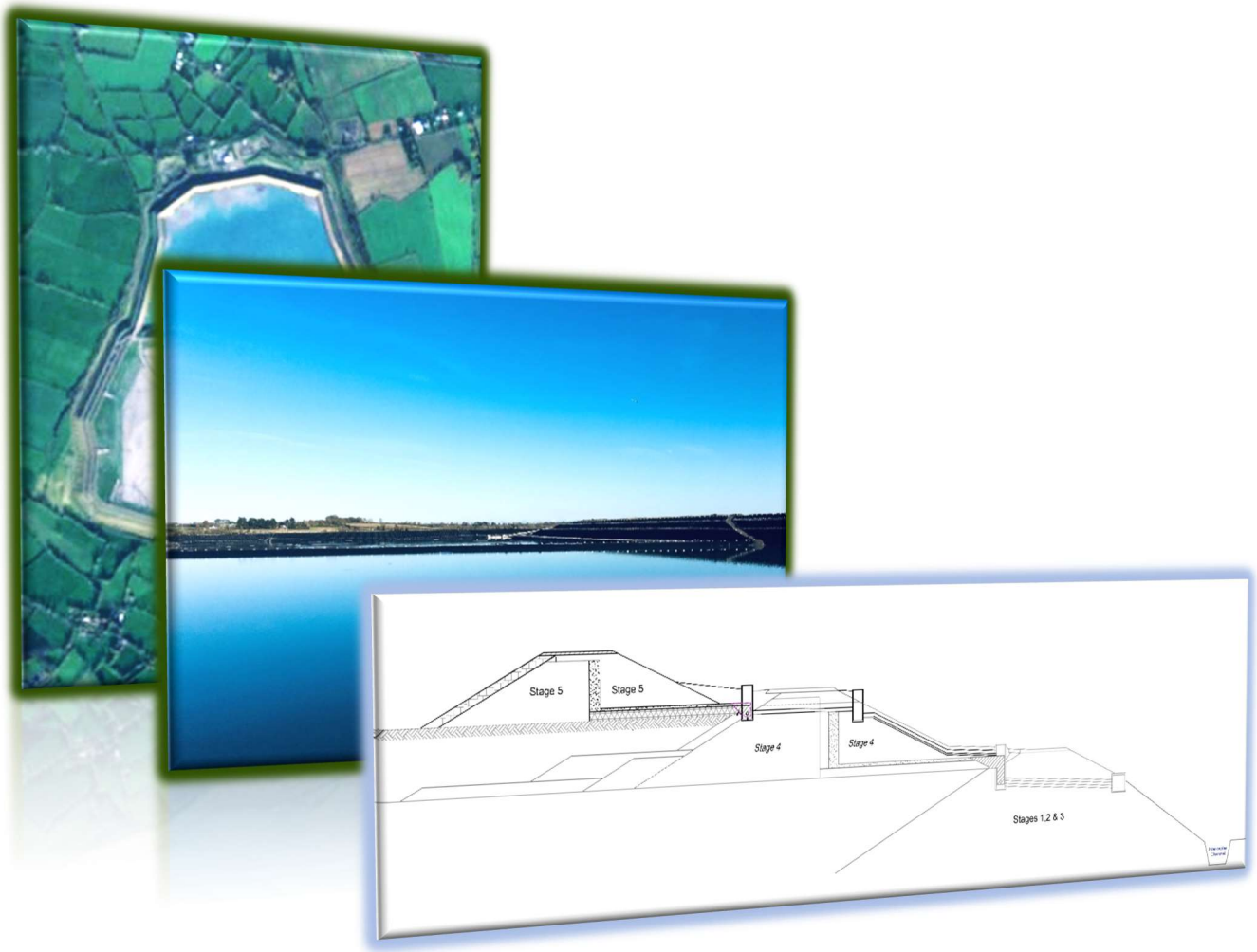
NEW BOLIDEN

Tara Mines

Tailings Facility Embankment Buttress

Natura Impact Statement (NIS)

Appeal Reference Number: ABP-315173-22



Submitted: February 2024

NATURA IMPACT STATEMENT IN SUPPORT OF APPROPRIATE ASSESSMENT
OF PROPOSED BUTTRESSING WORKS AT THE RANDALLSTOWN TAILINGS MANAGEMENT FACILITY, NAVAN, CO MEATH

fers

Updated February 2024 by:

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EXECUTIVE SUMMARY

In January 2022, FERS ltd was commissioned by Boliden Tara Mines DAC (BTM) to undertake an Appropriate Assessment screening of proposed buttressing works to be undertaken on a section of the dam walls of the Randallstown Tailings Facility. These works are proposed to be undertaken with a view to increasing the Factor of Safety associated with the dam walls.

Screening having identified significant potential impacts associated with the proposed buttressing works, Phase II Appropriate Assessment was undertaken, and a Natura Impact Statement prepared.

Following the preparation of a Natura Impact Statement (contained herein) entailing an examination, analysis, and evaluation of the relevant information, and applying the precautionary principle, it is considered that there would be no adverse impact of the proposed buttressing works (assuming the comprehensive implementation of all prescribed mitigation and monitoring measures) on the Qualifying Interests, nor the attainment of specific conservation objectives, either alone or in-combination with other plans or projects on the Natura 2000 sites described herein. Indeed, following the completion of the buttressing works, the Factor of Safety of the tailings dam will be enhanced, thus reducing any risks to the surrounding habitats associated with a dam breach.

Please note that this NIS has been updated in January 2024 in order to requirement of the preparation of an EIAR for the proposed development as indicated by An Bord Pleanála (Case Number ABP-315173-22).

1 Introduction

1.1 FERS Ltd. Company background

Forest, Environmental Research and Services have been conducting ecological surveys and research since the company's formation in 2005 by Dr Patrick Moran and Dr Kevin Black. Dr Moran, the principal ecologist with FERS, holds a 1st class honours degree in Environmental Biology (UCD), a Ph.D. in Ecology (UCD), a Diploma in EIA and SEA management (UCD) a Diploma in Environmental and Planning Law (King's Inn) and a M.Sc. in Geographical Information Systems and Remote Sensing (University of Ulster, Coleraine). Patrick has in excess of 20 years of experience in carrying out ecological surveys on both an academic and a professional basis. Dr Emma Reeves, senior ecologist with FERS holds a 1st class honours degree in Botany, and a Ph.D. in Botany. Emma has in excess of 10 years of experience in undertaking ecological surveys on an academic and professional basis. Ciarán Byrne, a senior ecologist with FERS holds a 1st class honours degree in Environmental Management (DIT) and a M.Sc. in Applied Science/Ecological Assessment (UCC). Ciarán has in excess of 5 years in undertaking ecological surveys on both an academic and a professional basis.

FERS client list includes National Parks and Wildlife Service, An Bord Pleanála, various County Councils, the Heritage Council, Teagasc, University College Dublin, the Environmental Protection Agency, Inland Waterways Association of Ireland, the Department of Agriculture, the Office of Public Works and Coillte in addition to numerous private individuals and companies. FERS Ltd. has prepared in excess of 300 Appropriate Assessment Screenings/Natura Impact Statements for a wide range of plans and projects.

1.2 The aim of this report

This report has been prepared (and updated January 2024) in compliance with Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (DoEHLG 2009, February 2010) and the European Communities (Birds and Natural Habitats) Regulations 2011 (DoEHLG 2011) in support of the Appropriate Assessment of proposed buttressing works at the Randallstown Tailings Management Facility, Navan, Co Meath. This report provides the information required in order to establish whether or not the proposed development is likely to have a significant

ecological impact on any Natura 2000 sites, in the context of their conservation objectives and specifically on the habitats and species for which the sites have been designated.

This report has been prepared with regard to relevant rulings by the Court of Justice of the European Union (CJEU), the High Court, and the Supreme Court including but not limited to:

- [2013] C-258/11 Peter Sweetman and Others v An Bord Pleanála. The CJEU ruled that Article 6 (3) of Council Directive 92/43 / EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that a project not directly linked to it is not immediately necessary for the management of a site to prejudice the integrity of that site if it is likely to prevent the preservation of the constituent characteristics of the site concerned in relation to the presence of a natural priority habitat whose purpose is to maintain gave the reason for registering that site in the list of sites of Community importance within the meaning of that directive. For this verification, the precautionary principle must be applied;
- [2018] C – 164/17 Edel Grace and Peter Sweetman v An Bord Pleanála. The CJEU ruled that Article 6 of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that, where it is intended to carry out a project on a site designated for the protection and conservation of certain species, of which the area suitable for providing for the needs of a protected species fluctuates over time, and the temporary or permanent effect of that project will be that some parts of the site will no longer be able to provide a suitable habitat for the species in question, the fact that the project includes measures to ensure that, after an appropriate assessment of the implications of the project has been carried out and throughout the lifetime of the project, the part of the site that is in fact likely to provide a suitable habitat will not be reduced and indeed may be enhanced may not be taken into account for the purpose of the assessment that must be carried out in accordance with Article 6(3) of the directive to ensure that the project in question will not adversely affect the integrity of the site concerned; that fact falls to be considered, if need be, under Article 6(4) of the directive;
- [2018] C-323/17 People Over Wind and Sweetman v Coillte Teoranta - The (CJEU) ruled that Article 6(3) of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that, in order to determine whether it is necessary to carry out, subsequently, an appropriate assessment of the implications, for a site concerned, of a plan or project, it is not appropriate, at the

screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site;

- [2018] C-461/17 Holohan v An Bord Pleanála – The CJEU ruled that:
    - Article 6(3) of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that an 'appropriate assessment' must, on the one hand, catalogue the entirety of habitat types and species for which a site is protected, and, on the other, identify and examine both the implications of the proposed project for the species present on that site, and for which that site has not been listed, and the implications for habitat types and species to be found outside the boundaries of that site, provided that those implications are liable to affect the conservation objectives of the site.
    - Article 6(3) of Directive 92/43 must be interpreted as meaning that the competent authority is permitted to grant to a plan or project consent which leaves the developer free to determine subsequently certain parameters relating to the construction phase, such as the location of the construction compound and haul routes, only if that authority is certain that the development consent granted establishes conditions that are strict enough to guarantee that those parameters will not adversely affect the integrity of the site.
    - Article 6(3) of Directive 92/43 must be interpreted as meaning that, where the competent authority rejects the findings in a scientific expert opinion recommending that additional information be obtained, the 'appropriate assessment' must include an explicit and detailed statement of reasons capable of dispelling all reasonable scientific doubt concerning the effects of the work envisaged on the site concerned.
    - Article 5(1) and (3) of, and Annex IV to, Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment, must be interpreted as meaning that the developer is obliged to supply information that expressly addresses the significant effects of its project on all species identified in the statement that is supplied pursuant to those provisions.
    - Article 5(3)(d) of Directive 2011/92 must be interpreted as meaning that the developer must supply information in relation to the environmental impact of both the chosen option and of all the main alternatives studied by the developer, together with the reasons for his choice, taking into account at least the environmental effects, even if such an alternative was rejected at an early stage.

- [2023] C721/21 Eco Advocacy CLG v An Bord Pleanála – The CJEU ruled *inter alia* that:
    - Article 6(3) of Directive 92/43 must be interpreted as meaning that in order to determine whether it is necessary to carry out an appropriate assessment of the implications of a plan or project for a site, account may be taken of the features of that plan or project which involve the removal of contaminants and which therefore may have the effect of reducing the harmful effects of the plan or project on that site, where those features have been incorporated into that plan or project as standard features, inherent in such a plan or project, irrespective of any effect on the site.

In addition to:

- [2018] IESC 31 Connelly v An Bord Pleanála;
- [2019] IEHC 84 Kelly v An Bord Pleanála;
- [2021] IEHC 265 Eco-Advocacy v An Bord Pleanála;
- [2021] IEHC 369 Kerins & Anor.v An Bord Pleanála;
- [2021] IEHC 777 Sweetman v An Bord Pleanála;
- [2022] IEHC 6 Enniskerry Alliance & c. v An Bord Pleanála;
- [2022] IEHC 116 Dublin 8 Residents v An Bord Pleanála; and
- [2022] IESC 42 Friends of the Irish Environment v Government of Ireland (NPF)

Furthermore, there have been a number of Judicial Reviews that have the potential to influence the findings of this Appropriate Assessment screening and Natura Impact Statement (e.g. [2020] No. 238 J.R.).

1.3 An outline of the Appropriate Assessment process

The "Habitats Directive" (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna) is the main legislative instrument for the protection and conservation of biodiversity within the European Union and lists certain habitats and species that must be protected within wildlife conservation areas, considered to be important at a European as well as at a national level. A "Special Conservation Area" or SAC is a designation under the Habitats Directive.

The "Birds Directive" (Council Directive 2009/147/EC on the Conservation of Wild Birds) provides for a network of sites in all member states to protect birds at their breeding, feeding, roosting, and wintering areas. This directive identifies species that are rare, in danger of extinction or vulnerable to changes in habitat and which need protection. A "Special Protection Area" or SPA, is a designation under The Birds Directive.

Special Areas of Conservation and Special Protection Areas form a pan-European network of protected sites known as Natura 2000 sites.

