: https://www.google.ie/maps/ [Accessed August 2023].

[4] EPA Maps. Available at: https://gis.epa.ie/EPAMaps/ [Accessed August 2023].

[5] NPWS Designations Viewer. Available at: https://dahg.maps.arcgis.com/apps/webappviewer/ [Accessed August 2023).

[6] National Biodiversity Data Centre – Biodiversity Maps. Available at: https://maps.biodiversityireland.ie/ [Accessed August 2023].

2 IMPACT ASSESSMENT METHODOLOGY

The impact assessment methodology applied follows the Chartered Institute of Ecology and Environmental Management 'CIEEM' guidance (CIEEM 2018, updated 2022). The following list provides a useful summary of the process for undertaking an EcIA, as detailed in the CIEEM guidance document.

Task	Description
➢ Scoping	• Determining the matters to be addressed in the EcIA, including consultation to ensure the most effective input to defining the scope.
➢ Establishing the baseline	• Collecting information and describing the ecological conditions in the absence of the proposed project, to inform the assessment of impacts.
➢ Important ecological features	• Identifying important ecological features (habitats and species) that may be affected, with reference to a geographical context in which they are considered important.
➢ Impact assessment	• An assessment of whether important ecological features may be subject to potential impacts and characterisation of these impacts and their effects. • Assessment of potential residual ecological impacts of the project remaining after mitigation and the significance of their effects, including cumulative effects.
➢ Avoidance, mitigation, compensation & enhancement	• Incorporating measures to avoid, reduce and/or compensate potential ecological impacts, and the provision of ecological enhancements.
➢ Monitoring	• Monitoring impacts of the development and evaluation of the success of proposed mitigation, compensation and enhancement measures.

2.1 Identifying Ecological Features within the Zone of Influence

Information acquired during the desk-study and field surveys, determines the Ecological Features potentially affected by the proposed development, and which occur within its Zone of Influence (ZoI). In establishing the ZoI of a proposed development, any potential source-pathway-receptor connections to European and nationally designated sites are screened in relation to their potential impacts. The potential impacts on sites are dependent on the nature of the pressures, the sensitivity of receptors, and the causal links and conduits, rather than distance. In many cases the potential ZoI can occur relatively close to its source (for example when considering noise or dust) while in other cases the potential ZoI could be much greater, for example if there is a direct hydrological connection. Further information on this is available within the Office of the Planning Regulator (OPR) (2021) *OPR Practice Note PN01 Appropriate Assessment Screening for Development Management.*

2.2 Evaluating Ecological Features within the Zone of Influence

Those Ecological Features which occur within the ZoI, such as nature conservation sites, habitats or species, are evaluated in geographic hierarchy of importance. **Table 1** below shows the frame of reference and criteria used for valuation. The approach employed for this

generally follows that set out in a guidance document on EcIA produced by the Republic of Ireland National Roads Authority (NRA, 2009)[7].

[7] NRA (2009). Guidelines for Assessment of Ecological Impacts of National Roads Schemes (Rev 2). National Roads Authority, Dublin, Ireland.

Table 1. Criteria for valuating ecological features within the ZoI (as per NRA, 2009 guidelines).

Importance	Criteria
International Importance	• Sites, habitats and species populations of importance in a European context. • 'European Site' including Special Area of Conservation (SAC), Site of Community Importance, Special Protection Area (SPA) or proposed Special Area of Conservation. • Proposed Special Protection Area (pSPA). • Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). • Features essential to maintaining the coherence of the Natura 2000 Network.[8] • Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. • Resident or regularly occurring populations (assessed to be important at the national level) of species of animal and plants listed in Annex II and/or IV of the Habitats Directive. • Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). • Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). • Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). • World Heritage Sites (implications for biodiversity value only) • Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).
National Importance	• Site designated or proposed as a Natural Heritage Area (NHA). • Statutory Nature Reserve. • Refuge for Fauna and Flora protected under the Wildlife Acts. • National Park. • Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Acts; and/or a National Park. • Resident or regularly occurring populations (assessed to be important at the national level) of the following: - Species protected under the Wildlife Acts; and/or - Species listed on the relevant Red Data list. • Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive.
County (Regional) Importance	• Area of Special Amenity. • Area subject to a Tree Preservation Order. • Area of High Amenity, or equivalent, designated under the County Development Plan. • Resident or regularly occurring populations (assessed to be important at the County level) of the following: o Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; o Species protected under the Wildlife Acts; and/or o Species listed on the relevant Red Data list. o Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance. • County important populations of species; or viable areas of semi-natural habitats; or natural heritage features identified in the National or Local BAP, if this has been prepared. • Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county. • Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Local Importance (Higher Value)	• Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; • Resident or regularly occurring populations (assessed to be important at the Local level) of the following:

[8] As described in Articles 3 and 10 of the Habitats Directive. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:31992L0043&from=EN [Accessed September 2023].

Importance	Criteria
	○ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; ○ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; ○ Species protected under the Wildlife Acts; and/or ○ Species listed on the relevant Red Data list. • Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality; • Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
Local Importance (Lower Value)	• Habitats and species populations of less than local importance but of some value. • Sites or features containing non-native species that is of some importance in maintaining habitat links.

The status of a species as requiring protection at an international level (such as otter) does not necessarily impose an international conservation value on any single example of that species found at the site. Approaches to attributing nature conservation value to species have been previously developed for some species groups such as birds and bats. The approach to attributing nature conservation value to bat populations and foraging habitats is adapted from Wray *et al.* 2010. Bird species conservation status is attributed by the Birds of Conservation Concern (BoCCI4) list (2020-2026) (Gilbert *et al*. 2021).

Only Important Ecological Features (i.e. those features evaluated as being of Local Importance (Higher Value) or greater) within the ZoI are assessed with respect to potential impact.

2.3 Identification and Characterisation of Impacts

When describing ecological impacts reference is made to the following characteristics;

- positive or negative;
- extent;
- magnitude;
- duration;
- timing;
- frequency; and,
- reversibility.

However, the assessment only needs to describe those characteristics relevant to understanding the ecological effect and determining the significance and as such does not need to incorporate all stated characteristics (CIEEM, 2018, updated 2022).

2.4 Significant Effects on Important Ecological Features

For the purpose of EcIA, significant effect is an effect that either supports or undermines biodiversity conservation objectives for those ecological features which have been identified as being an important feature of the site (Important Ecological Features). Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy). As such effects can be considered significant in a wide range of geographic scales from international to local. Consequently, significant effects are qualified with reference to the appropriate geographic scale (CIEEM, 2018, updated 2022).

2.5 Assessment of Residual Impacts and Effects

After characterising the potential impacts of the development and assessing the potential effects of these impact on the Important Ecological Features, mitigation measures are proposed to avoid and/or mitigate the identified ecological effects. Once measures to avoid and mitigate ecological effects have been finalised, assessment of the residual impacts and effects is undertaken to determine the significance of their effects on the Important Ecological Features.

2.6 Assessment of Cumulative Impacts and Effects

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location (CIEEM, 2018, updated 2022). Different types of actions can cause cumulative impacts and effects. As such, these types of impacts may be characterised as:

- Additive / incremental – in which multiple activities/projects (each with potentially insignificant effects) add together to contribute to a significant effect due to their proximity in time and space (CIEEM, 2018, updated 2022).
- Associated / connected – a development activity enables another development activity e.g. phased development as part of separate planning applications. Associated developments may include different aspects of the project which may be authorised under different consent processes. It is important to assess impacts of the project as a whole and not ignore impacts that fall under a separate consent process (CIEEM, 2018, updated 2022).

3 ECOLOGICAL SURVEY METHODOLOGY

Surveys of the terrestrial ecology at the site were undertaken following specific guidelines for the relevant target species outlined below. The importance of the habitats and species present is evaluated using the Chartered Institute of Ecology and Environmental Management Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal (CIEEM, 2018, updated 2022). This guidance document outlines an accepted approach for the evaluation of impact from such developments.

3.1 Desk Based Review of Biological Records

A desktop study was undertaken during August 2023 to gather information on the likely distribution of species in the general area prior to the field survey visits, so that a targeted approach to surveying could be undertaken.

- A desk-based review of biological records for the area was undertaken utilising information available from the National Biodiversity Data Centre (NBDC). Tromman Quarry spans two 10-km squares (N74 & N75) and the biological records for both squares were reviewed, as well as the 2 km x 2 km tetrads covering and adjoining the site (N74U, N75Q, N74Z & N75V). Information from the NBDC was downloaded from Biodiversity Maps in August 2023[9].
- The NBDC bat suitability index (Lundy *et al*. 2011), was also consulted. Information from the NBDC was downloaded from Biodiversity Maps in August 2023, to inform the baseline assessment.
- Environmental reporting for developments / activities within the Tromman Quarry, specifically ecological and hydrological sections within the EIS (May 2009) updated in 2023 (BCL Consultant Hydrogeologists Ltd).

3.2 Surveys Undertaken

Several surveys were undertaken in 2018 and 2019 as part of the SC application, the details of which are provided in the rEcIA (Woodrow, 2023a). Site visits were conducted during the summer of 2023 in order to provide a contemporary update to the ecological baseline at the site. The details of these visits are outlined below:

- Visit 1: 12 July 2023 Surveyor: Bruno Mels
- Visit 2: 01 August 2023 Surveyor(s): Oisín O'Sullivan & Frederico Hintze
- Visit 3: 03 August 2023 Surveyor: James O'Connor
- Visit 4: 10 August 2023 Surveyor(s): Giulia Mazzotti & Bruno Mels

During these visits, the whole of Tromman Quarry was covered with the primary aim of mapping and describing the habitats within the site, as classified in Fossitt (2000), following best practice methodology (Smith *et al*. 2011), as well as collecting information on occurrence and potential suitability for protected species. Ecological information collected, included:

- Usage of the site by terrestrial mammals, in particular badger (*Meles meles*). This involved following mammal trails within the site to locate any badger setts or other mammalian burrows.
- Bat surveys, comprising an assessment of the potential roost feature (PRF) on site as well as an activity survey (by means of five static detectors deployed over 13 nights).

[9] National Biodiversity Data Centre (NBDC) Maps –Available at: https://maps.biodiversityireland.ie/Map [Accessed August 2023].

- Breeding bird surveys, which were undertaken on 12 July and 03 August, respectively.
- Protected invertebrate habitat suitability, such as habitat suitability for marsh fritillary butterfly.
- Non-native, invasive species occurring within the site.

3.3 Survey Limitations

While the majority of 2023 surveys adhered to the recommended timeframe for target species and habitats, programme constraints hindered the surveying of breeding birds until mid-July and August, falling outside the optimal survey period (April to June). However, it is important to note that the primary aim of these surveys was to provide a contemporary update to data obtained in 2018. There is not considered to have been any significant change to the site since that time (see remedial EcIA (rEcIA) – Woodrow, 2023a).

There were no targeted surveys for reptiles and amphibians conducted as part of these surveys, as the previous baseline assessment undertaken in 2018/2019 (see rEcIA – Woodrow, 2023a), found the site to be largely unsuitable for reptiles and amphibians (with the exception of common frog (*Rana temporaria*)).

Given the location of the development, the habitats present on the site and the long-established nature of the development, it is considered that desk-based and ecological field surveys in 2023 are sufficient to assess the ecological impacts.

4 DESIGNATED SITES WIETH POTENTIAL ECOLOGICAL / HYDROLOGICAL CONNECTIONS TO THE DEVELOPMENT

4.1 European Sites

The EPA Guidelines for Environmental Impact Assessment Reports (EPA, 2022) states in section 3.3.5 that:

> *A biodiversity section of an EIAR, for example, should not repeat the detailed assessment of potential effects on European sites contained in documentation prepared as part of the Appropriate Assessment process, but it should refer to the findings of that separate assessment.*

This approach has been adopted and the conclusions of the Natura Impact Statement (NIS) (Woodrow, 2023b) are referenced. No part of the application site lies within a designated Special Area of Conservation (SAC) or Special Protection Area (SPA). A map showing the European Sites within 15 km of Tromman Quarry is presented in **Figure 3** below. As a result of hydrological connections via the stream located to the north of the development site, two European Sites were brought through to Stage 2 Appropriate Assessment. The European Sites and the Qualifying Interests (QIs) / Special Conservation Interests (SCI) assessed were:

- River Boyne and River Blackwater SAC – Qualifying Interests:
  - Alkaline fens
  - *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno - Padion*, *Alnion incanae*, *Salicion albae*)
  - River lamprey (*Lampetra fluviatilis*)
  - Otter (*Lutra lutra*)
  - Atlantic salmon (*Salmo salar*)
- River Boyne and River Blackwater SPA – Special Conservation Interests:
  - Kingfisher (*Alcedo atthis*) – breeding

The concluding statement of the NIS (Woodrow, 2023b) is as follows:

> *The two European Sites, and associated QIs/SCI listed above, were assessed as part of the AA process. This process found that whilst a number of potential impacts pertaining to water quality were identified, including in-combination impacts, the mitigation measures presented in Section 6 eliminate the potential for any adverse effects.*
>
> *Taking into account the best available scientific knowledge, applying the precautionary principle, and considering the conservation objectives of the relevant European Sites, it is concluded that the continuation of operations at Tromman Quarry, whether on its own or in conjunction with other plans or projects, does not pose an adverse impact on the integrity of any European Site.*

There is a gradient dropping south away from the site and therefore, the potential for connectivity between the site and the River Boyne via a stream to the south of the site (Formal Stream) was also investigated. The distance from Tromman Quarry to the Special Area of Conservation (SAC) via this southern stream is shorter (*c*. 1.6 km). This stream flows into a tributary of the River Boyne before joining the main river at Boardsmill, covering a distance of *c*. 5 km. However, given the lack of any direct hydrological pathway, the proposed development poses no risk to this watercourse. (BCL Consultant Hydrogeologists Ltd., 2023).

Excess water from the quarry is pumped up to the drainage infrastructure (seven-stage settlement tanks) at the northern end of the land holding. Four of the settlement tanks are sited to the east of the overburden storage area and the final three tanks are situated alongside the south-east corner of the pre-cast manufacturing structure. The water from these tanks is discharged into a culvert, equipped with a V-notch weir, which includes a data logger for monitoring and recording water flow data. This in turn connects with an open drainage channel leading to the consented discharge point, as covered by Trade Effluent Discharge Licence Ref. 04/2. There is no natural baseflow in this drainage channel. It was excavated for the sole purpose of conveying water from the settlement tanks to the discharge point (BCL Consultant Hydrogeologists Ltd., 2023).

4.2 Nationally Designated Sites

No part of the application site lies within an NHA or pNHA. A map showing the NHAs and pNHAs within 15 km of Tromman Quarry is illustrated in **Figure 4** below. There was only one NHA within 15 km of Tromman Quarry and six pNHAs. These sites are located between 2 km and 14 km from the quarry and there is considered to be no ecological or hydrological connection between these sites and the quarry.

Natural Heritage Areas (NHAs) and distance from Tromman Quarry

- Molerick Bog *c*. 10. 5 km

Proposed Natural Heritage Areas (pNHAs) and distance from Tromman Quarry

- Ballina Bog *c*. 9.8 km
- Ballynabarry Fen *c*. 9.7 km
- Mount Hevey Bog *c*. 13.3 km
- Rathmolyon Esker *c*. 2.0 km
- Royal Canal *c*. 8.1 km
- Trim *c*. 8.1 km

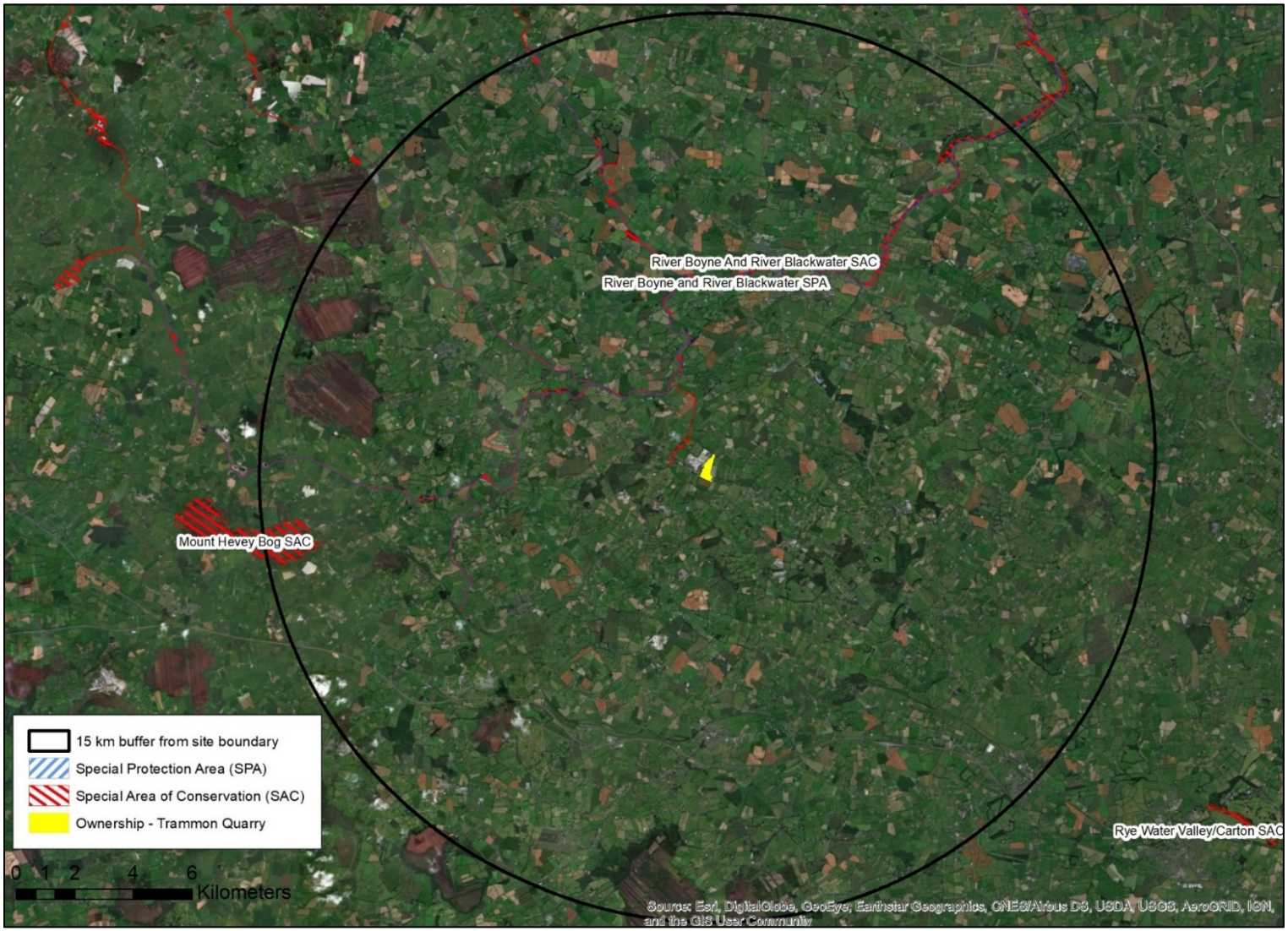

Figure 3. European Designated Sites (European Sites) within 15 km of the Tromman Quarry site.

Figure 4. Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) within 15 km of the Tromman Quarry site.

5 BASELINE CONDITIONS

5.1 Surrounding Landscape Character

Tromman Quarry is located within a rural setting, where the landscape is dominated by pastural agriculture with patches of arable production. There is another quarry directly adjacent to Tromman Quarry that is operated by Kilsaran.

5.2 Ecological Baseline

Site visits undertaken in July and August 2023 provide the information for the baseline ecological conditions. The results of these surveys are provided in the sections below.

5.2.1 Terrestrial Mammals

Several mammal trails were identified as part of the mammal survey. However, apart from one trail located in the east of the site, most were associated with the woodland located outside the southern boundary. These were often accompanied by scent marks indicative of fox (*Vulpes vulpes*) activity. Within the same woodland, a single burrow was discovered at the base of a tree (see **Figure 5**). This burrow measured approximately 40 cm in width and 25 cm in height, and it appeared to be in active use. Like the trails identified, the scent associated with this burrow also suggested it was likely inhabited by fox. Furthermore, fresh fox faeces was found on one of the verges west of the quarry road leading to the manufacturing facility.

There was some evidence of badger activity observed within the site. This evidence primarily manifested as signs of digging, which were located in the western section of the site, along the verge adjacent to the quarry road leading to the manufacturing facility, as well as outside the south-eastern boundary in an adjoining field. Additionally, to the north of the quarry there were a number of burrows identified that were indicative of badger. However, upon further inspection it was evident that these had been inactive for some time and in any case, were judged to be *c*. 100 m away from the northernmost extent of the site.

There was evidence of rabbit (*Oryctolagus cuniculus*) activity within the environs of the site (mainly in the form of droppings), and one Irish hare (*Lepus timidus hibernicus*) was observed in the field to the east of the quarry. One small unidentified burrow was recorded in the north-west of the site, however, this too looked inactive. There was one old faeces (scat) recorded on top of a large boulder along the road in the west of the site, which was suspected to belong to pine marten (*Martes martes*), and most likely originated from an individual commuting through the site. The hardstand surrounding the manufacturing facility in the north of the site means that it is difficult to track mammals there. In any case, this area is considered to be largely unsuitable for most mammal species, with the possible exception of rodents.

Other mammals listed as occurring in the wider area as part of the desk study performed (10-km squares N74 & N75) include wood mouse (*Apodemus sylvaticus*), house mouse (*Mus musculus*), brown rat (*Rattus norvegicus*), grey squirrel (*Sciurus carolinensis*), rabbit, Irish hare, pygmy shrew (*Sorex minutus*), hedgehog (*Erinaceus europaeus*), pine marten, otter, mink (*Neovison vison*) and red deer (*Cervus elaphus*) (NBDC). House mouse, brown rat, grey squirrel, and mink are all listed as high impact invasive species by the NBDC, with rabbit listed as medium impact invasive species.