The Habitats Directive sets out the protocol for the protection and management of SACs. The Directive sets out key elements of the system of protection including the requirement for Appropriate Assessment of plans and projects. The requirements for an Appropriate Assessment are set out in the EU Habitats Directive. Articles 6(3) and 6(4) of the Directive respectively, state:

> "*…Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public….*"
>
> "*…If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of over-riding public interest, including those of social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted….*"

1.4 Methodology for Appropriate Assessment

A number of guidance documents on the appropriate assessment process have been consulted during the preparation of this document. These are:

- Managing Natura 2000 Sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (2000);
- Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (Nov. 2001 – published 2002);
- EU Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC (2007);
- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DoEHLG 2009, Revised February 2010);
- European Communities (Birds and Natural Habitats) Regulations 2011 (DoEHLG 2011); and
- Commission notice "Managing Natura 2000 sites The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Brussels, 21.11.2018 C (2018) 7621 final.
- OPR Practice note PN01 – "Appropriate Assessment Screening for Development Management". Office of the Planning Regulator (2021).

The assessment requirements of Article 6 are generally dealt with in a stage-by-stage approach. The stages as outlined in "Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities" are:

1.4.1 Stage (1) Appropriate Assessment (Habitats Directive) Screening

This initial process identifies the likely impacts of a proposed project or plan upon a Natura 2000 site, either alone, or in combination with other projects or plans and considers whether these impacts are likely to be significant. A recent judgement in the ECJ (C323/17) that has large implications for appropriate assessment screening in Ireland has found that:

"…Article 6(3) of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that, in order to determine whether it is necessary to carry out, subsequently, an appropriate assessment of the implications, for a site concerned, of a plan or project, it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site…"

1.4.2 Stage (2) Preparation of Natura Impact Statement

The consideration of the impact of the project or plan on the integrity of the Natura 2000 Site, either alone or in combination with other projects or plans to the sites structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts.

1.4.3 Stage (3) Assessment of Alternative Solutions

The process which examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the Natura 2000 site.

1.4.4 Stage (4) Assessment where Adverse Impacts Remain

An assessment of compensatory measures where, in the light of an assessment of Imperative Reasons of Overriding Public Interest (IROPI), it is deemed that the project or plan should proceed.

At each stage, there is a determination as to whether a further stage in the Appropriate Assessment process is required. If, for example, the conclusions of the Screening stage indicate that there will be no significant impacts on the Natura 2000 site, there is no requirement to proceed further. Appropriate Assessment stages 1 and 2 deal with the main requirements for assessment under Article 6.3. Stage 3 may be part of Article 6(3) or a necessary precursor for Stage 4. This report is comprised of the ecological impact assessment and testing required under the provisions of Article 6(3) by means of the first stage of Appropriate Assessment, the screening process (as set out in the EU Guidance documents).

EU guidance states:

"…This stage examines the likely effects of a project or plan, either alone or in combination with other projects or plans, upon a Natura 2000 site and considers whether it can be objectively concluded that these effects will not be significant...".

This report has been undertaken in accordance with the European Commission's Guidance on Appropriate Assessment (European Commission, 2001) which comprises the following:

1. Description of the Plan.
2. Identification of Natura 2000 sites potentially affected by the Plan.
3. Identification and description of individual and cumulative impacts likely to result from the Plan.

4. Assessment of the significance of the impacts identified on the conservation objectives of the site(s).
5. Exclusion of sites where it can be objectively concluded that there will be no significant impacts on conservation objectives.

1.5 Consultations

For the purposes of the Biodiversity Chapter of the EIAR, On the 24th of November, 2023, correspondence was sent to the following bodies in order to ascertain fi they might have any comment on the proposed works. A copy of the Flood Risk Assessment prepared by Coyle Environmental was attached in order to inform the bodies as to the proposed project:

- Inland Fisheries (info@fisheriesireland.ie);
- An Taisce (info@antaisce.org);
- Birdwatch Ireland (info@birdwatchireland.ie); and
- NPWS (natureconservation@npws.gov.ie).

There had been minimal response at the time of preparation of this report (January 2024).

1.5.1 NPWS

The primary body consulted with regard to matters involving Natura 2000 sites is the National Parks and Wildlife Service (NPWS). The role of the NPWS is:

- To secure the conservation of a representative range of ecosystems and maintain and enhance populations of flora and fauna in Ireland.
- To implement the EU Habitats and Birds Directives.
- To designate and advise on the protection of Natural Heritage Areas (NHA) having particular regard to the need to consult with interested parties.
- To make the necessary arrangements for the implementation of National and EU legislation and policies and for the ratification and implementation of the range of international Conventions and Agreements relating to the natural heritage.
- To manage, maintain and develop State-owned National Parks and Nature Reserves.

Information pertaining to Natura 2000 sites within the Republic of Ireland is typically held by NPWS and is publicly accessible through their on-line database at www.npws.ie . Consultations carried out primarily involved querying the NPWS database for information pertaining to Natura 2000 sites within 15 km of the proposed development. Please note that the OPR Guidance[1] recommends that "…*The zone of influence of a proposed development is the geographical area over which it could affect the*

[1] OPR Practice Note PN01 Appropriate Assessment Screening for Development Management (2021). Office of the Planning Regulator

receiving environment in a way that could have significant effects on the Qualifying Interests of a European site. This should be established on a case-by-case basis using the Source-Pathway-Receptor framework and not by arbitrary distances (such as 15 km)…" While a 15 km buffer is the primary step in identifying sites potentially impacted upon, this is complemented by the identification of Source-Pathway-Receptor linkages (Section 2.6).

1.5.2 NBDC Database

The National Biodiversity Database Centre database was queried for records of species of conservation concern present within the immediate vicinity of the proposed development.

1.5.3 Other relevant data-sources

Other relevant data-sources were queried as necessary

2 Screening

Following the guidelines set out by NPWS (2009), Appropriate Assessment Screening (Phase I Appropriate Assessment) is the process that addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3) of the EU Habitats Directive. According to the guidelines as laid by NPWS (2009), Appropriate Assessment Screening is the process that addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3):

(1) Is the plan or project directly connected to or necessary for the management of the site?

(2) Is the plan or project, alone or in combination with other such plans or projects likely to have significant negative effects on a Natura 2000 site(s) in view of the conservation objectives of that site(s)?

The proposed development does not comply with the first screening test (i.e., the proposed plan is not directly connected to, or necessary for the management of any Natura 2000 site). The screening exercise will therefore inform the Appropriate Assessment process in determining whether the proposed development, alone or in combination with other plans and projects, has any potential to have significant effects on the Natura 2000 sites within the study area. If the effects are deemed to be significant, potentially significant, or uncertain, or it the screening process becomes overly complicated, then applying the Precautionary Principle and in accordance with Article 6(3) of the Habitats Directive, a Stage 2 Appropriate Assessment is required stage, i.e., "*The consideration of the impact of the project or plan on the integrity of the Natura 2000 Site, either alone or in combination with other projects or plans to the sites structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts."*

2.1 Description of proposed development

2.1.1 Rationale

BTM has recently become a member of the International Council for Mining and Metals (ICMM) and is in the process of adopting the Global Industry Standard on Tailings Management (GISTM).

A key objective of GISTM is to address the risk of tailings embankment failure through conservative design criteria, independent of trigger mechanisms, in order to minimise potential impacts.

To this end a suitable conservative approach must be taken in terms of the factors of safety to be adopted in scenarios relating to the liquefaction / brittleness of the tailings.

The proposed buttress will be constructed against the extant embankment walls of the Tailings Storage Facility.

- The extant embankment walls have been designed and assessed to meet a target design criterion, for long-term static slope stability, with a Factor of safety (FoS) of >/= 1.5 using effective strength parameters.
- The buttressing works will increase the Factor of Safety to
    - >/=1.5 for the peak strength undrained scenario and to
    - >/= 1.1 for the residual strength undrained scenario which is now required

The Tailings Facility is located approximately 2.8 km north of the mine site in Navan. The facility is constructed as a ring-dike configuration and encloses an area of c. 250 Hectares. Stages 1,2,3,4 and 5 have earth fill embankment walls constructed from locally sourced natural materials. It is proposed to construct a buttress to sections of these existing embankment walls to increase their strength thus reducing the risk of failure. TSF Stage 6 is a composite lined facility.

Figure 1: Tailings Facility layout plan

The TSF has been constructed in six main stages during the period from 1974 to present.

- Stages 1, 2 and 3 were built at ground level to a height of c.12 metres.
- Stages 4 and 5 were upstream vertical raises over Stages 1,2 and 3 (6m and 4m respectively).
- Stage 6 is a lateral extension to the north of stages 1,2,3,4 & 5.

Refer to Figure 2, Figure 3 and Figure 4.

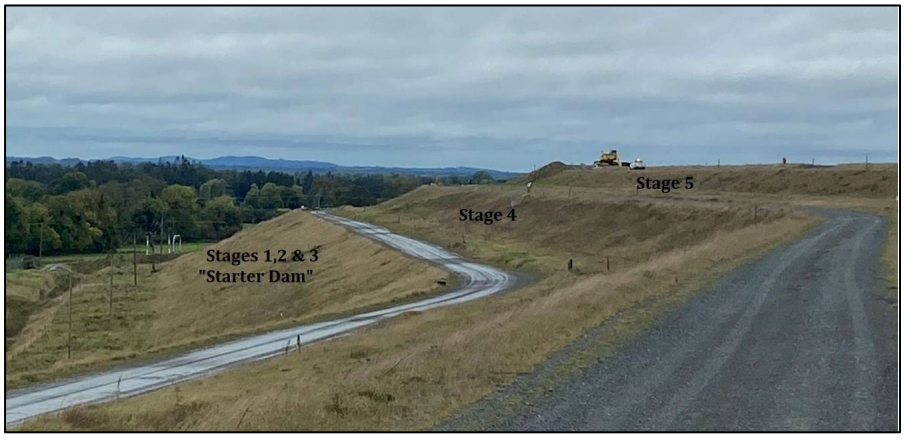

Figure 2: Embankments side profile

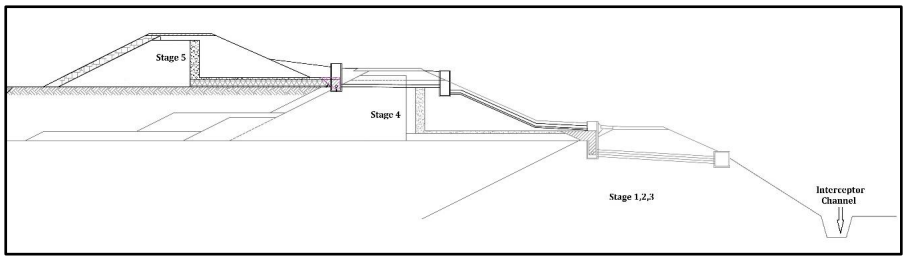

Figure 3: Cross section – stages 1 to 5 extant facility embankment

The proposed buttress, to be constructed on the downstream slope of and at the crest of the Stage 1, 2 and 3 starter Embankments, see Figure 4, will provide additional support to the Stage 4 dam embankment wall in order to increase the overall stability of the upstream raises i.e. Stage 4 and Stage 5.

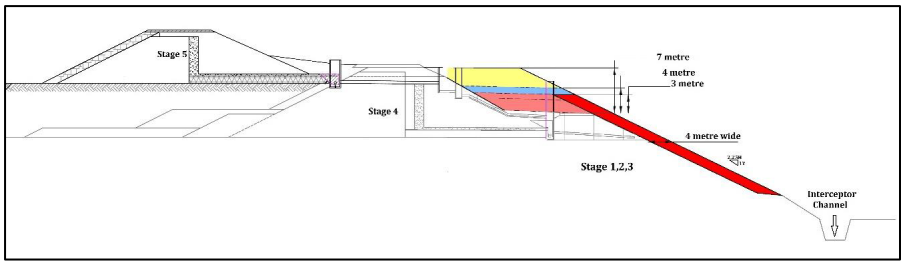

Figure 4: Cross section – facility embankment with buttress

2.1.2 Factor of Safety (FoS)

BTM has undertaken a comprehensive liquefaction assessment using Cone Penetration Tests (CPT) and laboratory testing on the existing tailings.

As with all loose tailings, the tailings at Randalstown could potentially liquefy either during dynamic or static liquefaction.

- Dynamic liquefaction occurs as a result of seismic activity, the risk of which is very low in Ireland.
- Static liquefaction occurs when the dam wall has already failed for other reasons and the tailings statically liquefy under the large strains as a result of loss of confinement.

In engineering, a factor of safety (FoS) indicates how much stronger a structure actually is compared to what it needs to be for an intended load.

The original facility design and stability analyses were undertaken using effective strength parameters and monitored piezometric levels in the stack wall which is the traditional procedure. The facility was originally designed and assessed to meet a target design criterion for long-term static slope stability of FoS > 1.5 using effective strength parameters.

However, current industry best practice is to evaluate the stability using peak undrained shear strengths and with further analysis using residual undrained shear strengths. Tailings undrained strength parameters simulates excess pore pressure within the tailings and is therefore, a more conservative analysis.

The undrained stability analysis indicates that a buttress is required at the toe of the Stage 4 embankment to achieve a factor of safety of 1.5 based on peak undrained shear strength of the fine tailings.