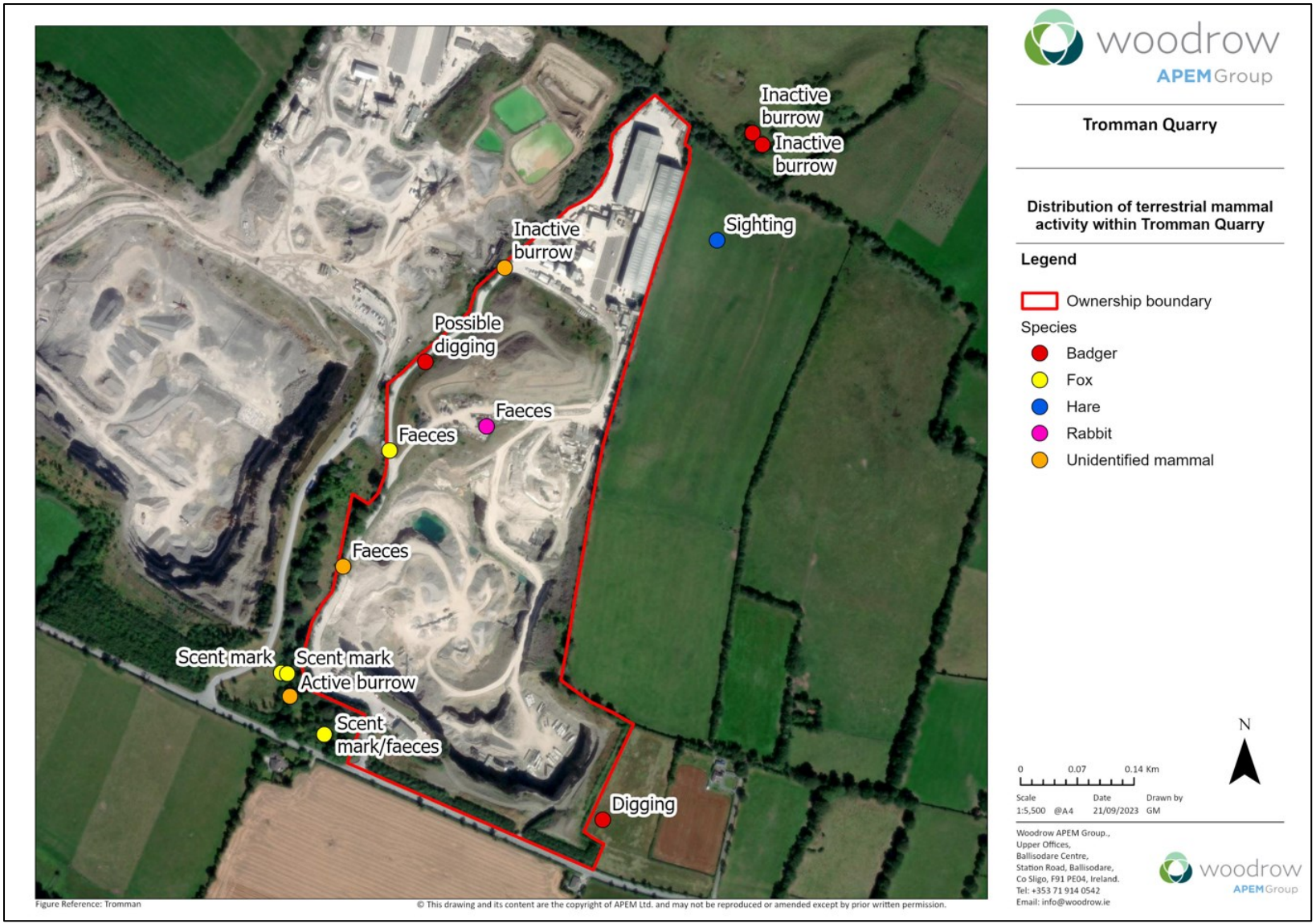

Figure 5. Distribution of terrestrial mammal activity within Tromman Quarry during the surveys performed in 2023.

5.2.2 Bats

The most recent suitability index on NBDC maps (August 2023) scored the 5 km x 5 km squares surrounding the quarry as holding habitats of moderate suitability for bats. The updated scores for each bat species (according to NBDC) are shown below in **Table 2**.

Table 2. NBDC habitat suitability for bat species.

Common name	Scientific name	Suitability index	
All bats	**Chiroptera**	**28**	**Moderate**
Soprano pipistrelle	*Pipistrellus pygmaeus*	40	Very high
Common pipistrelle	*Pipistrellus pipistrellus*	46	Very high
Brown long-eared bat	*Plecotus auritus*	35	High
Lesser horseshoe bat	*Rhinolophus hipposideros*	0	Very low
Leisler's bat	*Nyctalus leisleri*	43	Very high
Whiskered bat	*Myotis mystacinus*	13	Low
Nathusius' pipistrelle	*Pipistrellus nathusii*	10	Very low
Natterer's bat	*Myotis nattereri*	33	High

Bat surveys were undertaken on the 01 August 2023 by means of five deployed static bat detectors. The locations of the bat detectors deployed are shown in **Figure 6** and the number of passes by each species at the detector locations are shown in **Table 3**. Five species of bat were detected as part of the 2023 surveys.

Potential roosts within the site were notably scarce, with one moderately sized dead tree covered in ivy (see **Plate 1**) being the only main option. Additionally, the abandoned gate lodge situated in the small southern woodland offered some limited suitability as a roost (see **Plate 2**). A few other trees with ivy cover and occasional older specimens providing deadwood and knots were also present. However, the majority of these sites were considered to have low suitability due to their limited sheltering capabilities. Nonetheless, it's worth noting that given the moderate foraging potential on the site, there may be an increase in the use of these less suitable sites as satellite roosts.

Table 3. Bat species recorded at Tromman Quarry during the August 2023 deployment.

SM2 unit id number (Habitat feature)	Number of bat passes	Species recorded
WSS-063 (Next to the quarry with a semi-mature and mature broadleaf treeline)	3,660	Common pipistrelle (1,945) Soprano pipistrelle (444) Leisler's bat (1,259) *Myotis* sp. (11) Brown long-eared bat (1)
WSS-028 (Open area next to the top of the spoil heap	1,642	Common pipistrelle (626)

SM2 unit id number (Habitat feature)	Number of bat passes	Species recorded
in the north-west area of the quarry)		Soprano pipistrelle (168) Leisler's bat (833) *Myotis* sp. (8) Brown long-eared bat (7)
WSS-051 (On a linear feature alongside stream vegetation.)	7,517	Common pipistrelle (4,675) Soprano pipistrelle (1,878) Leisler's bat (925) *Myotis* sp. (23) Brown long-eared bat (16)
WSS-069 (Next to the road, on the quarry's house gate)	4,298	Common pipistrelle (2,785) Soprano pipistrelle (811) Leisler's bat (627) *Myotis* sp. (26) Brown long-eared bat (48)
WSS-077 (On a lone immature sycamore situated on quarry cliff to the south, with treeline 30m to the west)	2,144	Common pipistrelle (1,480) Soprano pipistrelle (249) Leisler's bat (384) *Myotis* sp. (13) Brown long-eared bat (18)

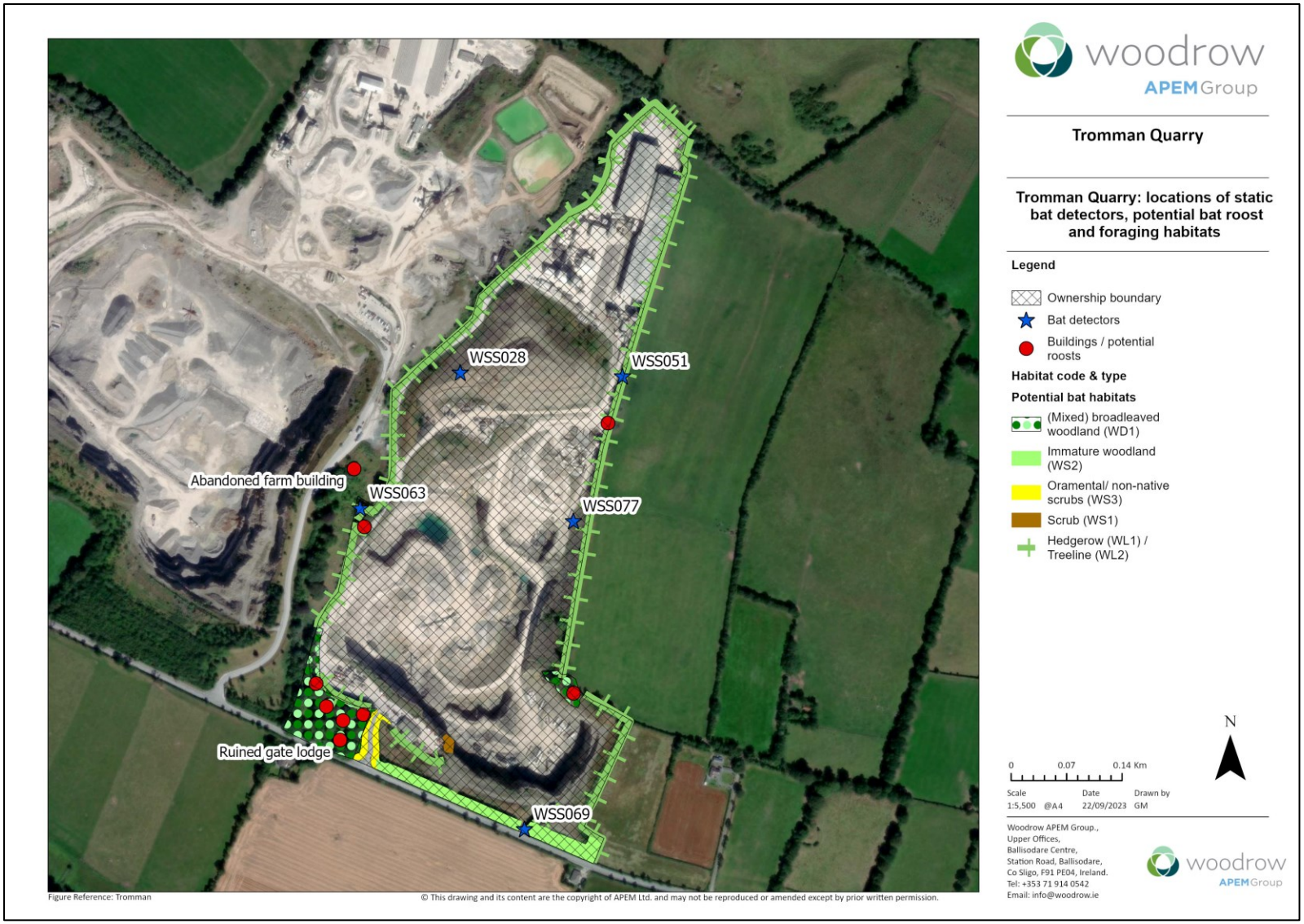

Figure 6. Tromman Quarry - location of static bat detectors (August 2023) and locations of potential bat roost and foraging habitats identified.

Plate 1. Dead tree with ivy located along the eastern boundary, considered to be of moderate roosting suitability.

Plate 2. Abandoned gate lodge of low roosting suitability.

5.2.3 Birds

Two bird surveys were undertaken at the site during the 2023 visits, occurring on 12 July and 03 August, respectively. As these dates fell outside the optimal survey period for breeding birds (April to June), it was more challenging to identify what birds may have been breeding on site, given that some species may have moved on, and typical breeding behaviour (e.g. singing) is not usually exhibited outside this timeframe. Nonetheless, when consulting the 2023 data in conjunction with the breeding bird data recorded in 2018 (see rEcIA – Woodrow, 2023a), it is possible to deduce what birds are likely to have been breeding within the site and its environs over this time.

A full list of the birds recorded in and around the site as part of the 2023 surveys, including their current conservation status (BoCCI4: 2020-2026) (Gilbert *et al*., 2021)[10] are provided in **Table 4**. Birds recorded were mostly common, widespread species, and typical for the habitat available within the site.

Yellowhammer (*Emberiza citronella*), which were the only red-listed species recorded, were observed calling from a hedgerow to the south-east of the quarry. This area is in close proximity to the cereal fields that are on the periphery of the site, and as such, yellowhammer are likely to be using the hedgerows around the site for nesting. One peregrine falcon (*Falco peregrinus),* which is an Annex I species under the EU Birds Directive, was observed commuting across the neighbouring quarry (Kilsaran) but was not exhibiting any territorial behaviour. Raven (*Corvus corax*) were frequently recorded flying over the quarry and are likely to have been using some of the quarry faces for nesting.

There were also a number of amber-listed species recorded on site, and which have the potential to breed within the site and its environs. These included spotted flycatcher

[10] Gilbert, G., Stanbury, A., & Lewis, L. (2021) Birds of Conservation Concern in Ireland 2020 –2026. Irish Birds 43: 1—22.

(*Muscicapa striata*), swallow (*Hirundo rustica*), goldcrest (*Regulus regulus*), starling (*Sturnus vulgaris*) and tree sparrow (*Passer montanus*). Other species like buzzard (*Buteo buteo*) and sparrowhawk (*Accipiter nisus*) were mostly associated with pockets of woodland and farmland to the east of the site but are likely to still use the quarry for hunting and foraging. As mentioned, some species (e.g. warblers) would be less likely to exhibit breeding behaviour at the time of surveying, and as a result, may have been unintentionally missed.

Table 4. Bird species recorded at Tromman Quarry in 2023.

BTO Code	Common Name	Scientific Name
Red listed species *are those which are of highest conservation concern where the population is rapidly declining in abundance or range, has experienced a historic rapid decline (without recovery) or are globally threatened.*		
Y	Yellowhammer	*Emberiza citrinella*
Amber listed species *are those with unfavourable European status, occur in internationally important numbers or are moderately declining in abundance or range. May also be Amber listed if population occurs in very small numbers.*		
GC	Goldcrest	*Regulus regulus*
SF	Spotted flycatcher	*Musciapa striata*
SG	Starling	*Sturnus vulgaris*
SL	Swallow	*Hirundo rustica*
TS	Tree sparrow	*Passer montanus*
Green-listed species *are not considered threatened.*		
B	Blackbird	*Turdus merula*
BC	Blackcap	*Sylvia atricapilla*
BT	Blue tit	*Cyanistes caeruleus*
BZ	Buzzard	*Buteo buteo*
CH	Chaffinch	*Fringilla coelebs*
GO	Goldfinch	*Carduelis carduelis*
GT	Great tit	*Parus major*
HC	Hooded (grey) crow	*Corvus cornix*
LT	Long-tailed tit	*Aegithalus caudatus*
MG	Magpie	*Pica pica*
PE	Peregrine	*Falco peregrinus*
RN	Raven	*Corvus corax*
R	Robin	*Erithacus rubecula*
SH	Sparrowhawk	*Accipiter nisus*
TC	Treecreeper	*Certhia familiaris*

BTO Code	Common Name	Scientific Name
WP	Woodpigeon	*Columba palumbus*
WR	Wren	*Troglodytes troglodytes*

5.2.4 Flora and habitats

A site walkover performed on 10 August 2023 sought to provide information on the habitats that were present on site. This was carried out in consultation with previous data that were collected in 2018/2019 as part of the rEcIA for the same application (Woodrow, 2023a). The findings from the 2023 walkover found that the majority of habitats on site comprised those already described in the rEcIA.

Figure 7 provides a map showing the occurrence of habitat types within the site, as classified in Fossitt (2000). The following provides a description of the habitat types occurring within the site, based on the habitat classifications outlined in Fossitt (2000).

No rare plants listed under the Flora (Protection) Order, 2022 (S.I. No. 235 of 2022) were located within Tromman Quarry during the 2023 habitat survey, nor were there any such records found on the NBDC database.

FL8 Other artificial lakes and ponds

Sequential aerial imagery shows that Tromman Quarry has had water bodies associated with the deepest areas of extraction at the base of the quarry (i.e. the quarry sump), and these too were visible during the site visits performed in 2023. The location of these waterbodies has shifted over time, mirroring quarry face progression.

There is a constructed system of holding tanks running along the eastern boundary of the site, which is a control measure to trap sediment and prevent contamination of surface waters. This consists of a series of vertical side concrete tanks and as such have no natural features. Galvanized steel meshed security fencing limits access to the tanks.

FW4 Drainage ditches

A drainage ditch flows west along the northern boundary of the site. The flow is anthropogenic in origin, arising from dewatering activities in the quarry and upstream of the discharge point. This watercourse is within the River Boyne catchment and flows over *c*. 10 km, via the Tromman, Moynasboy and Knightsbrook streams, before joining the River Boyne to the north of the site, just east of Trim.

There is another channel on the western boundary of the site running adjacent to the pre-cast concrete manufacturing facility. The sides of this channel have been heightened, creating a deep, steep sided channel that has become densely vegetated with scrub and trees. As with the northern drain, there is no natural baseflow in this channel, however pools suggest that there is flow into it during periods of prolonged or heavy rainfall.

GA2 Amenity grassland

Several small areas within the site have been landscaped and are managed as short grassy lawns, including the verges along the quarry roads. In parts the predominately grassy swards, although far from being species rich, were observed to support moderately diverse assemblages of broadleaved herbs and the following species have been recorded there; dandelion (*Taraxacum* spp.), clovers (*Trifolium* spp.), plantains (*Plantago* spp.), yarrow

(*Achillea millefolium*), common knapweed (*Centaurea nigra*), self-heal (*Prunella vulgaris*) and charlock (*Sinapis arvensis*).

GS2 Dry meadows and grassy verges

This habitat, which exclusively occurs in the south of the site (see **Figure 7**), and which had been previously classified as recolonising bare ground (ED3), is now dominated by tall, coarse grasses such as false oat-grass (*Arrhenatherum elatius*) and Yorkshire fog (*Holcus lanatus*), as well as bents (*Agrostis* spp.). While still containing certain species indicative of ED3 habitat, e.g. dandelion (*Taraxacum* spp.), willow-herb (*Epilobium* sp.), it also contains species such as bush vetch (*Vicia sepium*).

Plate 3. Dry meadows and grassy verges (GS2) located in the south of the site.

WD1 (Mixed) broadleaved woodland

On the western side of the main entrance to Tromman Quarry there is relatively mature woodland, however this lies beyond the site boundary. The oldest specimens in this area are non-native species, including common beech (*Fagus sylvatica*). Historically, this habitat would probably have been managed as WD5 (scattered trees and parkland) leading north up to the main farm house (Trammont), the grounds of which border the site and have also been abandoned.

WS1 Scrub

Although only a small area has been mapped as WS1 scrub, there are several patches where scrub, predominately gorse (*Ulex europaeus*), brambles and willow (Salix sp.) are colonising previously bare ground. These patches of scrub have been incorporated within areas mapped as ED3 recolonising bare ground.

WS2 Immature woodland

A screening belt (*c*. 10 m wide) of predominately broadleaved species has been planted along the southern boundary of the site and stretches east from the site entrance to the southeast (*c*. 290 m). This woodland is relatively young (~ 4-5 m in height) and was planted in 2012. Species recorded include birch (*Betula* spp.), ash sp. (*Fraxinus* sp.), rowan (*Sorbus aucuparia*), common osier (*Salix viminalis*), maple sp. (*Acer* sp.) and larch (*Larix* sp.). The woodland was planted infield of the original roadside hedgerow and species within the hedge (predominately hawthorn with the occasional ash, elder, grey willow and sycamore) which has become assimilated into the planting scheme.

Plate 4. Screening belt (immature woodland) located along the southern boundary of the site.

WS3 Ornamental/ non-native scrub

There are two beds on the embankments on either side of the road that have been planted with ornamental shrubbery. While predominately planted with shrubs, some of the elements could also be classed as BC4 (Flower beds and borders).

WL1 Hedgerows / WL2 Treelines

Almost the entire outer perimeter of the site is demarcated with hedgerows. Hawthorn is the dominant hedgerow species, with bramble, elder, ash, willow, maple, privet, ivy and dog rose all featuring. A length of ornamental cypress species has been planted along the southern boundary of the site car park and is becoming a treeline. Many of the hedgerows along the site boundary have already developed into treelines. Ash trees are the main native tree species occurring in treelines, with non-native beech and sycamore also present.

Plate 5. Hedgerow along the western boundary (top) and treeline along the eastern boundary (bottom).

Disturbed ground

According to Fossitt (2000) exposed rock, piles of spoil or quarried material and bare ground within an active quarry should be classified as ED4 - active quarries and mines. As per the 2018/2019 assessment (see rEcIA – Woodrow, 2023a), a distinction is made between areas being actively quarried (ED4), areas of spoil/bare ground (ED2), recolonising bare ground (ED3) and built infrastructure within the quarry, e.g. roads (BL3).

ED2 Spoil and bare ground

Within the Tromman Quarry two basic categories of spoil and bare ground were considered, including:

- Overburden (spoil) consisting of topsoil and subsoil that has been stripped off the surface of the site to facilitate access to the quarriable material beneath. The overburden has been stored within the confines of the site and currently forms a large mound located in the northern end of the site. This spoil provides a good substrate for colonising plants and is rich in nutrients. The spoil will be utilised for restoration works to infill the quarry.
- Areas where the topsoil and subsoil has been stripped off, exposing the upper layers of the quarriable material, which is exposed rock often with a covering of loose rocky till, where access to soil and nutrients for plants are limited. The area in the south-east of the site where the overburden has recently been stripped was mapped as bare ground.

Vegetation cover was notably sparse (< 50 % cover) and included species that largely occurred in isolation. These included, coltsfoot (*Tussilago farfara)*, alder saplings (*Alnus glutinosa*), and willow-herb (*Epilobium* sp.). Certain areas of bare ground (ED2) are beginning to transition into Recolonising bare ground (ED3)

ED3 Recolonising bare ground

Some areas that were previously mapped as recolonising bare ground (ED3) have seen a reduction in range, and in certain places have transitioned to dry meadows and grassy verges (GS2). This is most evident in the south of the site, between the main site entrance and the offices of Keegan Quarries Ltd (see **Figure 7**). On the contrary, small areas of habitat previously classified as ED2 have now been recolonised by vegetation (> 50 % cover), that include dock (*Rumex* sp.), nettle (*Urtica dioica*), colts foot (*Tussilago farfara*), and silverweed (*Potentilla anserina*). This is most evident in the northern end of the site at the base of the main spoil heap, as well as in the south-east of the site next to the earth banks (BL2), where ground had been stripped.

ED4 Active quarries and mines

Although the majority of the site is an active quarry, there has not been any further lateral expansion of the quarry beyond its previously permitted limits. Hence, extractive operations have been concentrated within the lower benches of the quarry, with the quarry face moving in a southerly direction.

Plate 6. Disturbed ground at Tromman Quarry, including spoil (top) and bare ground (centre), with recolonising bare ground (bottom).

Plate 7. Overview of Tromman Quarry, facing south toward the Keegan Quarry Ltd. head office (August 2023).

Built land

BL2 Earth banks

There are several longstanding earth banks within the site, mainly occurring along the perimeter of the site. Stretches of relative newly constructed embankments (berms) also occur around the upper edges of quarry faces (noticeably in the south), which are beginning to recolonise.

BL3 Buildings and artificial surfaces

The northern part of the site, involved in the manufacturing of concrete products is entirely under a concrete hard stand with several associated sheds, buildings and plants. This northern section is connected to the working quarry, spoil storage area and the main entrance via two roads both surfaced with concrete or hard core. The main offices for Keegan Quarries Ltd are located at the southern end of the site, just to the east of the main site entrance, with this southern end of the site also having substantial areas of hardstanding for parking cars and machinery.