The buttress will provide additional support to the Stage 4 dam embankment wall in order to increase the overall stability of the upstream raises i.e. Stage 4 and Stage 5.

For the stability analysis based on residual undrained shear strength, the buttress size will need to be increased in height to achieve the required factor of safety of 1.1. In order to achieve this increase in height, it is necessary to construct a buttress to the starter dam to facilitate the further increase in height.

It has been determined that the addition of a rock fill buttress at the downstream toe of the Stage 4 dam would meet the necessary requirements (endorsed by Independent Tailings Review Board (ITRB)).

- The minimum required FoS of 1.5 is achievable for all static and seismic loading conditions and all failure surface locations when the peak undrained strength of the tailings was considered.
- In order to meet the FOS of 1.1 for the residual undrained strength scenario the analysis indicated that a 4 m wide buttress to the starter dam is required for the majority of the perimeter wall. At the starter dam crest level, the height of the buttress will vary between 3 and 7 m.

The proposed buttress will be approximately 12 m wide at the base and will have an outer slope of 1 V: 2.75 H. This slope will be similar to the downstream slope of the Stage 4 dam wall as well as the downstream slope of the Starter Dams (Stages 1, 2 and 3) at most locations. It should be noted that where the Starter Dam height is greater than 14 m, the slope will be 1 V: 2.5 H. In these scenarios, the outer slope of the buttress will match the more shallow slope of the Starter Dam.

The proposed buttress would be sequenced in two phases, which may run concurrently. The works will commence at the eastern extremity of the site and proceed westward):

- Phase I will proceed on a horizontal basis along Stage 4 of the tailings dam. Works will begin at the level of the toe of the Stage 4 upstream raise against the embankment wall and will vary between 3, 4 and 7 metres in height. The material will be placed in layers along 500m sections, with each 500 m section taking approximately one month to complete. It is envisaged that the Phase I works will take approximately 30 weeks; and
- Phase 2 will proceed on a horizontal basis at ground level against the embankment wall of stages 1,2 and 3 (starter dams). The material will be placed in layers along 500m sections, with each 500 m section taking approximately one month to complete. It is envisaged that the Phase 2 works will take approximately 80 weeks.

Construction quantities:

Rock Fill (m3)	**Soil (m3)**	**Total (m3)**
265,690	295,650	561,340

2.2 Plan and Construction Sequence

The following items are designed and specified for the Works and are listed in order of the proposed sequence of works.

2.2.1 Sequence of Works.

1) Preparatory Works including cleaning the crest of the Starter Dams, removal of any topsoil, shrubs / scrub from the side-slopes over the footprint of the proposed buttress and to facilitate plant access; and
2) Installation of the Phase 1 Buttress (toe of stage 4)
3) Installation of the Phase 2 Buttress (at ground level starter embankments)

2.2.2 Preparatory Works

Accommodation of Monitoring Instrumentation

The construction of the buttress will require the extension or otherwise accommodation of a number of geotechnical instruments which will be impacted by the works. These instruments include Casagrande standpipes, environmental monitoring wells, vibrating wire piezometers and flow measurement weirs.

2.2.3 Clearance of Work Areas

The proposed Phase 1 buttress overlies the crest of the Starter Dams, (Stages 1, 2 and 3). The crest of this road includes a layer of rockfill material as capping and surface dressing. It is proposed that this material be salvaged where possible and where the quality of the material permits. This shall be done by either stockpiling the material temporarily for re-use or preferably, through the re-use of the material as a capping layer on a section where the buttress works have already been completed.

Removal of topsoil from the footprint of the area adjacent to the crest road, i.e. the area above the Stage 4 toe drain and the Stage 4 slope shall be completed prior to commencement of the buttressing works.

For the Phase 2 buttress, it will be necessary to remove the topsoil from the entirety of the starter dam perimeter slope as well as the footprint of the buttress at the toe.

Topsoil shall be either stockpiled temporarily for re-use or preferably, through the direct re-use of the topsoil on sections where the buttressing works have already been completed. Following excavation to the Formation Level, the footprint will require trimming, grading and compaction prior to the placement of the compacted fill. The final excavated surfaces shall be trimmed and rolled to provide a clean, even and firm foundation to permit the movement of construction vehicles without causing rutting or other deleterious effects. Benching will be employed where buttress materials are being placed onto slopes to ensure that a sufficient key-in is achieved between the buttress and the dam walls.

A specified number of passes of a suitable vibratory roller will be required for the underlying soils. Soft spots and areas of unsuitable materials identified shall be excavated and replaced with suitable material placed and compacted and / or shall be improved *in-situ* via compaction or the installation of appropriate geosynthetics as approved by the engineer.

As part of the Phase 1 buttress construction works, the material which overlies the Stage 1,2 and 3 chimney drains shall be removed intermittently. This will allow sub-surface water drainage in the section to drain into the Stage 1, 2 and 3 chimney drain. This water will then report into the Perimeter Interceptor Channel (PIC) and from there will be returned back to the tailings facility.

2.3 Description of existing conditions on site

The site was visited on numerous occasions in 2021 and 2022 as outlined in the Biodiversity Chapter of the EIAR. In addition, a site visit was undertaken by Dr Patrick Moran on the 1st of February 2024 in order to validate the findings presented in the Biodiversity Chapter as regarding any wholesale changes that may have occurred in interim. The site was observed to be largely unchanged from the 2021/2022 period. While the area in the vicinity of the tailings facility is part of an industrial facility, the sloped banks of the tailings facility as they currently exist comprise semi-natural grassland habitat, maintained largely through grazing by rabbit and hare. There is a wide variety of plant species occurring within this habitat. This habitat is an important breeding site for numerous bird species of conservation concern, including Yellowhammer, Meadow Pipit and Skylark. A large variety of mammals utilise the site, including Badger, Fox, Pine Marten, Irish Hare and several species of bat. Of particular note, Otter and Kingfisher have been observed utilising the Simonstown stream immediately to the east of the tailings facility. During the winter months, the tailings pond itself is utilised as a roost by large numbers of numerous species of conservation concern including Whooper Swan, Golden Plover, Lapwing and numerous Gull species. Peregrine Falcon has been recorded hunting over the facility.

Figure 5: Kingfisher on perch within Simonstown stream

While the area of habitat occurring within the tailings facility is “Industrial” in nature, it supports a wide variety of biodiversity, providing an ecological “Stepping stone” of habitat. The proposed buttressing works must be undertaken in an ecologically sensitive fashion such as to minimise the disturbance to the rich diversity of flora and fauna occurring. It is recommended that a Biodiversity Management and Conservation Plan be drawn up and implemented such as to ensure that both during works and post-works, the biodiversity of the site is maintained and indeed enhanced.

Figure 6: Photograph of embankment slope in summer

Figure 7: Selection of images captured during site visit on 01/02/24

The location of the proposed development site is illustrated in Figure 8, Figure 9 and Figure 10. The location of the proposed development relative to the wider landscape is illustrated in Figure 11. As can be seen from the satellite imagery, the vast majority of the habitat in the immediate vicinity of the TSF is intensively managed agricultural land. There are, however, two significant watercourses

immediately adjacent to the tailings facility - the Simonstown stream along the eastern boundary, and the Yellow River along the western boundary of the tailings facility (see Figure 12).

Kingfisher and Otter are known to utilise these watercourses and indeed there has been evidence of both recorded from within the boundary of the tailings facility. Kingfisher (*Alcedo atthis*) is an Annex I (Birds Directive) listed species, and Otter (*Lutra lutra*) is an Annex II (Habitats Directive) listed species. The occurrence of these, and other species of conservation concern, within the tailings facility boundary indicate the ecological sensitivity of the habitats present. The occurrence of these species of conservation concern within the tailings facility itself indicates that the management of the facility is undertaken in an ecologically sensitive manner. Indeed, through increasing the FoS of the dam, the safety of the dam and any risk to the environment would be reduced.