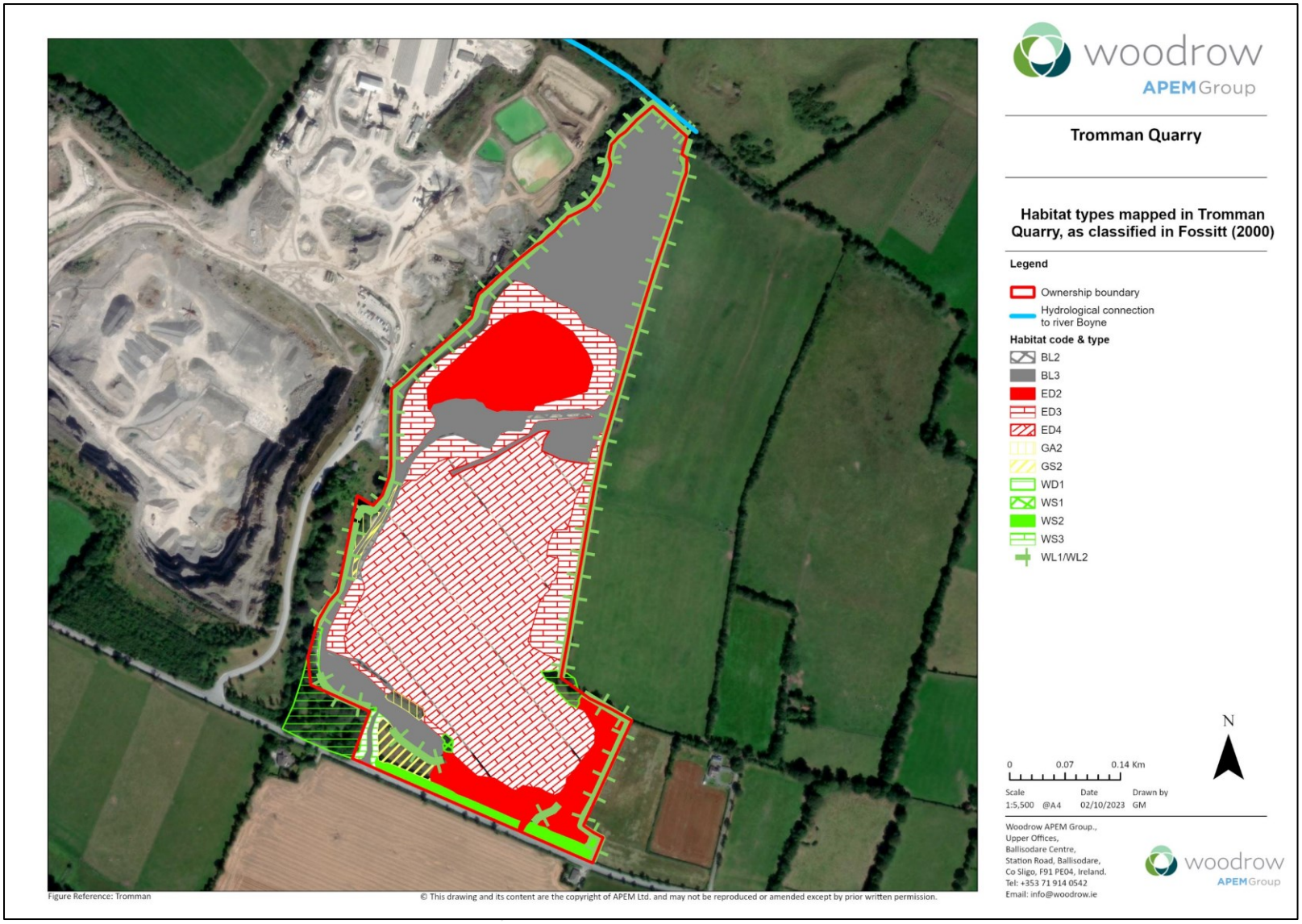

Figure 7. Habitat types mapped in Tromman Quarry as of 2023 and classified according to Fossitt (2000).

5.2.5 Invasive species

Figure 8 shows the distribution of non-native and potentially invasive plant species recorded within Tromman Quarry as part of the site visits performed. There were no plant species recorded that are included on the Third Schedule of Regulations 49 and 50 (not yet in effect) of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011).

Traveller's-joy (*Clematis vitalba*), butterfly bush (*Buddleja davidii*), and snowberry (*Symphoricarpos albus*) were observed in a number of areas, with the latter restricted to the woodland bordering the site. Montbretia (*Crocosmia* X *crocosmiiflora*) was found near the spoil heap at the northern end of the site, while *Cotoneaster* spp., which are a medium impact invasive species (NBDC), were also recorded.

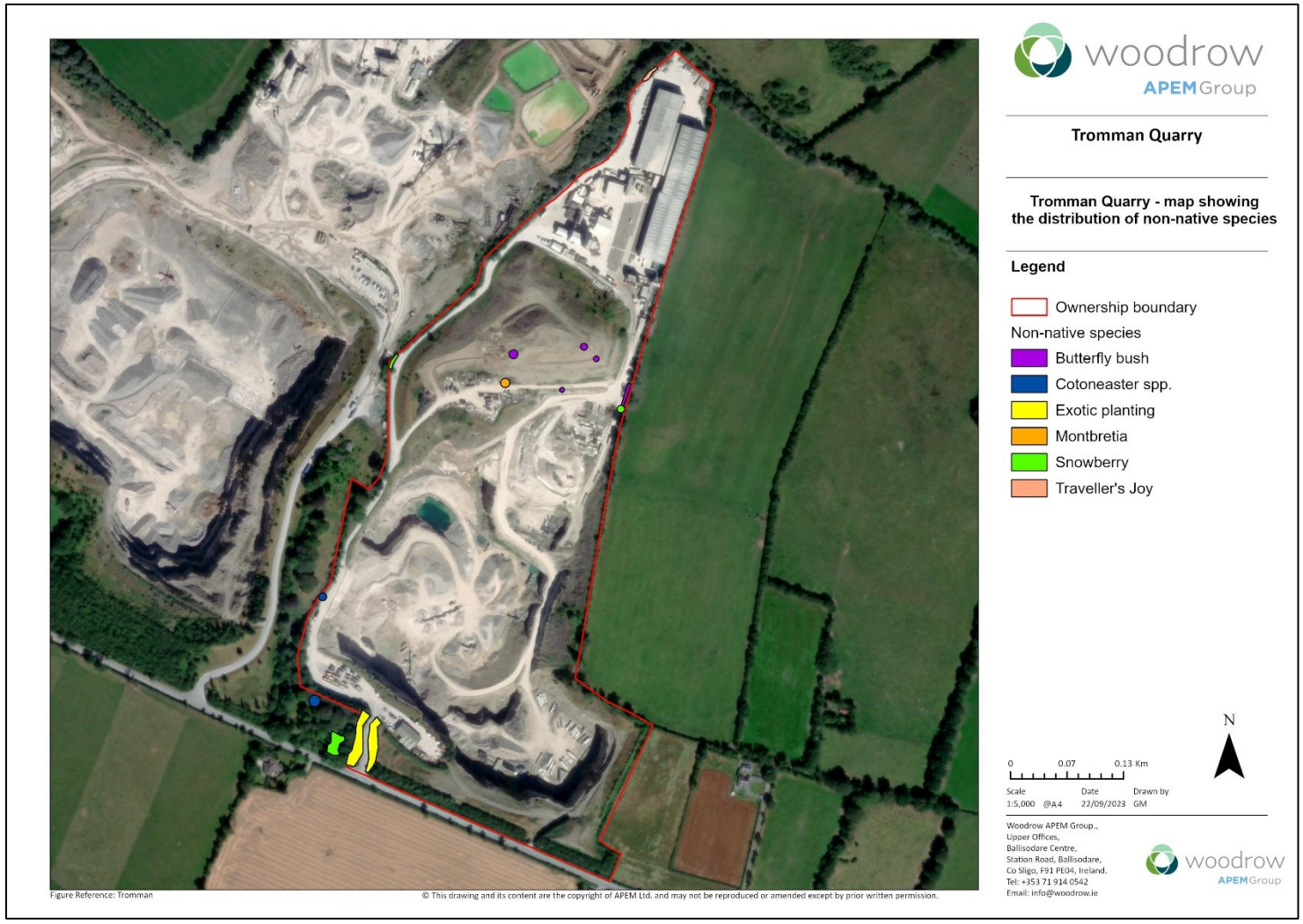

Figure 8. Tromman Quarry - map showing the distribution of non-native species on site.

6 EVALUATION OF IMPORTANT ECOLOGICAL FEATURES WITHIN THE ZONE OF INFLUENCE

This section provides a value assessment of the habitats and species within the ZoI of the proposed development, based on survey results and following the geographic evaluation methodology. It forms the basis of the impact assessment in the following section.

6.1 Evaluation of Designated Sites within the Zone of Influence

6.1.1 European Sites within the zone of influence of the development

Neither the pre-cast concrete manufacturing facility or the quarry lie within, or immediately adjacent to, any European site. The River Boyne and River Blackwater SAC and River Boyne and River Blackwater SPA are hydrologically linked to the development via a drain and lie approximately 10 km downstream by hydrological connection.

Evaluation: International Importance

6.2 Evaluation of Important Habitats within the Zone of Influence

6.2.1 FL8 Other artificial lakes and ponds

Anthropogenic habitat of low conservation and ecological value that is subject to high levels of disturbance. It includes settlement ponds that are fenced, vertical-sided concrete tanks, as well as the water that gathers at the base of the quarry, which is subject to continuous pumping operations (dewatering) and only forms temporary water bodies in the operational sump, containing heavy sediment loads.

Evaluation: Local Importance (Lower Value)

6.2.2 FW4 Drainage ditches

A variety of drains on the periphery of the site offer only limited habitat for aquatic species and wildlife corridors due to their current low flow (or lack of flow).

Evaluation: Local Importance (Lower Value)

6.2.3 GA2 Amenity grassland

Some small patches that support a range of broadleaved herbs and wild flowers, which in turn provide foraging habitat for invertebrates.

Evaluation: Local Importance (Lower Value)

6.2.4 GS2 Dry meadows and grassy verges

There is a small area of this habitat located in the south of the site that appears to have transitioned from recolonising bare ground (ED3). This habitat may provide connectivity for commuting mammals, and offer cover for certain bird species, not to mention invertebrates.

Evaluation: Local Importance (Higher Value)

6.2.5 WD1 (Mixed) broadleaved woodland

A small block of woodland on the periphery of the site is a vestige of a more garden / parkland type habitat, with a high proportion of non-native trees and remnant hedgerows. The ground storey was relatively diverse in places, although non-native species (e.g. snowberry) were found to be a prominent feature in parts. These areas offer a nesting and foraging habitat for birds. Although assessed as having a negligible to low potential for roosting bats, this habitat offers a feature for foraging bats, as well as a wildlife corridor for other species.

Evaluation: Local Importance (Higher Value)

6.2.6 WS1 Scrub

Scrub cover within this site is relatively young resulting in a patchy and sparse coverage dominated by gorse, bramble, and willow. These patches are not species rich but offer some cover and limited foraging habitat for mammals and suitable nesting locations for breeding birds.

Evaluation: Local Importance (Higher Value)

6.2.7 WS2 Immature woodland

A screening belt (*c*. 10 m wide) of predominately broadleaved varieties incorporating a mix of native and non-native species. Although assessed as having no roosting potential for bats, it provides a wildlife corridor, a feature for foraging bats and dense nesting cover for birds.

Evaluation: Local Importance (Higher Value)

6.2.8 WS3 Ornamental / non-native scrub

Ornamental shrubbery planted at the site entrance, with some exotic flowers possibly providing a food source for invertebrates.

Evaluation: Local Importance (Lower Value)

6.2.9 WL1 Hedgerows

Almost the entire outer perimeter of the site is demarcated with hedgerows. The age and condition of the hedgerow varies from some more recently planted hedging along the western boundary to older remnant hedgerows taking on the characteristics of WL2 treelines. This habitat provides an important feature for foraging bats, as well as a wildlife corridor and nesting / foraging habitat for birds.

Evaluation: Local Importance (Higher Value)

6.2.10 WL2 Treelines

Many of the hedgerows along site boundary are not heavily managed and are developing into treelines. Similarly, these provide a feature for foraging bats, a wildlife corridor as well as nesting / foraging habitat for birds. These contained Ivy clad trees that were mostly assessed as having negligible to low potential for roosting bats.

Evaluation: Local Importance (Higher Value)

6.2.11 ED2 Spoil and bare ground

These areas, which are the result of quarrying activity, are not species rich and are typically subject to high levels of disturbance due to the temporary nature of spoil heaps. Nevertheless, the spoil does provide substrate for badger setts and other burrowing animals.

Evaluation: Local Importance (Lower Value)

6.2.12 ED3 Recolonising bare ground

Some of these areas exhibit greater species richness than others, however they are not generally considered to be of notable ecological value.

Evaluation: Local Importance (Lower Value)

6.2.13 ED4 Active quarries and mines

Quarries are anthropogenic habitats that have the potential to offer a range of habitats for protected species, such as spoil heaps for badger setts, exposed earth for mining bees and sand martins, settlement ponds for newts, as well as cliff faces for nesting birds like peregrine falcon. They can occasionally offer the physical or chemical conditions to create interesting habitats such as tufa-forming springs. However, the quarry at Tromman is considered to have a relatively low intrinsic value for wildlife.

Evaluation: Local Importance (Lower Value)

6.2.14 BL2 Earth banks

Traditional boundary banks can be hundreds of years old, representing relatively undisturbed habitat within an agricultural landscape, offering suitable cover and protection for smaller fauna (e.g. invertebrates, amphibians, reptiles, birds and rodents) and also supports bryophytes and lichens. As such, they are considered to be of ecological value in the landscape.

Evaluation: Local Importance (Higher Value)

6.2.15 BL3 Buildings and artificial surfaces

Anthropogenic habitat of low conservation and ecological value that is subject to high levels of disturbance. Buildings can potentially offer nest sites for birds and roosts for bats, and these features can be enhanced by erecting nest boxes and bat boxes.

Evaluation: Local Importance (Lower Value)

6.3 Evaluation of fauna within the Zone of Influence

6.3.1 Badger (& Other Mammals)

There was limited evidence of badger activity during the terrestrial mammal survey performed in August 2023. No active badger setts were located within the site or adjacent to the site, however a series of possible sett entrances were located to the north of the site, though these were deemed to be inactive and *c.* 100 m or greater from the northernmost extent of the quarry. It is of the opinion that areas of spoil on the site would become increasingly attractive to badgers once scrub has a chance to properly establish.

There was, what appeared to be, an active fox den within the woodland outside the southern boundary. One old pine marten scat was also located on a boulder along the road leading to

the manufacturing facility, however it is most likely that this originated from an individual commuting through the site.

The small blocks of woodland, hedgerows, treelines and scrub do offer some cover for mammals, and some of the plant species found on the site may provide a source of food (e.g. brambles). The northern part of the site occupied by the manufacturing facility was assessed as being of limited value to mammals. The small waterbodies on the periphery of the site could be periodically utilised by otter.

Evaluation: Local Importance (Higher Value)

6.3.2 Bats

The static bat detector deployment recorded five species of bat. These comprised brown long-eared bat (*Plecotus auratus*), common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), Leisler's bat (*Nyctalus leisleri*) and *Myotis* species.

NBDC records indicate that Nathusius' pipistrelle (*Pipistrellus nathusii*), Daubenton's bat (*Myotis daubentonii*) and Natterer's bat (*Myotis nattereri*) also occur within the 10-km squares covering the site. Interestingly, whiskered bat (*Myotis mystacinus*) was noted as being resident in environmental documentation for the adjoining quarry (Kilsaran).

Given the habitat types available on the site, which consist of small blocks of relatively open broadleaf woodland, hedgerows, treelines, buildings and small watercourses, it is considered that bats will mainly utilise the area for foraging and commuting. The availability of suitable roosting sites was assessed as negligible to low.

All bat species including the species listed above, are protected under Annex IV of the Habitats Directive.

Evaluation: Local Importance (Higher Value)

6.3.3 Birds

Only one red-listed (yellowhammer) and five amber-listed species of conservation concern (BoCCI4) were recorded over the survey period of 2023. The small watercourses on the periphery of the site could be periodically utilised by foraging kingfisher (*Alcedo atthis*), a species listed on Annex I of the EU Birds Directive and an SCI of the River Boyne and River Blackwater SPA.

Of the species recorded, only peregrine falcon are listed under Annex I of the EU Birds Directive. While one bird was observed in flight, there were no signs of territorial behaviour nor was there a breeding site within the quarry confirmed. Peregrine along with raven, jackdaw (*Corvus monedula*) and feral pigeon (*Columba livia f. domestica*) were the only species typically benefiting from quarrying activities that were noted as breeding or potentially breeding at the site.

Overall, the range of bird species noted to date, for both the manufacturing facility (no cliff faces) and the site as a whole are considered to be typical for the habitats present within the environs, with some red and amber-listed species occurring (Gilbert *et al*., 2021). However, all of the species noted are considered common and widespread throughout Ireland, and as such, are considered in the context of this site to be of relatively low conservation value.

All breeding bird species are protected under the Wildlife Act, 1976 and the Wildlife (Amendment) Act, 2000.

Evaluation: Local Importance (Higher Value)

6.4 Important Ecological Features within the Zone of Influence

Table 5 below summarises the Important Ecological Features within the ZoI of the development.

Habitats and species which have been assessed to be of Local Importance (Higher Value) or above within the application site, have been listed as Important Ecological Features as shown in **Table 5** below.

Table 5. Important Ecological Features and their evaluation.

Important Ecological Feature	Evaluation
Designated Areas	
River Boyne and River Blackwater SAC River Boyne and River Blackwater SPA	International Importance
Habitat	
GS2 Dry meadows and grassy verges	Local Importance (Higher Value)
WS1 Scrub	Local Importance (Higher Value)
WS2 Immature woodland	Local Importance (Higher Value)
WL1 Hedgerows	Local Importance (Higher Value)
WL2 Treelines	Local Importance (Higher Value)
BL2 Earth banks	Local Importance (Higher Value)
Species	
Badger	Local Importance (Higher Value)
Birds	Local Importance (Higher Value)
Bats (commuting & foraging)	Local Importance (Higher Value)

7 IMPACT ASSESSMENT OF IMPORTANT ECOLOGICAL FEATURES WITHIN THE ZONE OF INFLUENCE

The EcIA is undertaken in this section. The methodology set out in **Section 2** is applied to Important Ecological Features which have been identified and described in **Section 5** and evaluated in **Section 6**. All impacts are described in the absence of mitigation.

7.1 Potential Ecological Impacts of the Proposed Development

In the absence of mitigation measures the following impact sources have been judged as having the potential to arise should proposed quarrying activities continue at Tromman Quarry.

7.1.1 Contamination of surface water / groundwater

Quarrying activities occurring near water can result in pollution from fuel spillages, oil leakages, and accidents, causing the contamination of surface water runoff and degradation of water quality in the vicinity of the site. Moreover, extraction activities, dewatering and the discharge of water has the potential to alter localised groundwater levels and surface water base flows.

The stripping of vegetation, ground disturbance and the storing of stripped soils, can lead to sediment and pollutants derived from quarrying activities being washed into watercourses during periods of prolonged rainfall or flood events. Associated impacts of this include sedimentation and contamination of watercourses, resulting in ecological implications for freshwater biota downstream of the quarry site. This includes QIs/SCI of the River Boyne and River Blackwater SAC and SPA, which occur downstream of the site via hydrological connection.

Translocation of the stockpile of overburden during Phase 3, which involves removing and transporting the spoil near the northern end of the site and placing it in the void in the southern margin of the quarry, may lead to the potential loss of sediment that could be carried into existing watercourses. However, due to the site's topography, characterised by a southward gradient, the likelihood of direct surface runoff is low. Any runoff that does occur will be directed to the quarry sump and the existing drainage infrastructure before discharge into the watercourses located to the north of the site.

Due to the anticipated increase in dewatering driven by an increase in ingress water (estimated at 2,750 m³/day) arising from continued mineral extraction (BCL Consultant Hydrogeologists Ltd., 2023), it is paramount that the mitigation measures outlined in the Keegan Quarries Ltd. Environmental Management System (EMS) (Byrne Environmental Consulting Ltd., 2009, updated 2023) continue to be implemented. Without these measures, there is a heightened risk of contaminants and sediment entering the drainage ditch along the northern site boundary, which is hydrologically connected, albeit distantly (*c*. 10 km), to the River Boyne and River Blackwater SAC and SPA.

7.1.2 Potential impacts on Designated Sites

River Boyne and Blackwater SAC and River Boyne and Blackwater SPA fall within the potential ZoI because of the existing hydrological link and the potential for impact on water quality on the sites, and consequent impact on the QIs and/or SCI.

The NIS accompanying this application (Woodrow, 2023b) concluded that the distance of the hydrological link to European Sites downstream of the development (*c*. 10 km) in combination with the control measures within the site, mean that there is no potential for adverse impacts on the integrity of the River Boyne and Blackwater SAC or the River Boyne and Blackwater SPA.

7.1.3 Potential impacts on flora and habitats

Habitat loss and fragmentation

Habitat loss incurred as part of preparatory works for the south-eastern quarry expansion (vegetation stripping) and replacement planting along the southern boundary, occurred within the consented timeframe for quarrying (2011-2017). As this loss has been previously assessed for ecological impacts, it does not form part of this report. Vegetation stripping in preparation for the development of the quarry faces had largely been completed pre-August 2018. An exception to this includes the removal of a garage and *c*. 60 m of non-native beech hedgerow that occurred post July 2019, following the completion of a bat emergence survey.

The development of quarry faces will result in the loss of small patches of WS1 scrub and ED3 recolonising bare ground that occur on the upper levels of the quarry faces. There will be no further loss of WS1 scrub on the south-eastern quarry face, as vegetation has not yet properly established on these recently quarried faces. An area of built land comprising the head office building will be lost during Phase 1, in order to facilitate the development of quarry faces in the southern part of the site.

Dust deposition on flora

Quarrying activities generate dust and in the absence of mitigation, dust emissions have the potential to exceed permitted levels. Fugitive dust is typically deposited within 10 to 200 m of the source; the greatest proportion of which, comprising larger particles (> 30 µm) is deposited within 100 m. Large amounts of dust deposited on vegetation over a prolonged period results in adverse effects on plant productivity, which can lead to the degradation of sensitive habitats. Prevailing weather conditions have a bearing on how much dust is generated and deposited, with factors such as rainfall supressing the agitation of dust and potentially having a cleansing effect, washing deposits off foliage (UK DoE, 1995).

A review by Farmer (1993) found that dust deposition starts to affect the more sensitive species at levels above 1000 mg/m^2/day, which is significantly higher than the upper limit permitted under the planning conditions for the site – set at 350 mg/m^2/day. Based on these limits the impact on flora in the vicinity of the quarry will be minimal and in addition there are no dust sensitive terrestrial habitats adjacent to the development.

Non-native and invasive plant species

No high impact invasive plant species (as listed by NBDC) were recorded during the site visits at Tromman Quarry, nor were there any plant species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011. Several invasive species were recorded throughout the site however, including, snowberry, traveller's-joy, buddleja, montbretia, and *Contoneaster* spp. The latter of these is classified as a medium impact invasive species (NBDC).

7.1.4 Potential impacts on fauna

Disturbance to fauna

As outlined above (under habitat loss), much of the preparatory work for the development of quarry faces (vegetation removal and stripping of overburden) has already been undertaken; and as such, there will be minimal direct disturbance to fauna resulting from habitat loss (see sections under birds and protected mammals below).