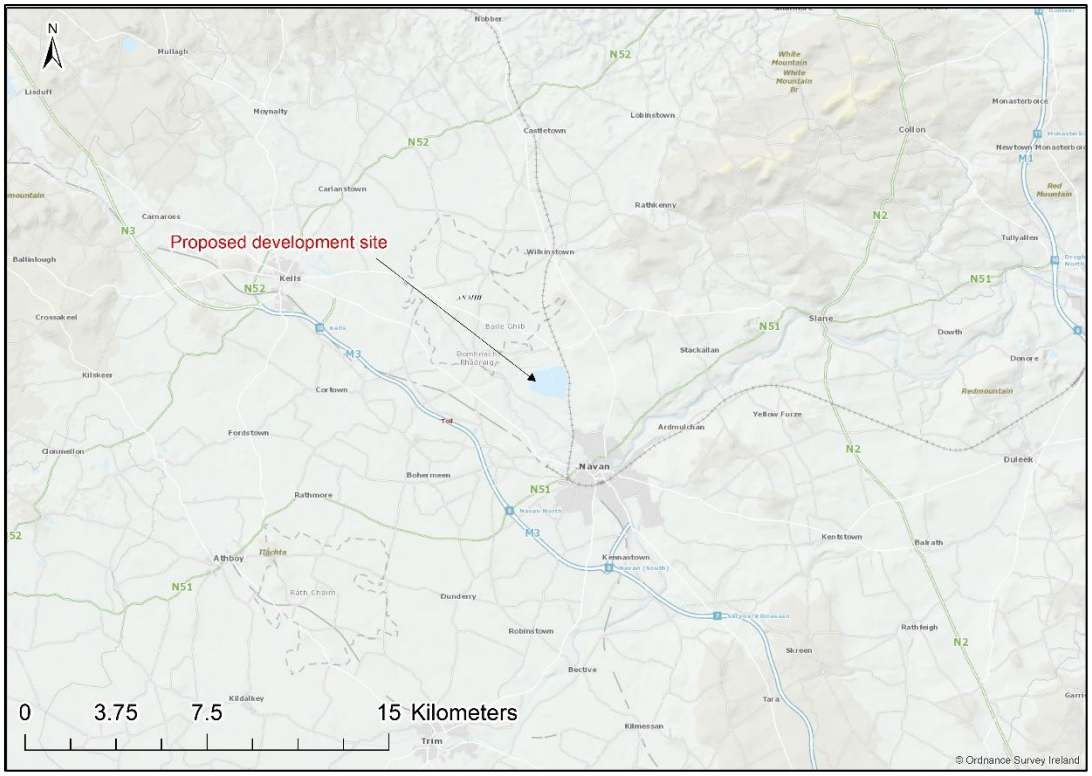

Figure 8: Location 1 in 150,000

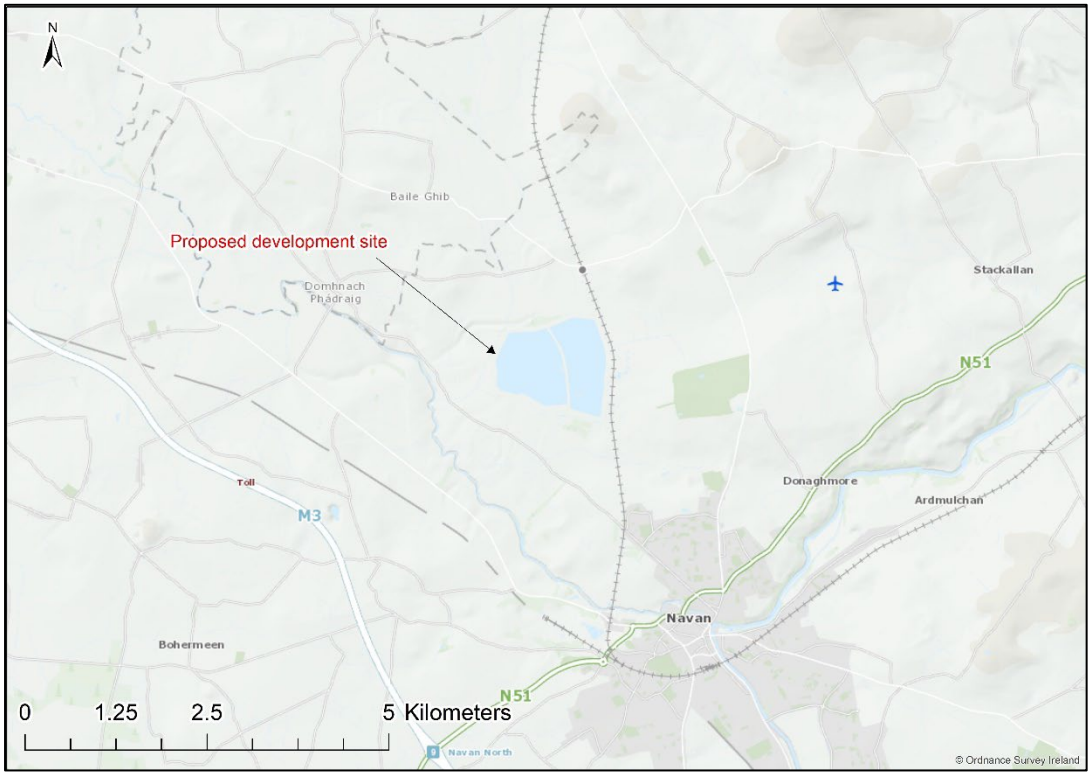

Figure 9: Location 1 in 50:000

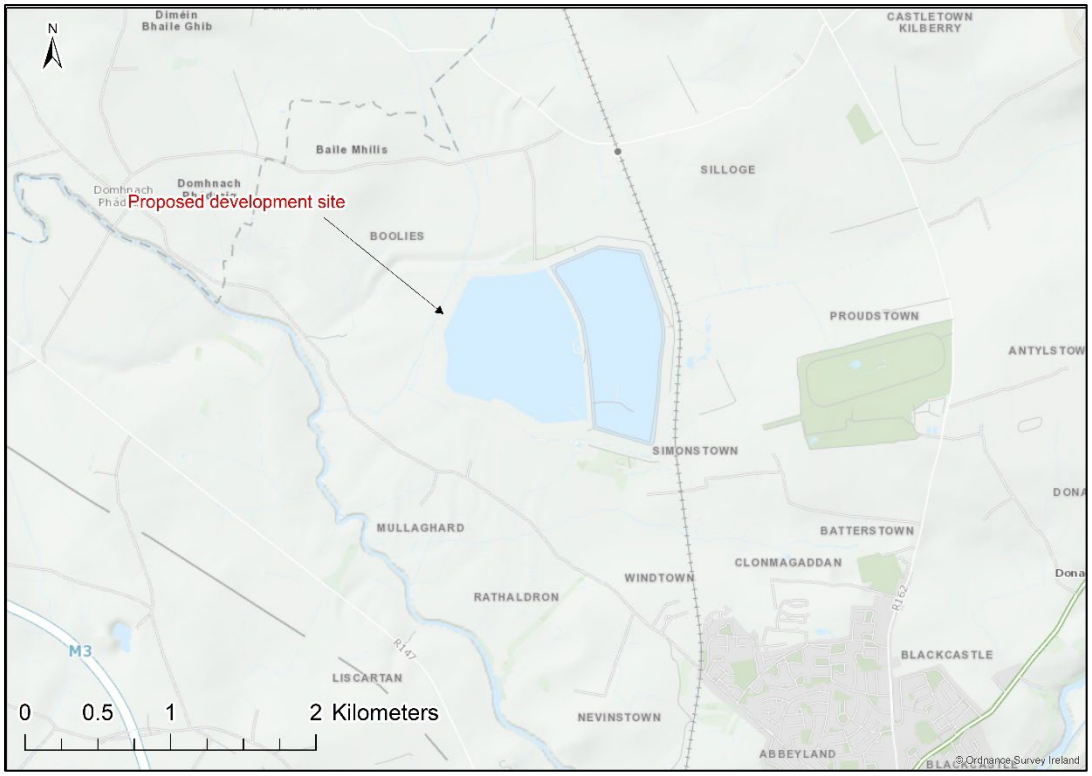

Figure 10: Location 1:25,000

Figure 11: Satellite imagery indicating approximate location of proposed works (1:12,500)

Figure 12: Satellite imagery overlain with approximate location of proposed development, Yellow River and Simonstown stream

2.4 Description of scope

The geographical scope of the assessment is to determine if the proposed works/development has the potential to have any significant negative impact on the Natura 2000 sites occurring within 15 km of the proposed development.

The NBDC database was accessed on to query records occurring within the vicinity of the proposed development (2 km squares, N87K and N87L see Figure 13). The species of conservation concern as recorded within these 2 km squares are illustrated in Table 1.

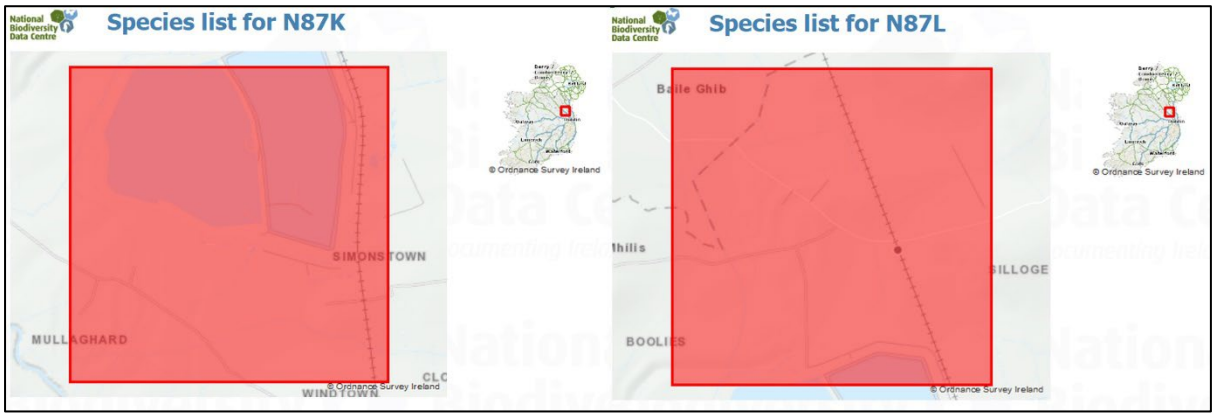

Figure 13: Location of 2km squares queried (National Biodiversity Data Centre)

Table 1: Species of conservation concern recorded in the vicinity of the proposed development site

Scientific Name	**Common Name**
Alauda arvensis	Sky Lark
Aloina aloides	Common Aloe-moss
Anas crecca	Eurasian Teal
Anas platyrhynchos	Mallard
Aneura pinguis	Greasewort
Anser anser	Greylag Goose
Apus apus	Common Swift
Aythya ferina	Common Pochard
Barbula convoluta	Lesser Bird's-claw Beard-moss
Barbula unguiculata	Bird's-claw Beard-moss
Bombus (Melanobombus) lapidarius	Large Red Tailed Bumble Bee
Brachythecium rutabulum	Rough-stalked Feather-moss
Bryum argenteum	Silver-moss
Bryum dichotomum	Bryum dichotomum
Calidris alpina	Dunlin

Scientific Name	**Common Name**
Calliergonella cuspidata	Pointed Spear-moss
Carduelis cannabina	Common Linnet
Cornu aspersum	Common Garden Snail
Cratoneuron filicinum	Fern-leaved Hook-moss
Cygnus cygnus	Whooper Swan
Cygnus olor	Mute Swan
Delichon urbicum	House Martin
Dicranella varia	Variable Forklet-moss
Emberiza citrinella	Yellowhammer
Falco tinnunculus	Common Kestrel
Gallinago gallinago	Common Snipe
Hirundo rustica	Barn Swallow
Larus argentatus	Herring Gull
Larus fuscus	Lesser Black-backed Gull
Larus marinus	Great Black-backed Gull
Larus ridibundus	Black-headed Gull
Lutra lutra	European Otter
Meles meles	Eurasian Badger
Mergus merganser	Goosander
Numenius arquata	Eurasian Curlew
Passer montanus	Eurasian Tree Sparrow
Perdix perdix	Grey Partridge
Pluvialis apricaria	European Golden Plover
Pseudocrossidium hornschuchianum	Hornschuch's Beard-moss
Riparia riparia	Sand Martin
Sturnus vulgaris	Common Starling
Tachybaptus ruficollis	Little Grebe
Tandonia budapestensis	Budapest Slug
Vanellus vanellus	Northern Lapwing
Vertigo pygmaea	Common Whorl Snail

There are several additional species of conservation concern recorded recently utilising the habitats occurring at the Tailings Facility, including numerous species of bat. Several Annex II and Annex IV species (Habitats Directive) and Annex I species (Birds Directive) are known to occur in the vicinity of the proposed works.

2.5 Identification of Natura 2000 sites potentially impacted upon by the development

It is general practice, when screening a plan or project for compliance with the Habitats Directive, to identify all Natura 2000 sites within the functional area of the plan/project itself and within 15 km of the boundaries of the area the plan/project applies to (with an appropriate "Zone of Influence" identified from any Source-Pathway-Receptor linkages). This approach is currently recommended in the Department of the Environmental, Heritage and Local Government's document Guidance for Planning Authorities and as a precautionary measure, to ensure that all potentially affected Natura 2000 sites are included in the screening process. The maintenance of habitats and species within individual Natura 2000 sites at favourable conservation condition contributes to the overall maintenance of favourable conservation status of those habitats and species at a national level. It is therefore necessary to identify any potential impacts of the proposed development on the conservation status of Natura 2000 sites. The National Parks and Wildlife Service deem that the favourable conservation status of a habitat is achieved when:

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

The National Parks and Wildlife Service deem that the favourable conservation status of a species is achieved when:

- Population data on the species concerned indicate that it is maintaining itself.
- The natural range of the species is neither being reduced, or likely to be reduced in the foreseeable future.
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

There are two areas designated as a special area of conservation (SAC) and one area designated as a Special Protection Area within 15 km of the proposed development (See Table 2, Figure 14 and Figure 15).

Table 2: Natura 2000 sites within 15km of the proposed development

SITE CODE	DESIGNATION	SITE NAME
002203	SAC	GIRLEY (DREWSTOWN) BOG SAC
002299	SAC	RIVER BOYNE AND RIVER BLACKWATER SAC
004232	SPA	RIVER BOYNE AND RIVER BLACKWATER SPA

.