Quarrying activities, and potential ecological disturbance factors including noise, vibration and movement (machinery and human operatives) have been long-established at Tromman Quarry over the last *c*. 25 years. As such, any fauna occurring in the area will have become habituated to disturbance factors emanating from the site and species particularly sensitive to disturbance are likely to have been displaced previously.

Given the minimal levels of lateral expansion and the fact that the majority of quarrying activity will be restricted to the existing quarry void and the northern spoil heap, there are no additional significant impacts predicted to occur during the operational lifespan of the quarry.

Badger

A low level of badger activity was recorded during the terrestrial mammal survey conducted in 2023, however most of this was limited to potential signs of foraging along the periphery of the site. No resting places were located for badger, with the exception of what appeared to be, the remnants of an inactive sett *c*. 100 m from the northern site boundary. The areas targeted for quarry face development are inherently unsuitable for badgers to excavate setts, as the overburden has been stripped or the slopes / cliffs are too steep with no suitable substrate.

The spoil heap currently sitting above the proposed northern quarry extension does offer suitable substrate for badger, and translocation of the spoil would result in disturbance to any badgers that have inhabited it. However, scrub has not properly established here, and thus the likelihood of badgers taking up this area as a resting place, is considered to be low. Given the current context of the site, with ample foraging and sett building opportunities in the environs, the impact to badger is also assessed as low.

Bats

The linear features on the periphery of the site provide foraging habitat for bats. These features on the outer edges of the site will continue to be retained throughout the operational phase of the quarry. The removal of the spoil heap in the northern end of the site may reduce the number of features available to bats, given that a relatively high-level of activity was recorded here as part of the static deployments. Additionally, the loss of small patches of WS1 scrub that occur on the upper levels of the quarry faces may result in the loss of potential foraging habitat, however these areas will likely re-colonise, and thus this loss is only considered temporary.

The only other potential foraging habitats for bats that will be lost during the operational phase of the quarry will be small patches of scrub lost periodically as the faces expand. Over time, these areas will be re-colonised and scrub loss is considered temporary.

Overall, in the context of substantial areas of suitable habitats existing on the periphery of the site and in the surrounding area, the potential loss of any foraging / commuting features is deemed to be insignificant at a local level.

No new lighting regimes are proposed; and therefore, impacts from increased Lux levels on roosting bats was discounted as is the potential loss of foraging habitat.

Birds

The linear features on the periphery of the site (i.e. hedgerows / treelines, streams) provide nesting and foraging habitat for birds, as does the scrub and woodland that occur within and adjacent to the site boundaries. These features will continue to be retained throughout the operational phase of the quarry.

While peregrine were recorded flying within the vicinity of the quarry, there was no evidence of breeding within the site. However, data collected as part of previous surveys at the quarry (rEcIA – Woodrow, 2023a) suggest that there is a history of breeding within the site. It is also noted that there may be a pair nesting in the adjoining quarry owned by Kilsaran.

Peregrine nest on the ledges of cliffs and tall buildings, and as such, quarries have facilitated the expanding breeding distribution for the species in Ireland. The species' conservation concern in Ireland is currently listed as green; as breeding numbers have recovered from historic declines (Gilbert *et al*., 2021).

Non-active cliff faces will be available within the quarry throughout the operational lifespan of quarrying activities and cliffs will be retained as part of the restoration plans. This will have a positive impact for peregrine falcon and other cliff nesting birds including kestrel (*Falco tinnunculus),* raven, jackdaw and rock dove (*Columba livia*).

It is not considered that development of quarry faces poses any significant impacts upon the local bird population.

7.2 Cumulative Impacts

There will not be any habitat fragmentation as a result of the continuation of quarrying activities, with linear features around the site (such as hedgerows, treelines and drains) being retained. There is therefore not considered to be any potential for cumulative impacts in this regard.

Disturbance on breeding birds, bats and other fauna have been considered to be absent or not significant beyond local level and are not considered to contribute to wider disturbance to a significant extent.

Cumulative water quality impacts relate to both localised impacts on the Rathmolyon and Knightsbrook streams, as well as downstream impacts on the River Boyne and River Blackwater SAC and SPA. The potential for cumulative impacts on these European Sites is dealt with in the accompanying NIS (Woodrow, 2023b). As outlined, the most recent Q-value rating (2020) classifies the Knightsbrook stream as having 'Moderate Status' (Q3-4) in accordance with Water Framework Directive (WFD) monitoring. While this signifies a minor decline in water quality compared to the previous monitoring cycle, it remains marginally superior to another monitoring station located upstream of where the Rathmolyon (which receives discharge from Tromman Quarry) and the Knightsbrook streams converge. This suggests that while there may be other pressures elsewhere in the river network, the quarry itself is unlikely to contribute further to cumulative water quality impacts.

In addition, and as outlined in the Water Environment Chapter of the EIAR, water samples are collected on a regular basis from the discharge point and submitted for laboratory analysis in order to demonstrate compliance with the discharge consent (Trade Effluent Discharge Licence Ref. 04/2).

The latest water quality analysis indicates that, while discharge waters were largely in compliance with the standards outlined in the discharge consent, the measured value of 14 mg/l for suspended solids (September 2023), is in exceedance of the 1 mg/l limit specified in the license conditions (Byrne Environmental Consulting Ltd.). However, this still remains well below the Emission Limit Values (ELV) of 35 mg/l set out within the EPA (2006) environmental management guidelines for the extractive industry, as well as the European Communities (Quality of Salmonid Waters) Regulations 1988 (S.I. No. 293 of 1988), which established a standard of ≤ 25 mg/l for salmonid waters. This includes the main channel of the River Boyne, which constitutes part of the River Boyne and Blackwater SAC and SPA located *c*. 10 km away.

Therefore, provided the mitigation measures outlined in the Keegan Quarries Ltd. EMS continue to be adhered to, and monitoring of the discharge point continues into the future, then there is not considered to be any potential for quarry operations to contribute to cumulative water quality impacts within the locality.

There are no other issues that are considered to be relevant with respect to potential in-combination impacts for this site.

7.3 Consideration Against Alternative Baseline Scenario

In terms of the likely evolution of the baseline, two scenarios have been identified: one is that the quarry continues to operate, the impacts of this have been considered in the above sections. The alternative baseline scenario is that the site is restored and remediated. In this instance, there would be short term impacts associated with the restoration of the quarry, following which, all activity at the site would cease. The site would be restored for nature conservation through planting and natural regeneration, the range and extent of habitats occurring on the site will be increased including grasslands, transitional scrub, woodland and a lake surrounded by rocky cliffs, which will provide opportunities for a range of species.

When assessing the proposed development against the alternative baseline scenario, the proposed development would result in impacts which would otherwise not be experienced. However, given that any future development at the site will be subject to best practices and mitigation measures already employed, it is considered that the proposed development will not result in any additional impacts beyond those currently experienced.

8 PROPOSED MITIGATION AND ENHANCEMENT MEASURES

This section of the report aims to outline mitigation and/or enhancement measures, which aim to avoid, reduce and compensate for impacts on Important Ecological Features within the ZoI of the proposed development.

8.1 Mitigation for Potential Water Quality Impacts

Without existing mitigation in place, future quarrying activities have the potential to cause significant impacts on ecological receptors within the ZoI of the development, through impacting water quality. The Keegan Quarries Ltd. EMS provides a list of mitigation measures to control against contamination of surface water and groundwater, thereby protecting watercourses in the local area. Quarry ingress water (groundwater and surface runoff) will be directed into the pre-existing water management system in a continuation of current practice and discharged in accordance with the standards specified in the Trade Effluent Discharge Licence (License Ref. 04/2).

All ingress water currently drains under gravity into the primary sump located in the north-west corner of the quarry floor. The proposed development will see this sump being widened out to form the new quarry floor, and a secondary sump (with a storage volume of 1,350 m³) being maintained alongside the primary sump throughout the operational life of the quarry.

After initial settlement for suspended solids within these sumps, the ingress water is pumped to the approved drainage infrastructure (seven-stage settlement tanks) in the northern end of the quarry. After passing through the final three tanks situated alongside the south-east corner of the pre-cast manufacturing facility, drainage water is directed into a concrete culvert (0.77 m in width by 1.0 m in depth) that incorporates a V-Notch weir equipped with a data logger (installed on 08 April 2019). This records head measurements at 15-minute intervals. The culvert connects with a drainage channel (40 m in length, 3 m in width and 2 m in depth) leading to the consented discharge point, as covered by Trade Effluent Discharge Licence Ref. 04/2.

There are very specific conditions attached to this discharge licence, detailing permitted volumes for discharge, as well as permitted chemical and physical composition of discharged waters. In order to demonstrate compliance with the limits specified in the consent, water samples must be collected from the discharge point on a quarterly basis and samples submitted for laboratory analysis. As outlined in the Hydrogeological and Hydrological Impact Assessment (BCL Consultant Hydrogeologists Ltd., 2023), it is anticipated that the applicant will seek a modification to the discharge license to increase the discharge rate, along with an adjustment to the specified limits for suspended solids. This will be done in accordance with the standards set out in the European Communities (Quality of Salmonid Waters) Regulations 1988 for salmonid waters (suspended solids: ≤ 25 mg/l).

As highlighted in the rEcIA accompanying this application (Woodrow, 2023a), as well as the above section (**Section 7.2**), while discharge waters generally meet the standards outlined in the discharge consent, there can be some occasional variability. To enhance the efficiency of the settlement system in further reducing suspended solids, cleaning and maintenance of settlement tanks will be conducted at regular intervals (every 3-6 months) to prevent the accumulation of solids and ensure optimal performance.

As well as reducing the amount of sediment laden runoff on site, specific measures will be implemented to prevent the release of sediment to viable watercourses during the creation of any screening bunds around the application site. This will include maintaining bunds or stockpiles at an appropriate height and locating them as far away from watercourses and/or drainage ditches as possible (recommended > 20 m). Silt fences will be erected on the outer slopes of screening bunds and left in place until such time as vegetation has properly established.

With these requirements in place as mitigation, the risk of local watercourses and groundwaters becoming contaminated as a result of continuation of extraction is considered to be low. During restoration of the quarry, dewatering activities would cease, meaning that discharge and flow into the northern drain would also cease. This would further diminish any hydrological link between the site and the downstream SAC/SPA.

8.2 Mitigation for Potential Impacts on Habitats

8.2.1 Mitigation by avoidance / reduction

Continuation of quarrying activities will not significantly impact on any habitats on the periphery of the site, such as hedgerows, treeline and drains, as these areas will be avoided when quarrying resumes.

There were no high impact invasive plant species (as listed by NBDC) recorded as part of the 2023 site visits at Tromman Quarry, nor were there any plant species recorded that are included on the Third Schedule of Regulations 49 and 50 (not yet in effect) of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011).

There is potential for dust deposition to supress plant productivity and lead to the degeneration of sensitive habitats. As detailed in the EMS for Keegan Quarries Ltd., control measures, which have been in place since 2009, are employed throughout the site to suppress the generation of dust and ensure that threshold levels are not exceeded. Continued employment of these control measures is likely to ensure that quarry operations continue to operate below the 350 mg/m^2/day threshold, and as such, minimise the risk of dust depositing on foliage. Additionally, as of 2023, there are no sensitive terrestrial habitats adjacent to the development.

8.2.2 Mitigation by compensation

There are no significant impacts anticipated to result from the proposed continuation of quarrying activities at Tromman; and therefore, mitigation by compensation is not required.

8.3 Mitigation for Potential Impacts on Bats

8.3.1 Mitigation by avoidance / reduction

None of the potential bat roosts identified on the periphery of the site will be removed during the operational phase of the quarry. As such, no bat roosts will be impacted by the proposed continuation of quarrying activities.