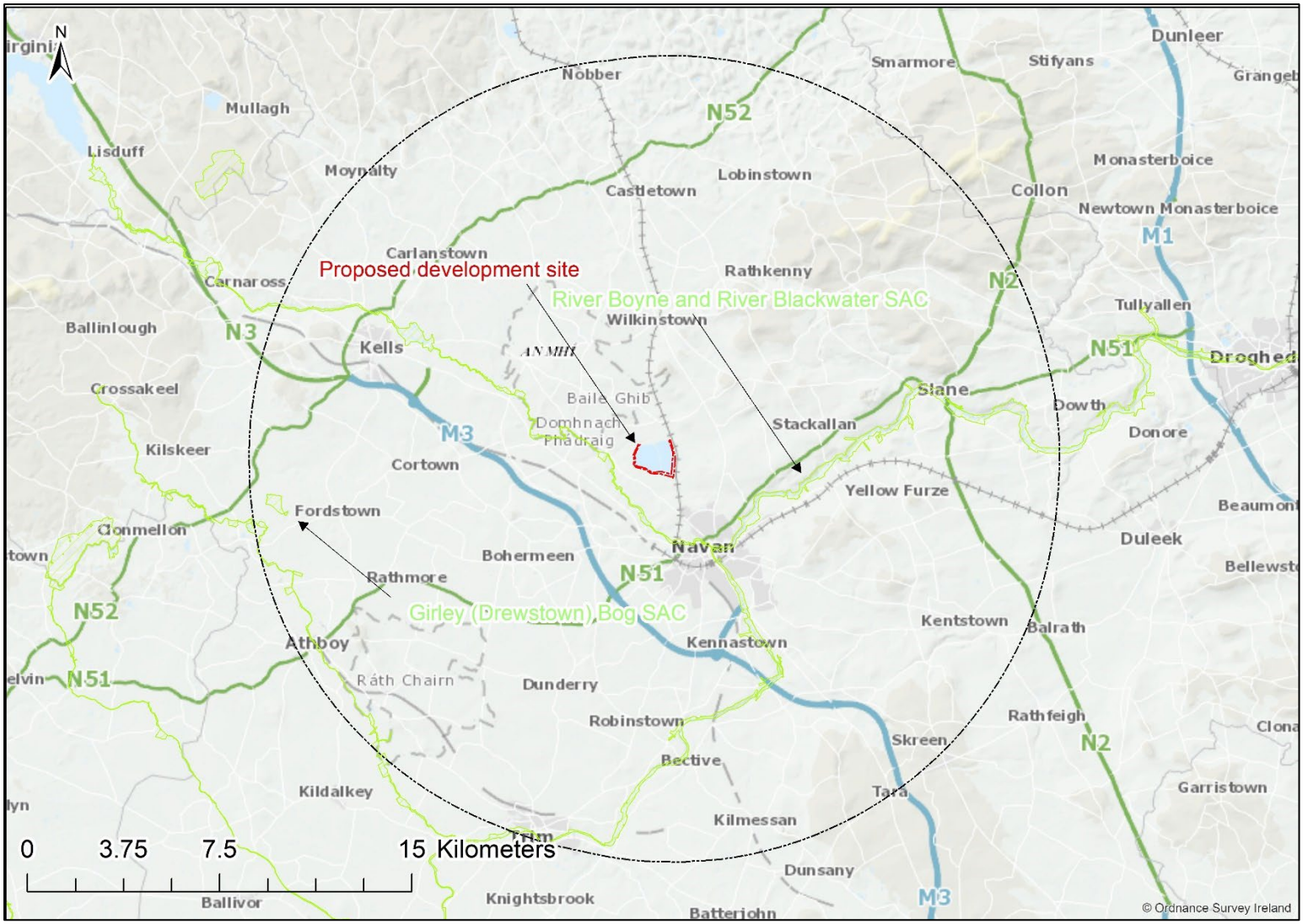

Figure 14: Location of SACs within 15 km of proposed development

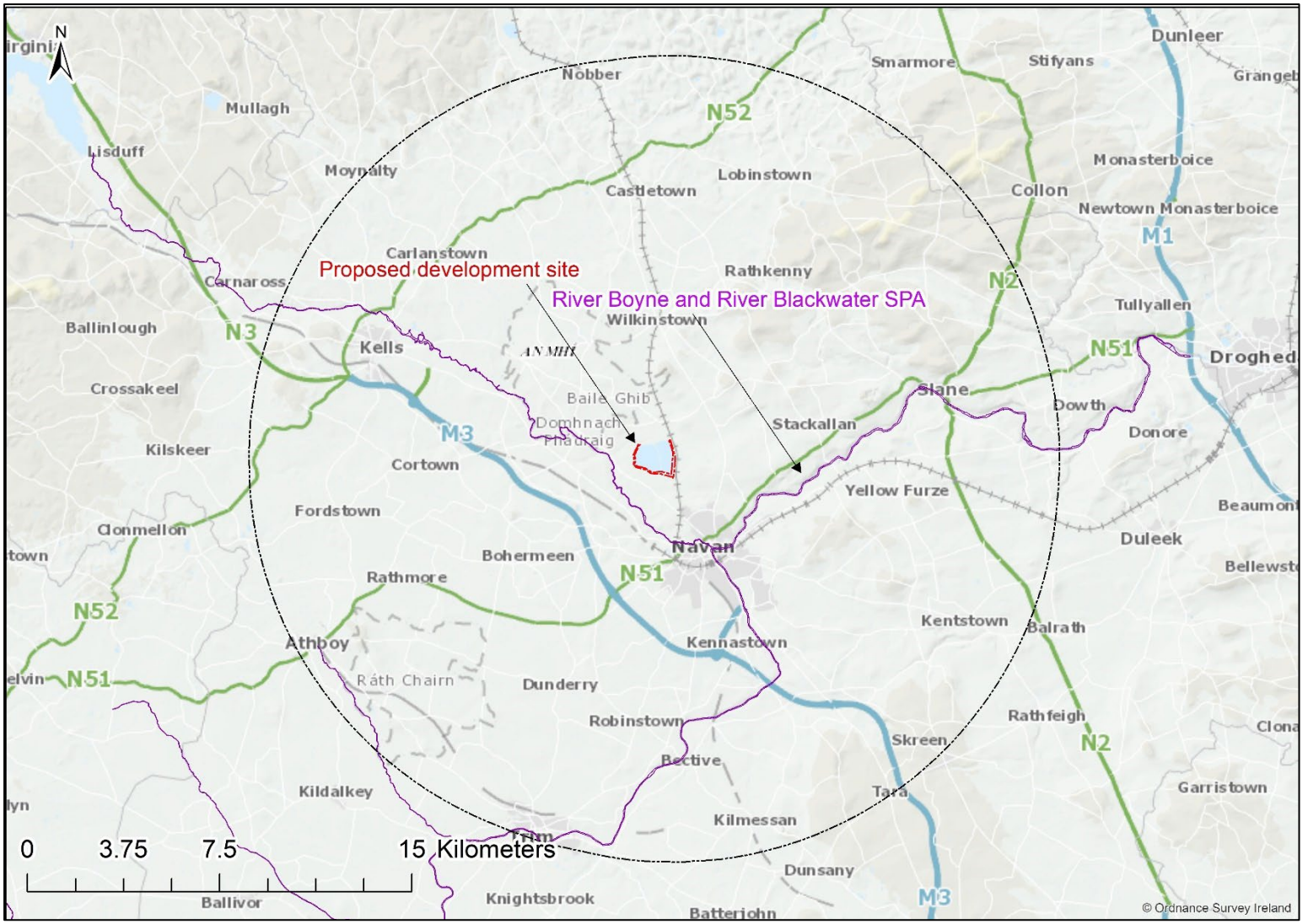

Figure 15: Location of SPAs within 15 km of the proposed development location

2.6 Description of Natura 2000 sites potentially impacted upon by the proposed development

It is the goal of NPWS to draw up conservation plans for all areas designated for nature conservation, and that these plans will, among other things, set clear objectives for the conservation of the features of interest within a site. Where a detailed Conservation Objectives Document is not available, NPWS have provided a site synopsis, generic Conservation Objectives and a Natura 2000 data form from which information is sourced.

In this section, the Natura 2000 sites potentially impacted upon by the proposed development are described according to:

1) General description of the site;
2) Qualifying Interests (QI) of the site;
3) Threats, pressures and activities with negative impacts on the site;
4) Conservation Objectives of the site; and
5) Conservation status of the site.

The codes utilized within the Natura 2000 forms are available from http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

2.6.1 Girley (Drewstown) Bog SAC (Site synopsis version date 14/09/2017, Natura 2000 form update 06/2015, Conservation Objectives Version 1.0)

2.6.1.1 General Description

Girley (Drewstown) Bog (002203) consists of 32.26 ha of raised bog (15.05 ha of high bog and 17.21 ha of cutover bog) which occupies the south-western part of Girley Bog NHA (001580). Girley Bog is a Midland type raised bog developed in a basin. The SAC is bounded by open high bog on its northern and eastern sides, by agricultural land on its western side and by cutover bog with forestry on its southern side. Most of the SAC, and all of the high bog included in the SAC, was completely covered by coniferous forestry, which has been recently clear-felled as part of the restoration program for the site. Most of the conifers in the SAC were removed and the associated intensive drainage system was blocked by 2013 as part of an EU LIFE funded Coillte project (Demonstrating Best Practice in Raised Bog Restoration in Ireland) so as to raise the water table and restore Active Raised Bog (ARB) on the site. With the clear-felling of conifers and blocking of drains, water-levels have risen and remain high throughout most of the year. As a consequence, raised bog vegetation, including typical sphagnum

species, has returned to the wetter areas of the high bog. Overall, the high bog appears to be re-wetting with limited areas of wet flats and hummock/hollows. However, the majority of the restored areas have not yet developed vegetation characteristic of the wettest conditions and there is a considerable amount of conifer and birch regeneration occurring in these areas. Two areas in the north-east of the site covering 2.28 ha have been identified by hydrological modelling as Degraded Raised Bog (7120) (DRB) habitat. They now have standing surface water in the hollows and pools for most of the year with considerable areas of rapidly regenerating bog mosses. These wet areas with regenerating Sphagnum moss are expected to develop into Active Raised Bog habitat within 20 years. However, to ensure that these areas reach their full potential it will be necessary to block the boundary drains in consultation with other stakeholders. The cutover bog to the south of the site is generally drier and is developing into wet and dry woodland dominated currently by Downy Birch scrub with occasional conifers from the former plantation. Cherry Laurel, Rhododendron and conifers are regenerating strongly in this area and are subject to ongoing control programs. The Degraded Raised Bog in Girley (Drewstown) Bog SAC is of conservation significance as it has the potential for restoration to Active Raised Bog which is a priority habitat in the EU and one that is scarce and under threat in Ireland. Despite the relatively small area of Degraded Raised Bog present the restoration actions have resulted in active redevelopment of the habitat towards Active Raised Bog which add significantly to the diversity and scientific value of the site. The site is being actively managed for conservation as part of the Coillte EU LIFE Project and most of the required restoration measures have already been carried out. However, some significant threats remain and an After LIFE management plan is being developed for the future conservation management of the SAC. The SAC is located within the raised bog Girley Bog NHA (001580) the conservation management of which should support the maintenance and improvement of Degraded Raised Bog in the SAC. It is estimated that restoration works carried out on the SAC will in turn benefit the conservation of 0.5 ha of Active Raised Bog and the restoration of 0.5 ha of Degraded Raised Bog in the adjacent area of Girley Bog NHA (001580).

A detailed Conservation Objectives document has been prepared and is available at https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002203.pdf

2.6.1.2 Qualifying Interests

The qualifying interests for this site are:

- [7120] Degraded raised bogs still capable of natural regeneration.

2.6.1.3 Threats, pressures and activities with negative impacts on the site

Details as to the threats, pressures and activities with negative impacts on the site are identified from the Natura 2000 data form for the sites and are illustrated in Table 3.

Table 3: Threats, pressures and activities with impacts on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	J02.15		b
M	I01		b
M	I02		b
M	J01.01		b

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
H	B02.02		i
M	I02		b
H	J02.01		i
M	J02.15		b
M	I01		b

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification, T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

2.6.1.4 Conservation Objectives of the site

The generic Conservation Objective of this site is to maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected. More detailed conservation objectives are presented in the Conservation Objectives Document.

Table 4: Conservation Objectives for [7120]

Conservation Objectives for : Girley (Drewstown) Bog SAC [002203]

7120 Degraded raised bogs still capable of natural regeneration

To restore the favourable conservation condition of Degraded raised bogs still capable of natural regeneration in Girley (Drewstown) Bog SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Restore area of active raised bog to 3.3ha, subject to natural processes	Active Raised Bog (ARB) habitat has not been recently recorded within the boundary of Girley (Drewstown) Bog SAC. The area of Degraded Raised Bog (DRB) on the high bog has been estimated as being 2.3ha. Eco-hydrological assessments of the cutover estimate that an additional 1ha of bog forming habitats could be restored. The long term target for ARB is therefore 3.3ha. See raised bog supporting document for further details on this and following attributes
Habitat distribution	Occurrence	Restore the distribution and variability of active raised bog across the SAC. See map 2 for distribution of potential ARB	DRB corresponds to those areas of high bog where the hydrology has been adversely affected by peat cutting, drainage, afforestation and other land use activities, but which are capable of regeneration to ARB within 30 years (see area target above)
High bog area	Hectares	No decline in extent of high bog, subject to the conservation requirements of the SAC necessary to support the development and maintenance of active raised bog. See map 2	The area of high bog within Girley (Drewstown) Bog SAC in 2014 (latest figure available) was 21.9ha (NPWS, 2017)
Hydrological regime: water levels	Centimetres	Restore appropriate water levels throughout the site	For DRB to be restored to ARB, mean water level needs to be near or above the surface of the bog lawns for most of the year. Seasonal fluctuations should not exceed 20cm, and should only be 10cm below the surface, for very short periods of time. Open water is often characteristic of soak systems
Hydrological regime: flow patterns	Flow direction; slope	Restore, where possible, appropriate high bog topography, flow directions and slopes. See map 3 for current situation	The restoration of DRB to ARB depends on mean water levels being near or above the surface of bog lawns for most of the year. Long and gentle slopes are the most favourable to achieve these conditions. Changes to flow directions due to subsidence of bogs can radically change water regimes and cause drying out of higher quality DRB areas and soak systems
Transitional areas between high bog and adjacent mineral soils (including cutover areas)	Hectares; distribution	Restore adequate transitional areas to support / protect the active raised bog ecosystem and the services it provides	The cutover bog to the south of the site is generally drier and is developing into wet and dry woodland dominated currently by downy birch (*Betula pubescens*) scrub with occasional conifers from the former plantation. Cherry laurel *Prunus laurocerasus*; rhododendron (*Rhododendron ponticum*) and conifers are regenerating strongly in this area and are subject to ongoing control programs
Vegetation quality: central ecotope, active flush, soaks, bog woodland	Hectares	Restore 1.6ha of central ecotope/active flush/soaks/bog woodland as appropriate as appropriate	At least 50% of ARB habitat should comprise high quality ARB habitat such as central ecotope, active flush, soaks and bog woodland. Target area of ARB for the site has been set at 3.3ha (see area target above)
Vegetation quality: microtopographical features	Hectares	Restore adequate cover of high quality microtopographical features	As a result of restoration efforts, the high bog appears to be re-wetting with limited areas of wet flats and hummock/hollows
Vegetation quality: bog moss (*Sphagnum*) species	Percentage cover	Restore adequate cover of bog moss (*Sphagnum*) species to ensure peat-forming capacity	*Sphagnum* cover varies naturally across Ireland with relatively high cover in the east to lower cover in the west. Hummock forming species such as *Sphagnum austinii* are particularly good peat formers. *Sphagnum* cover and distribution also varies naturally across a site
Typical species: flora	Occurrence	Restore, where appropriate, typical active raised bog flora	Typical flora species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Typical species: fauna	Occurrence	Restore, where appropriate, typical active raised bog fauna	Typical fauna species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Elements of local distinctiveness	Occurrence	Maintain features of local distinctiveness, subject to natural processes	Despite the relatively small area of DRB present the restoration actions have resulted in active redevelopment of the habitat towards ARB which add significantly to the diversity and scientific value of the site
Negative physical indicators	Percentage cover	Negative physical features absent or insignificant	Negative physical indicators include: bare peat, algae dominated pools and hollows, marginal cracks, tear patterns, subsidence features such as dry mineral mounds/ridges emerging or expanding, and burning evidence. Bare peat has been recorded along some of the bog margins (Derwin & MacGowan 2000; Denyer 2014)
Vegetation composition: native negative indicator species	Percentage cover	Native negative indicator species at insignificant levels	The majority of the restored areas have not yet developed vegetation characteristic of the wettest conditions and there is considerable amount of conifer and birch regeneration occurring in these areas. The cutover bog to the south of the site is generally drier and is developing into wet and dry woodland dominated currently by downy birch (*Betula pubescens*) scrub with occasional conifers from the former plantation
Vegetation composition: non-native invasive species	Percentage cover	Non-native invasive species at insignificant levels and not more than 1% cover	The most common non-native invasive species of raised bogs include lodgepole pine (*Pinus contorta*), rhododendron (*Rhododendron ponticum*), and pitcherplant (*Sarracenia purpurea*) (Cross, 1990). At this site Cherry laurel (*Prunus laurocerasus*), rhododendron and conifers are regenerating on the cutover and are subject to ongoing control programs
Air quality: nitrogen deposition	kg N/ha/year	Air quality surrounding bog close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr	Change in air quality can result from fertiliser drift; adjacent quarry activities; or other atmospheric inputs. The critical load range for ombrotrophic bogs has been set as between 5 and 10kg N/ha/yr (Bobbink and Hettelingh, 2011). The latest N deposition figures for the area around Girley (Drewstown) Bog suggests that the current level is approximately 15.4kg N/ha/yr (Henry and Aherne, 2014)
Water quality	Hydrochemical measures	Water quality on the high bog and in transitional areas close to natural reference conditions	Water chemistry within raised bogs is influenced by atmospheric inputs (e.g. rainwater). However, within soak systems, water chemistry is influenced by other inputs such as focused flow or interaction with underlying substrates. Water chemistry in areas surrounding the high bog varies due to influences of different water types (bog water, regional groundwater, and runoff from surrounding mineral lands)

2.6.1.5 Baseline Conservation Status of the site

A synopsis of the conservation status of this site is provided in Table 5.

Table 5: Habitat types present on site and assessment for them

Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A|B|C|D	A|B|C		
						Representativity	Relative Surface	Conservation	Global
7120			2.28		G	B	C	C	B

2.6.2 River Boyne and River Blackwater SAC (Site synopsis version date 06/01/2014, Natura 2000 form update 09/19, Conservation Objectives Version 1)

2.6.2.1 General Description

This site comprises most of the freshwater element of the River Boyne from upriver of the Boyne Aqueduct at Drogheda, the Blackwater River as far as Lough Ramor and the principal Boyne tributaries, notably the Deel, Stoneyford and Tremblestown Rivers. This system drains a considerable area of Cos. Meath and Westmeath and smaller areas of Cavan and Louth. The underlying geology is Carboniferous Limestone for the most part with areas of Upper, Lower and Middle well represented. In the vicinity of Kells Silurian Quartzite is present while close to Trim are Carboniferous Shales and Sandstones. The rivers flow through a landscape dominated by intensive agriculture, mostly of improved grassland but also cereals. Much of the river channels were subject to arterial drainage schemes in the past. Natural floodplains now exist along only limited stretches of river, though often there is a fringe of reed swamp, freshwater marsh, wet grassland or deciduous wet woodland. Along some parts, notably between Drogheda and Slane, are stands of tall, mature mixed woodland. Substantial areas of improved grassland and arable land are included in site for water quality reasons. There are many medium to large sized towns adjacent to but not within the site.

The main channel of the Boyne contains a good example of alluvial woodland of the *Salicetum albo-fragilis* type which has developed on three alluvium islands. Alkaline fen vegetation is well represented at Lough Shesk, where there is a very fine example of habitat succession from open water to raised

bog. The Boyne and its tributaries is one of Ireland's premier game fisheries and offers a wide range of angling, from fishing for spring salmon and grilse to sea trout fishing and extensive brown trout fishing. The site is one of the most important in eastern Ireland for *Salmo salar* and has very extensive spawning grounds. The site also has an important population of *Lampetra fluviatilis*, though the distribution or abundance of this species is not well known. *Lutra lutra* is widespread throughout the site. Some of the grassland areas along the Boyne and Blackwater are used by a nationally important winter flock of *Cygnus cygnus*. Several Red Data Book plants occur within the site, with *Pyrola rotundifolia*, *Poa palustris* and *Juncus compressus*. Also occurring are a number of Red Data Book animals, notably *Meles meles*, *Martes martes* and *Rana temporaria*. The River Boyne is a designated Salmonid Water under the EU Freshwater Fish Directive.

2.6.2.2 Qualifying Interests

The qualifying interests for this site are indicated in Table 6

Table 6

Qualifying Interests

** indicates a priority habitat under the Habitats Directive*

002299	River Boyne and River Blackwater SAC
1099	River Lamprey *Lampetra fluviatilis*
1106	Salmon *Salmo salar*
1355	Otter *Lutra lutra*
7230	Alkaline fens
91E0	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)*

2.6.2.3 Threats, pressures and activities with negative impacts on the site

Details as to the threats, pressures and activities with negative impacts on the site are identified from the Natura 2000 data form for the sites and are illustrated in Table 7.

Table 7: Threats, pressures and activities with impacts on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i|o|b]
M	G02.10		i
H	H01		i
L	D01.05		i
M	A07		i
M	A08		i
M	A05.02		o
L	G01		i
H	J02.15		i
M	A01		i
M	A10.01		i
M	C01.01		i
L	G05.06		i
L	G05		i
M	A10.01		i
M	E05		i
M	E01.04		i
M	J02.11		i
M	J02.10		i
M	D01.02		i
M	E03.02		i
H	E03.04		i
M	J02		i
H	E02		i
H	I01		i
M	B01.02		i

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i|o|b]
M	A03		i
H	J02.05.02		i

Rank: H = high, M = medium, L = low
Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,
T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions
i = inside, o = outside, b = both

2.6.2.4 Conservation Objectives of the site

A detailed Conservation Objectives document for this site has been prepared and is available at:

https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002299.pdf

The Conservation Objectives for this site are outlined in Table 8, Table 9, Table 10, Table 11 and Table 12

Table 8: Conservation Objectives for [7230]

Conservation Objectives for : River Boyne and River Blackwater SAC [002299]

7230 Alkaline fens

To maintain the favourable conservation condition of Alkaline fens in River Boyne and River Blackwater SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Alkaline fen has not been mapped in detail for River Boyne and River Blackwater SAC and thus the exact total current area of the qualifying habitat in the SAC is currently unknown. The main areas of alkaline fen in the SAC are documented to occur in the vicinity of Lough Shesk, Freekan Lough, Newtown Lough in the upper reaches of the Stonyford River. At Lough Shesk, the habitat is particularly well-represented and there is a good example of succession from open water to fen-type habitat (NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes	See the notes for habitat area above
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil pH and nutrient status within natural ranges	Relevant nutrients and their natural ranges are yet to be defined. However, nitrogen deposition is noted as being relevant to this habitat in NPWS (2013). See also Bobbink and Hettelingh (2011). Increased nutrients can lead to changes in plant and invertebrate species through competition and subsequent structural changes to micro-habitat. These nutrients favour growth of grasses rather than forbs and mosses and leads to a higher and denser sward
Ecosystem function: peat formation	Percentage cover of peat-forming vegetation and water table levels	Maintain active peat formation, where appropriate	In order for peat to form, water levels need to be slightly below or above the soil surface for c.90% of the time
Ecosystem function: hydrology - groundwater levels	Water levels (centimetres); duration of levels; hydraulic gradients; water supply	Maintain, or where necessary restore, appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	Fen habitats require high groundwater levels (i.e. water levels at or above the ground surface) for a large proportion of the calendar year (i.e. duration of mean groundwater level). Fen groundwater levels are controlled by regional groundwater levels in the contributing catchment area (which sustain the hydraulic gradients of the fen groundwater table). Regional abstraction of groundwater may affect fen groundwater levels
Ecosystem function: hydrology - surface water flow	Drain density and form	Maintain, or where necessary restore, as close as possible to natural or semi-natural, drainage conditions	Drainage, either within or surrounding the fen habitat, can result in the drawdown of the groundwater table. The depth, geometry and density of drainage (hydromorphology) will indicate the scale and impact on fen hydrology. Drainage can result in loss of characteristic species and transition to drier habitats
Ecosystem function: water quality	Various	Maintain appropriate water quality, particularly pH and nutrient levels, to support the natural structure and functioning of the habitat	Fens receive natural levels of nutrients (e.g. iron, magnesium and calcium) from water sources. However, they are generally poor in nitrogen and phosphorus, with the latter tending to be the limiting nutrient under natural conditions. Water supply should be also relatively calcium-rich
Vegetation composition: community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	The entire diversity of alkaline fen vegetation communities present in the SAC is currently unknown. Information on the vegetation communities associated with alkaline fens is provided by O'Neill et al. (in prep.). See also the Irish Vegetation Classification (Perrin, 2018; www.biodiversityireland.ie/projects/ivc-classification-explorer)

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Vegetation composition: typical brown mosses	Percentage cover at a representative number of monitoring stops	Maintain adequate cover of typical brown moss species	For lists of typical bryophyte species, including high quality indicator species, see O'Neill et al. (in prep.). Species recorded at Lough Shesk and Newtown Lough include: *Calliergon giganteum, Scorpidium scorpioides, Campylium stellatum, Bryum pseudotriquetrum, Fissidens adianthoides, Scorpidium scorpioides, Calliergonella cuspidata* and *Ctenidium molluscum* (NPWS internal files)
Vegetation composition: typical vascular plants	Percentage cover at a representative number of monitoring stops	Maintain adequate cover of typical vascular plant species	For lists of typical vascular plant species for the different vegetation communities, including high quality indicators, see O'Neill et al. (in prep.). Typical species recorded in the habitat in the SAC include black bog-rush (*Schoenus nigricans*), dioecious sedge (*C. dioica*) and common butterwort (*Pinguicula vulgaris*) (NPWS internal files)
Vegetation composition: native negative indicator species	Percentage cover at a representative number of monitoring stops	Cover of native negative indicator species at insignificant levels	Negative indicators include species not characteristic of the habitat and species indicative of undesirable activities such as overgrazing, undergrazing, nutrient enrichment, agricultural improvement or impacts on hydrology. Native negative indicators may include *Anthoxanthum odoratum, Epilobium hirsutum, Holcus lanatus, Juncus effusus, Phragmites australis* and *Ranunculus repens*. See O'Neill et al. (in prep.)
Vegetation composition: non-native species	Percentage cover at a representative number of monitoring stops	Cover of non-native species less than 1%	Attribute and target based on O'Neill et al. (in prep.). Non-native species can be invasive and have deleterious effects on native vegetation. A low target is set as non-native species can spread rapidly and are most easily dealt with when still at lower abundances
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on O'Neill et al. (in prep.). Scrub and trees will tend to invade if fen conditions become drier
Vegetation composition: algal cover	Percentage cover at, and in local vicinity of, a representative number of monitoring stops	Cover of algae less than 2%	Attribute and target based on O'Neill et al. (in prep.). Algal cover is indicative of nutrient enrichment from multiple sources (McBride et al., 2011)
Vegetation structure: vegetation height	Percentage cover at a representative number of monitoring stops	At least 50% of the live leaves/flowering shoots are more than either 5cm or 15cm above ground surface depending on community type	Attribute and target based on O'Neill et al. (in prep.). While grazing may be appropriate in this habitat, excessive grazing can reduce the ability of plant species to regenerate reproductively and maintain species diversity, especially if flowering shoots are cropped during the growing season
Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of monitoring stops	Cover of disturbed bare ground not more than 10%	Attribute and target based on O'Neill et al. (in prep.). While grazing may be appropriate in this habitat, excessive areas of disturbed bare ground may develop due to unsuitable grazing regimes. Disturbance can include hoof marks, wallows, human footprints, vehicle and machinery tracks. Excessive disturbance can result in loss of characteristic species and presage erosion for peatlands
Physical structure: tufa formations	Percentage cover in local vicinity of a representative number of monitoring stops	Disturbed proportion of vegetation cover where tufa is present is less than 1%	Attribute and target based on O'Neill et al. (in prep.)
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat; maintain features of local distinctiveness, subject to natural processes	This includes species on the Flora (Protection) Order, 2015 and/or Red Lists (Byrne et al., 2009; Regan et al., 2010; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.). The Near Threatened species (Wyse Jackson et al., 2016) round-leaved wintergreen (*Pyrola rotundifolia*) has been recorded in the habitat around Newtown Lough in the SAC (NPWS internal files)
Transitional areas between fen and adjacent habitats	Hectares; distribution	Maintain adequate transitional areas to support/protect the alkaline fen ecosystem and the services it provides	In many cases, fens transition to other wetland habitats. It is important that the transitional areas between fens and other habitats are maintained in as natural condition as possible in order to protect the functioning of the fen

Table 9: Conservation Objectives for [91E0]

Conservation Objectives for : River Boyne and River Blackwater SAC [002299]