The only potential foraging habitat for bats that will be lost during the operational phase of the quarry will be small patches of scrub, however these will likely re-colonise, and thus this loss is only expected to be temporary. Translocation of the spoil heap from the northern end of the site may reduce the number of features available to bats, though it is noted that the majority

of bat passes recorded here were for Leisler's, which typically forage at medium to high altitudes over open areas.

8.3.2 Mitigation by compensation

No significant impact of foraging or roosting bats is anticipated to result from the proposed continuation of quarrying activities at Tromman; and therefore, mitigation by compensation is not required.

8.4 Mitigation for Potential Impacts on Breeding Birds

8.4.1 Mitigation by avoidance / reduction

The development of quarry faces is likely to lead to the loss of small patches of WS1 scrub found on the upper levels of the faces themselves. As such, clearance of these areas will be curtailed to periods outside of the breeding bird season (breeding bird season: 01 March – 31 August, inclusive).

Peregrine falcon are known to become habituated to a range of human activity, including quarrying, however nesting birds can be sensitive to disturbance in the early stages of the breeding season (late March to early May). If nesting in the Tromman Quarry, implementation of a minimal blasting schedule over this early period will limit disturbance to breeding pairs. The following measures will be employed to protect nesting peregrine:

- There will be no blasting within 150 m of any peregrine nest while active.
- Blasting within the quarry will be limited to twice per month during the breeding season (March to June inclusive).

A limited blasting schedule designed to minimise disturbance to peregrine is also expected to have a positive effect on yellowhammer, and other passerine species, by reducing disruptions around the site's periphery during the bird breeding season.

8.4.2 Mitigation by compensation

No significant impact on foraging or breeding birds is anticipated to result from the proposed continuation of quarrying activities at Tromman; and therefore, mitigation by compensation is not required.

8.5 Enhancement Measures

A restoration plan has been produced for the proposal (detailed in Section 4 of the EIAR and outlined in **Figure 9** below). Following the completion of mineral extraction at the site, the site will be restored to provide a range of biodiverse habitats, primarily in the form of a water body. The site restoration will result in the following (approximate) areas for the site as a whole (i.e. includes restoration of the pre-cast concrete manufacturing facility):

- Floating islands to include planting of a wet woodland mix (0.507 ha)
- Dry woodland 2.08 ha
- Calcareous grassland 2.25 ha
- Hazel copse 0.125 ha
- Ponds x 8 No.

In terms of the restoration of the quarry void, it is understood that the quarry consents provide for bench and margin treatment and planting, with placement of some overburden resources around the quarry and then for the quarry void to be allowed to flood with anticipated water rebound levels of the order of 62 m AOD (± 2 m), though this is more likely to be in the region of 65 m AOD. This will result in cliffs of 13-23 m surrounding the quarry following restoration, meaning that parts of the site will remain suitable for nesting peregrine.

The overall impact of site restoration will be positive. The site would be restored for nature conservation through planting and natural regeneration, the range and extent of habitats

occurring on the site will be increased including grasslands, transitional scrub, woodland and a lake surrounded by rocky cliffs, which will provide opportunities for a range of species.

Once quarrying activities cease, and disturbance factors including light pollution dissipate and vegetation cover regenerates, connectivity through the site will be improved and more sensitive species will re-colonise the area. Species of conservation interest, including bats and peregrine, that occurred at the site during the operational phase of the development will not be negatively impacted by the site remediation process. Quarry faces providing nesting ledges for peregrine, as well as other species of bird like kestrel and raven will be retained. Foraging and commuting bats in particular will benefit from an increase in vegetation cover within the site. Areas of spoil within the site have the potential to be used by badgers for excavating setts.

8.6 Residual Impacts and Effects on Important Ecological Features

Negative residual impacts are limited from negligible to minor long-term impacts. These are not considered to be ecologically significant. As shown in **Table 6** below, residual impacts will not result in any significant effects on Important Ecological Features within the ZoI.

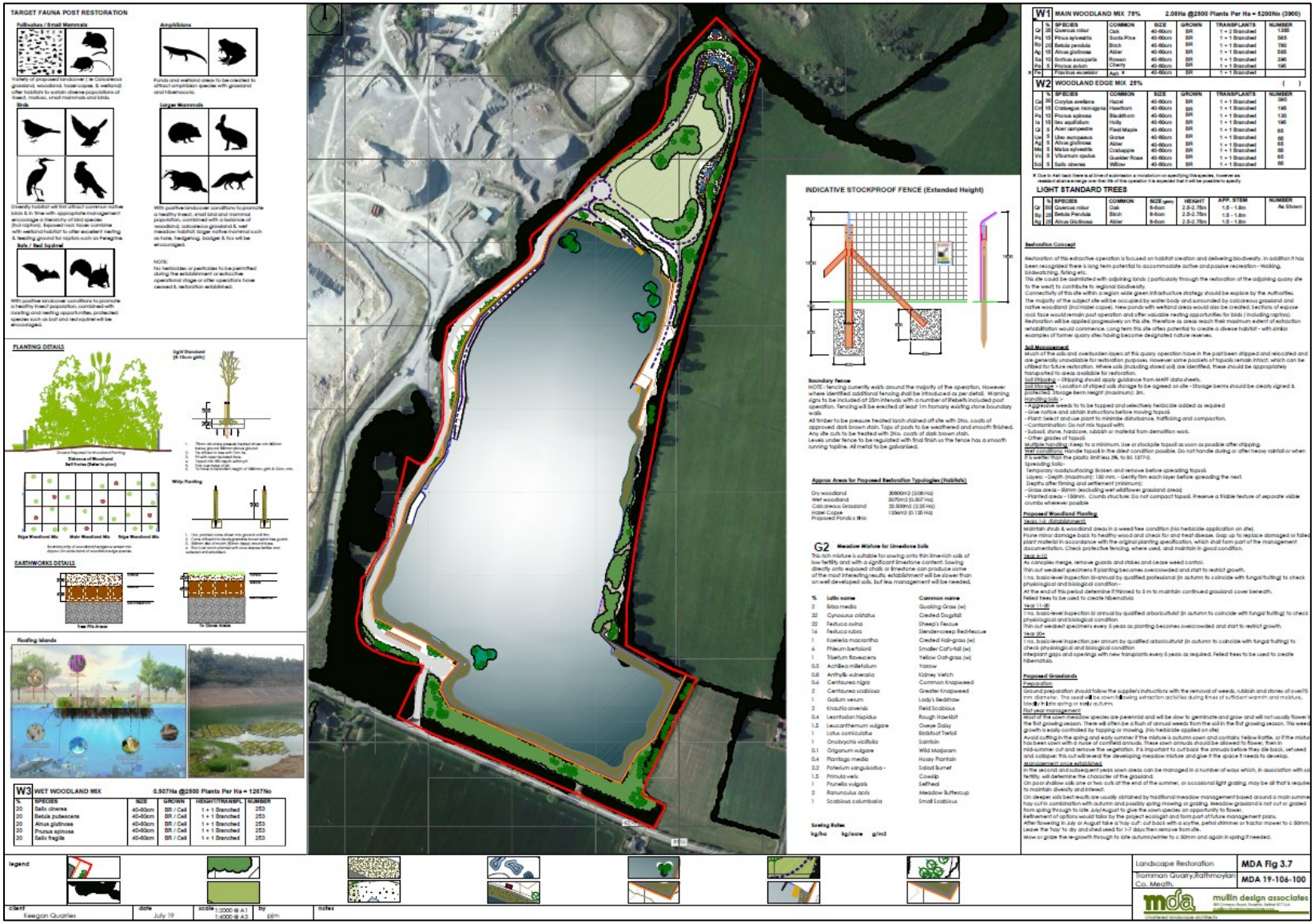

Figure 9. Overview of restoration proposals (see Section 4 of the EIAR for details) (Source: Mullen Design Associates (MDA)).

Table 6. Summary of potential impacts, potential effects, mitigation undertaken and residual effects.

Important Ecological Features	Evaluation	Potential Impact	Potential Effect	Potential Significance	Mitigation / Compensation Undertaken	Significance of Residual Effect
Designated Sites						
River Boyne and Blackwater SAC	International	Pollution due to suspended solids and chemical entering watercourses connecting to site	Impact on habitats sensitive to pollution and species either sensitive to pollution or relying on prey that are sensitive to pollution.	Potentially significant (Although site is located *c.* 10 km via hydrological connection)	Environmental Management System (EMS) applied since 2009, updated 2023.	Not significant
River Boyne and Blackwater SPA	International	Pollution due to suspended solids and chemical entering watercourses connecting to site	Impact on habitats sensitive to pollution and species either sensitive to pollution or relying on prey that are sensitive to pollution.	Potentially significant (Although site is located *c.* 10 km via hydrological connection)	Environmental Management System (EMS) applied since 2009, updated 2023.	Not significant
Habitats						
Dry meadows and grassy verges	Local (Higher)	Habitat loss	Loss of cover within the site	Significant	Area of site not targeted for removal.	Not significant
Scrub	Local (Higher)	Habitat loss	Loss of cover within the site	Significant	Planting of woodland for screening belts undertaken (2012)	Not significant
Immature woodland	Local (Higher)	Habitat loss	Loss of cover within the site	Significant	Immature woodland along southern boundary not targeted for removal	Not significant
Hedgerows	Local (Higher)	Permanent loss of hedgerow	Loss of, or damage to sections hedgerow leading to reduced connectivity and loss of foraging habitat and cover for breeding fauna	Significant	Hedgerows on site not targeted for removal.	Not significant
Treelines	Local (Higher)	Permanent loss of treeline	Loss of, or damage to sections treeline leading to reduced connectivity and loss of foraging habitat and cover for breeding fauna	Significant	Existing treelines on site not targeted for removal	Not significant
Earth banks	Local (Higher)	Permanent loss of habitat - cover for birds / small mammals	Loss of cover for fauna	Significant	Existing earth banks on site not targeted for removal	Not significant

Important Ecological Features	Evaluation	Potential Impact	Potential Effect	Potential Significance	Mitigation / Compensation Undertaken	Significance of Residual Effect
Fauna						
Birds	Local (Higher)	Habitat loss / disturbance	Potential for loss or disturbance of nesting sites	Significant	Implementation of minimal blasting schedule during the early stages of the breeding season (late March to early May) to limited disturbance to breeding birds (e.g. peregrine).	Not significant
Badger	Local (Higher)	Removal of foraging habitat Colonisation of spoil targeted for relocation	Reduction in access to feeding areas. Accidental disturbance of badger setts	Significant	Planted areas within the site may provide foraging habitat. For spoil stored on site and where due to be translocated, ensure that scrub cover is discouraged through regular cutting.	Not significant
Bats (foraging & commuting)	Local (Higher)	Removal of potential foraging habitat.	Potential disturbance / displacement to foraging bats.	Significant	Planting on southern boundary of site will provide additional foraging opportunity on site.	Not Significant
Invasive Alien Species (IAS)						
Invasive Alien Species (IAS)	-	Potential for spread around site and then dispersal through transportation of quarried materials	Spreading of IAS would be to the detriment of native species and habitats. Species recorded are low impact IASs	Not Significant		Not significant

9 CONCLUSIONS

Based on the collation of the above information, it is considered that the continuation of quarrying activities at Tromman will have a low adverse ecological impact via permanent habitat removal, which will then be negated by the proposed landscaping and planting as part of site restoration works.

While the site holds habitats that are likely to be locally important for foraging and commuting species in the wider area, such as birds and mammals (including bats), none are particularly rare or of significant ecological importance.

Given the existing habitats, and the permitted post-operational remedial landscaping and planting works, it is considered that the development shall result in a short to medium term ecological impact during operation, which shall be managed by implementing best practice mitigation measures across the site. As a result, the proposed development will not give rise to any significant impact beyond the local level.

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