91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)*

To restore the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)* in River Boyne and River Blackwater SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes. See map 3 for surveyed woodland areas	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)* is present within River Boyne and River Blackwater SAC. As part of the National Survey of Native Woodlands (NSNW), the sub-sites Grove Island (NSNW site code 688) and Yellow Island (752) were surveyed by Perrin et al. (2008). Yellow Island (code 752) was also included in national monitoring surveys (O'Neill and Barron, 2013; Daly et al., in prep.). Map 3 shows the minimum area of alluvial forests within the SAC, which is estimated to be 16.7ha (Perrin et al., 2008; Daly et al., in prep.). It is important to note that further unsurveyed areas may be present within the SAC
Habitat distribution	Occurrence	No decline, subject to natural processes. The surveyed woodland locations are shown on map 3	Distribution based on Perrin et al. (2008) and Daly et al. (in prep.). It is important to note that further unsurveyed areas may be present within the SAC
Woodland size	Hectares	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and "small" woods at least 3ha in size	The target areas for individual woodlands aim to reduce habitat fragmentation and benefit those species requiring 'deep' woodland conditions (Peterken, 2002). In some cases, topographical constraints may restrict expansion
Woodland structure: cover and height	Percentage; metres; centimetres	Total canopy cover at least 30%; median canopy height at least 7m; native shrub layer cover 10-75%; native herb/dwarf shrub layer cover at least 20% and height at least 20cm; bryophyte cover at least 4%	The target aims for a diverse structure with a canopy containing mature trees, shrub layer with semi-mature trees and shrubs, and well-developed field layer (herbs, graminoids and dwarf shrubs) and ground layer (bryophytes). Assessment criteria are described in Daly et al. (in prep.) and O'Neill and Barron (2013)
Woodland structure: community diversity and extent	Hectares	Maintain diversity and extent of community types	The Boyne River Islands are an example of gallery forests of willows (Salicion albae), which occur alongside river channels and on river islands, where tree roots are almost continuously submerged (Daly et al., in prep.). Grove Island (NSNW site code 688) and Yellow Island (752) were assigned by Perrin et al. (2008) to the *Salix triandra – Urtica dioica* vegetation type (2h) of the *Fraxinus excelsior – Hedera helix* group. This corresponds to the *Salix fragilis – Calystegia sepium* sub-community (WL3Di) of the Irish Vegetation Classification (Perrin, 2016; www.biodiversityireland.ie/projects/ivc-classification-explorer)
Woodland structure: natural regeneration	Seedling: sapling: pole ratio	Seedlings, saplings and pole age-classes of target species for 91E0* woodlands and other native tree species occur in adequate proportions to ensure survival of woodland canopy	The target species for 91E0* are alder (*Alnus glutinosa*), ash (*Fraxinus excelsior*) and willows (*Salix* spp.). Assessment criteria are described in Daly et al. (in prep.) and O'Neill and Barron (2013)

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Hydrological regime: flooding depth/height of water table	Metres	Appropriate hydrological regime necessary for maintenance of alluvial vegetation	Periodic flooding is essential to maintain alluvial woodlands along river and lake floodplains, but not for woodland around springs/seepage areas. Much of the river channel within the SAC was subject to arterial drainage schemes. Natural flood-plains now exist along only limited stretches of river (NPWS internal files)
Woodland structure: dead wood	Number per hectare	At least 19 stems/ha of dead wood of at least 20cm diameter	Dead wood is a valuable resource and an integral part of a healthy, functioning woodland ecosystem
Woodland structure: veteran trees	Number per hectare	No decline	Veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources
Woodland structure: indicators of local distinctiveness	Occurrence; population size	No decline in distribution and, in the case of red listed and other rare or localised species, population size	Includes ancient or long-established woodlands (see Perrin and Daly, 2010), archaeological and geological features as well as red listed and other rare or localised species
Woodland structure: indicators of overgrazing	Occurrence	All five indicators of overgrazing absent	There are five indicators of overgrazing within 91E0*: topiary effect on shrubs and young trees, browse line on mature trees, abundant dung, severe recent bark stripping, and trampling (Daly et al., in prep.)
Vegetation composition: native tree cover	Percentage	No decline. Native tree cover at least 90% of canopy; target species cover at least 50% of canopy	The target species for 91E0* are alder (*Alnus glutinosa*), ash (*Fraxinus excelsior*) and willows (*Salix* spp.) (Daly et al., in prep.; O'Neill and Barron, 2013)
Vegetation composition: typical species	Occurrence	At least 1 target species for 91E0* woodlands present; at least 6 positive indicator species for 91E0* woodlands present	A variety of typical native species should be present, depending on woodland type. The target species for 91E0* are alder (*Alnus glutinosa*), ash (*Fraxinus excelsior*) and willows (*Salix* spp.). Positive indicator species for 91E0* are listed in Daly et al. (in prep.) and O'Neill and Barron (2013)
Vegetation composition: negative indicator species	Occurrence	Negative indicator species cover not greater than 10%; regeneration of negative indicator species absent	Negative indicator species (i.e. any non-native species, including herbaceous species) should be absent or under control. The canopy at Grove Island (NSNW site code 688) and Yellow Island (752) is dominated by a range of *Salix* spp. (*S. cinerea, S. triandra, S. fragilis, S. viminalis*) (Perrin et al., 2008). Although the latter two are not native to Ireland, an exception is made for these species where they occur within gallery woodland (Daly et al., in prep.). Perrin et al. (2008) recorded some sycamore (*Acer pseudoplatanus*) in the canopy at Grove Island (NSNW site code 688). Daly et al. (in prep.) found that the recent arrival of the invasive non-native herb Himalayan balsam (*Impatiens glandulifera*) at Yellow Island (752) has caused significant negative impacts to the alluvial forest habitat
Vegetation composition: problematic native species	Percentage	Cover of common nettle (*Urtica dioica*) less than 75%	Common nettle (*Urtica dioica*) is a positive indicator species for 91E0* but, in some cases, it may become excessively dominant. Increased light and nutrient enrichment are factors which favour proliferation of common nettle (Daly et al., in prep.)

Table 10: Conservation Objectives for [1099]

Conservation Objectives for : River Boyne and River Blackwater SAC [002299]

1099 River Lamprey *Lampetra fluviatilis*

To restore the favourable conservation condition of River Lamprey (*Lampetra fluviatilis*) in River Boyne and River Blackwater SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Percentage of river accessible	Restore access to all water courses down to first order streams	Artificial barriers can block or impede the passage of upstream migrating lamprey, thereby restricting access to spawning areas (Gargan et al., 2011; Rooney et al., 2015). There are a number of weirs along the lower sections of the Boyne main channel, the most substantial of these are located at Slane and downstream of Navan at Blackcastle. Efforts to trap adult river lamprey were undertaken at four locations throughout the catchment during November 2014 to April 2015. This was augmented in April 2015 by an extensive fyke-netting survey (n=26 sites). No adult river lamprey were encountered, with the only record to date being a dead individual from the River Boyne at Slane in late March 2015 (Gallagher et al., 2016). On the Boyne main channel, there is ideal spawning habitat both upstream and downstream of the weir at Blackcastle but spawning has not been observed at these locations to date
Distribution of larvae	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	Not less than 50% of sample sites with suitable habitat positive for larval brook/river lamprey	It is not possible to distinguish between larval brook and river lamprey in the field and they are therefore considered together in assessing conservation status. A survey of the Boyne catchment in 2015 recorded n=583 *Lampetra* spp. larvae from n=102 sites (Gallagher et al., 2016). As stated, the weirs in the lower main stem are a significant impediment to river lamprey passage and, for this reason, these larvae are considered to be mainly, if not all, brook lamprey. To achieve favourable condition *Lampetra* spp. should, as a minimum, be present in not less than 50% of all sampling sites surveyed with suitable habitat present within the natural range (JNCC, 2015). *Lampetra* spp. larvae were recorded from 72% of sites indicating a pass for this target. Distribution remained similar to a 2005 survey (O'Connor, 2006) although larvae continued to be absent from the Boycetown and Skane Rivers, as well as the upper reaches of the Kells Blackwater system
Population structure of larvae	Number of age/size classes	At least three age/size classes of larval brook/river lamprey present	The target of at least three age/size classes is based on guidance from JNCC (2015). Larvae typically range from 10-150mm in length and this corresponds to up to six age classes. A broad range of size classes (12-153mm), including young-of-year larvae, was recorded from the 2015 Boyne catchment-wide survey indicating a pass for this target. However, given the issue of artificial barriers on the River Boyne, it is likely that this value pertains to brook lamprey, as previously stated
Larval lamprey density in fine sediment	Larval lamprey/m²	Mean density of brook/river larval lamprey in sites with suitable habitat more than 5/m²	A target mean density of more than 5/m² larvae in sites with suitable habitat is required to achieve favourable condition (JNCC, 2015). In the Boyne survey a mean density of 6/m² *Lampetra* spp. larvae (n=583) was obtained. A number of tributaries did not achieve a pass for this target, including the Athboy/Trembleston, Boycetown, Deel, Skane and Stonyford Rivers. Again, the overall mean density value is most likely indicative of the status of brook lamprey in the Boyne catchment
Extent and distribution of spawning nursery habitat	m² and occurrence	No decline in extent and distribution of spawning and nursery beds	This target is based on spawning and nursery bed mapping during targeted larval lamprey monitoring surveys. River lamprey spawn in clean gravels in flowing water where they excavate shallow nests. While coarse substrate is required for spawning, the close proximity of nursery areas comprising mainly sand/silt are necessary for the development of larvae. The 2015 Boyne survey recorded adequate spawning and nursery habitat availability within the catchment (Gallagher et al., 2016). However, the sequence of weirs in the lower main channel of the Boyne represents a significant impediment to upstream passage. In addition, this lower section of river is in a degraded hydromorphological state with impounding and, therefore, poor habitat availability for spawning

Table 11: Conservation Objectives for [1106]

Conservation Objectives for : River Boyne and River Blackwater SAC [002299]

1106 Salmon *Salmo salar*

To restore the favourable conservation condition of Atlantic Salmon (*Salmo salar*) in River Boyne and River Blackwater SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	Percentage of river accessible	100% of river channels down to second order accessible from estuary	Artificial barriers block salmons' upstream migration, thereby limiting species to lower stretches and restricting access to spawning areas. There are multiple barriers to fish migration in the Boyne system
Adult spawning fish	Number	Conservation limit (CL) for each system consistently exceeded	A conservation limit (CL) is defined by the North Atlantic Salmon Conservation Organisation (NASCO) as "the spawning stock level that produces long-term average maximum sustainable yield as derived from the adult to adult stock and recruitment relationship". The target is based on the Technical Expert Group on Salmon's (TEGOS) annual model output of CL attainment levels. See Gargan et al. (2021) for further details. Stock estimates are either derived from direct counts of adults (rod catch, fish counter) or indirectly by fry abundance counts. The Boyne is significantly below its CL
Salmon fry abundance	Number of fry/5 minutes electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 minutes sampling	Target is threshold value for rivers currently exceeding their conservation limit (CL)
Out-migrating smolt abundance	Number	No significant decline	Smolt abundance can be negatively affected by a number of impacts such as estuarine pollution, predation and sea lice (*Lepeophtheirus salmonis*)
Number and distribution of redds	Number and occurrence	No decline in number and distribution of spawning redds due to anthropogenic causes	Salmon spawn in clean gravels. There is restricted habitat for salmon in the Boyne and habitat rehabilitation programmes have been undertaken in sections of the catchment
Water quality	EPA Q value	At least Q4 at all sites sampled by EPA	Q values based on triennial water quality surveys carried out by the Environmental Protection Agency (EPA)

Table 12: Conservation Objectives for [1355]

Conservation Objectives for : River Boyne and River Blackwater SAC [002299]

1355 Otter *Lutra lutra*

To maintain the favourable conservation condition of Otter (*Lutra lutra*) in River Boyne and River Blackwater SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Percentage positive survey sites	No significant decline	Measure based on standard otter survey technique. Favourable Conservation Status (FCS) target, based on 1980/81 survey findings, is 88% in SACs. Current range is estimated at 93.6% (Reid et al., 2013)
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 447.6ha along river banks/ lake shoreline/around ponds	No field survey. Areas mapped to include 10m terrestrial buffer, identified as critical for otters (NPWS, 2007), along rivers and around water bodies
Extent of freshwater (river) habitat	Kilometres	No significant decline. Length mapped and calculated as 263.3km	No field survey. River length calculated on the basis that otters will utilise freshwater habitats from estuary to headwaters (Chapman and Chapman, 1982)
Extent of freshwater (lake) habitat	Hectares	No significant decline. Area mapped and calculated as 31.6ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (NPWS, 2007)
Couching sites and holts	Number	No significant decline	Otters need lying up areas throughout their territory where they are secure from disturbance (Kruuk and Moorhouse, 1991; Kruuk, 2006)
Fish biomass available	Kilograms	No significant decline	Broad diet that varies locally and seasonally, but dominated by fish, in particular salmonids, eels and sticklebacks in freshwater (Bailey and Rochford, 2006; Reid et al., 2013)
Barriers to connectivity	Number	No significant increase	Otters will regularly commute across stretches of open water up to 500m, e.g. between the mainland and an island; between two islands; across an estuary (De Jongh and O'Neill, 2010). It is important that such commuting routes are not obstructed

2.6.2.5 Baseline Conservation Status of the site

A synopsis of the conservation status of this site is provided in Table 13 and Table 14.

Table 13: Habitat types present on site and assessment for them

Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A|B|C|D	A|B|C		
						Representativity	Relative Surface	Conservation	Global
7230			23.21		M	B	C	B	B
91E0			23.21		M	B	B	B	B

Table 14: Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
B	A038	Cygnus cygnus			w	50	200	i		G	C	B	C	B
F	1099	Lampetra fluviatilis			r				P	DD	C	B	C	B
M	1355	Lutra lutra			p				P	DD	C	A	C	A
F	1106	Salmo salar			r				C	DD	C	B	C	B

2.6.3 The River Boyne and River Blackwater SPA (Site synopsis version date 25/11/10, Natura 2000 form update 10/2020, Conservation Objectives (First Order) 12/10/22.

2.6.3.1 General Description

The River Boyne and River Blackwater SPA is a long linear site that comprises stretches of the River Boyne and several of its tributaries: most of the site is in Co Meath but it extends also into Counties Cavan, Louth and Westmeath. It includes the following river sections: The River Boyne from the M1 motorway bridge, west of Drogheda, to the junction with the Royal Canal, west of Longwood, Co Meath; the River Blackwater from its junction with the River Boyne in Navan to the junction with Lough Ramor in Co Cavan; the Tremblestown River (and Athboy River) from the junction with the River Boyne

at Kilnagross Bridge to the bridge in Athboy, Co Meath; the Stoneyford River from its junction with the River Boyne to Stonestone Bridge in Co. Westmeath; the River Deel from its junction with the River Boyne to Cummer Bridge, Co.Westmeath. The site includes the river channel and marginal vegetation. The River Boyne and River Blackwater SPA supports nationally important numbers of *Alcedo atthis*. Other species which occur within the site include *Cygnus olor*, *Anas crecca*, *Anas platyrhynchos*, *Phalacrocorax carbo*, *Ardea cinerea*, *Gallinula chloropus*, *Gallinago gallinago* and *Riparia riparia*.

2.6.3.2 Qualifying Interests

The Qualifying Interest (QI) of the River Boyne and River Blackwater SPA is

- Kingfisher, *Alcedo atthis*

2.6.3.3 Threats, pressures and activities with negative impacts on the site

Details as to the threats, pressures and activities with negative impacts on the site are identified from the Natura 2000 data form for the sites and are illustrated in Table 15.

Table 15: Threats, pressures and activities with impacts on the site

RANK	SECTOR	THREATS AND PRESSURES	INSIDE/OUTSIDE/BOTH
HIGH	URBANISATION, RESIDENTIAL AND COMMERCIAL DEVELOPMENT	ROADS, MOTORWAYS	BOTH
MEDIUM	NATURAL SYSTEM MODIFICATIONS	HUMAN INDUCED CHANGES IN HYDRAULIC CONDITIONS	INSIDE
HIGH	URBANISATION, RESIDENTIAL AND COMMERCIAL DEVELOPMENT	URBANISED AREAS, HUMAN HABITATION	OUTSIDE
HIGH	URBANISATION, RESIDENTIAL AND COMMERCIAL DEVELOPMENT	DISPERSED HABITATION	OUTSIDE

2.6.3.4 Conservation Objectives

The primary conservation objective (generic) of this site is to maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

- Kingfisher (*Alcedo atthis*)

There is currently no detailed conservation objectives document prepared referring specifically to Kingfisher as a Qualifying Interest. It is, therefore, not possible to infer Conservation Objectives for this Qualifying Interest.

2.6.3.5 Baseline Conservation Status

A synopsis of the conservation status of this site is provided in Table 16.

Table 16: Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A|B|C|D	A|B|C		
						Min	Max				Pop.	Con.	Iso.	Glo.
B	A229	Alcedo atthis			r	19	19	p		G	C	B	C	B
B	A052	Anas crecca			w	166	166	i		G	C	B	C	C
B	A053	Anas platyrhynchos			w	219	219	i		G	C	B	C	C
B	A028	Ardea cinerea			w	44	44	i		G	C	B	C	C
B	A017	Phalacrocorax carbo			w	36	36	i		G	C	B	C	C

2.7 Identification and evaluation of likely significant effect

2.7.1 Description of source-pathway-receptor linkages and identification of "Zone of Influence"

The basis for identifying potential impacts/significance thereof and defining the zone of influence is the "Source-Pathway-Receptor" (S-P-R) model. This model underpins all water-protection schemes in Ireland, as well as the EU Water Framework Directive on which both surface water and groundwater regulations are based. When examining S-P-R relationships in regard to impacts on Natura 2000 sites, the main questions to be considered are:

1) Source characterisation – Identification of potential source(s) of the impact(s);
2) Pathway's analysis – Identification of means through which potential impacts could take place, for example is there a hydrogeological or hydrological link that can deliver a pollutant source to a nearby receptor; and
3) Receptor identification – identification of Natura 2000 sites/qualifying interests potentially affected.

The River Boyne and River Blackwater SAC/SPA are within 1,500 metres of the proposed development. The conservation objectives of the qualifying interests of the River Boyne and River Blackwater SAC and River Boyne and River Blackwater SPA (and indeed those species for which the sites are not designated, but which are key to the ecological integrity of the sites) are directly or indirectly dependent on water quality and disturbance levels.

The sources of impact most likely to impact on these Natura 2000 sites concern:

- Impacts on water quality during the implementation of the buttress works;
- Impacts on Qualifying Interests sensitive to changes in disturbance levels, such as Otter and Kingfisher;
- Impacts on species present that while not Qualifying Interests of either Natura 2000 site, are nonetheless integral to the ecological integrity of the sites (bats, for instance);
- The spread of any plant species listed in Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011 (as amended) must be taken into account owing to the nature of the proposed development;
- Impacts associated with Climate Change.

Therefore, the key questions to be considered are:

1) Is there any source(s) of impact(s) on water quality, and/or disturbance levels and/or potential for import/spread of Third Schedule-listed species?
2) Is there a pathway present between the source of impact and a Natura 2000 site?; and

3) What are the Natura 2000 sites/qualifying interests potentially impacted upon?

2.7.2 Sources of potential impacts

Sources of potential impacts are:

- Impacts associated with contamination of surface and/or ground water during construction of the proposed buttress works (including post works changes to hydrology);
- Impacts associated with increased disturbance associated with an increased human presence and machinery/vehicles/equipment;
- Impacts associated with Climate Change; and
- Impacts associated with the spread of Alien Invasive Plant Species listed on Part (1) the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011 (as amended). Such species could be introduced to the site through material and/or vehicles, etc.

2.7.3 Presence of pathway and receptor

The primary receptor of concern is the River Blackwater and associated ecological corridor (a primary component of both the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA). There are two watercourses occurring on the western (Yellow River) and eastern (Simonstown stream) edge of the proposed works that discharge to the River Blackwater (River Boyne and River Blackwater SAC/SPA) – see Figure 16. There is no direct pathway between the proposed works and the Girley (Drewstown) Bog SAC.

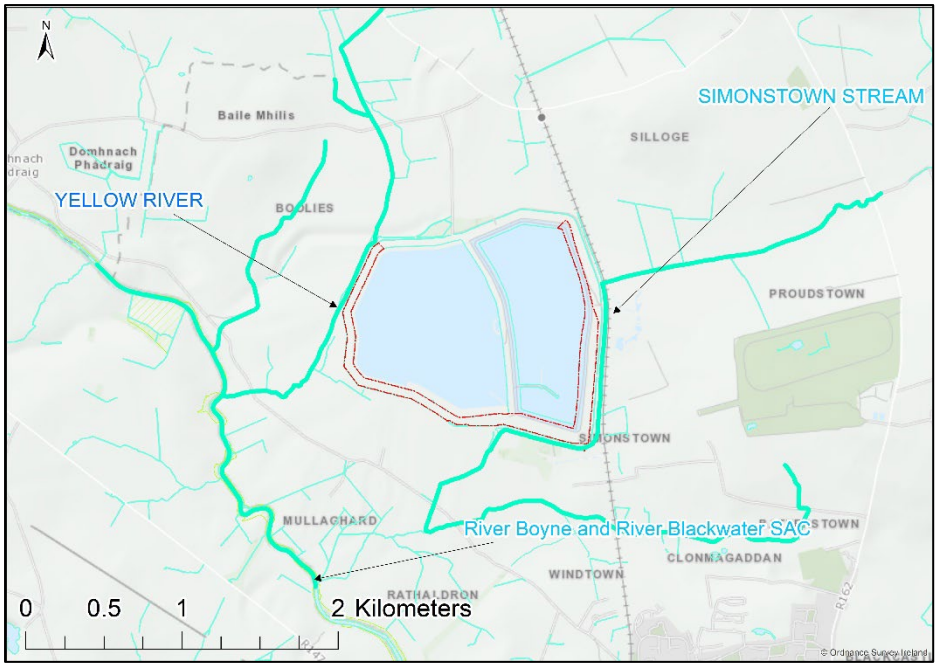

Figure 16: Map illustrating connectivity between the site of the proposed works and the River Boyne and River Blackwater SAC (and SPA)

2.7.4 Natura 2000 site(s) with potential to be impacted upon and Zone of Influence

There is potential for negative impacts on both the River Boyne and River Blackwater SAC and River Boyne and River Blackwater SPA through several impacts and pathways. The "Zone of Influence" should include these Natura 2000 sites. Girley (Drewstown) Bog SAC is not considered to be within the Zone of Influence.

2.7.5 Sources of potential Direct, Indirect or Secondary Impacts

2.7.5.1 Direct Impacts

There will be no land take, etc. of any habitats within the SAC/SPA and as such there will be no direct impacts on the Natura 2000 site through land take, habitat loss, etc. It should be noted that the increase in the Factor of Safety of the dam walls will provide increased security as regards any potential dam failure and impacts on proximate Natura 2000 sites. It should be noted that all buttressing works take place upstream of the interceptor channel and that there is no direct pathway to the Yellow river nor the Simonstown stream.

2.7.5.2 Indirect Impacts

There are several potential indirect impacts:

- Several components of the proposed development have the potential to impact on the water quality of the Yellow River and/or the Simonstown stream, both of which discharge to the River Blackwater, one of the chief constituents of the River Boyne and River Blackwater SAC/SPA.
    - The proposed development will entail the stripping and movement of a significant quantity of material in order to prepare the slopes of the dams. This will expose the material to movement during, for example, extreme rainfall events and potential contamination of the Yellow River and/or Simonstown stream.
    - The proposed development will entail the use of almost 600,000m^3 of material (rock fill and soil). This material itself poses a significant potential impact in the event of, for example, entry of the material into either water course associated with a heavy rainfall event.
    - There will be operating for an extended period of time machinery and vehicles in the vicinity of these water-course, with the potential for contamination through hydrocarbon leaks, etc.
- The extended period of time over which the works are planned, in addition to the increases in activity (both presence of human workers and machinery) has a significant potential to increase disturbance levels in the vicinity. Both Otter (a Qualifying Interest of the River Boyne and River Blackwater SAC) and Kingfisher (a Qualifying Interest of the River Boyne and River Blackwater SPA) are known to occur within these water courses. Impacts through disturbance could indirectly impact on the populations of these species utilising the SAC/SPA;

- The proposed development may impact negatively on usage of the habitat within the Tailings Facility by bats (all bat species occurring in Ireland are listed on Annex IV of the Habitats Directive), which are a key component of the ecological integrity of the riparian ecosystem);
- There may be potential impacts associated with the proposed development as regards climate change. Although the purpose of the proposed works is to increase the factor of safety associated with the dam walls, making the tailings storage facility less vulnerable to impacts associated with climate change, such as increased rainfall frequency and severity, the proposed development may have the potential to impact through Green House Gas emissions; and
- There are currently no Third Schedule-listed species recorded as occurring within the Tailings Facility. There is potential for the material being utilised, or indeed the vehicles being used to import the material, to be contaminated with the propagules of species such as Japanese Knotweed, Himalayan Balsam, etc. If spread, the presence of such plants in proximity to water courses discharging to the River Blackwater could have very serious negative impacts on the riparian ecosystem as regards erosion, bank management, etc.

2.7.5.3 Secondary Impacts

The tailings pond itself is utilised by large numbers of over-wintering species including significant flocks of Whooper Swan and Golden Plover. There is potential to disturb such species and for there to be secondary impacts on SPAs for which these species are designated.

In the event of the release of contaminants (in the form of sediment, contamination from a pollution event, etc.) into the adjacent water courses, there is a potential for secondary impacts associated with a build-up of contaminants (for example bioaccumulation) or sediment (for example impacting on larval ammocoete stage of Lamprey).

A summary of the potential for impacts upon Natura 2000 sites within the zone of influence of the proposed development is summarized in Table 17. The potential for impacts upon the Natura 2000 sites identified in the event of negative impacts is summarized in Table 18. The potential impacts on the qualifying interests of identified Natura 2000 sites is summarized in Table 19.

Table 17: Summary of the potential for impacts upon Natura 2000 sites.

Site Name	Direct Impacts	Indirect/ Secondary Impacts	Resource requirements (water abstraction etc.)	Emissions (to land, water or air)	Excavation requirements	Duration of construction, operation and decommissioning
River Boyne and River Blackwater SAC	None foreseen	Potential	None foreseen	None foreseen	None foreseen	Potential
River Boyne and River Blackwater SPA	None foreseen	Potential	None foreseen	None foreseen	None foreseen	Potential

Table 18: Summary of the potential for changes to Natura 2000 sites.

Site Name	Reduction of habitat area	Disturbance to key species	Habitat/species fragmentation	Reduction in species density	Changes in Key Indicators of Conservation Value	Climate change
River Boyne and River Blackwater SAC	Potential	Potential	Potential	Potential	Potential	Potential
River Boyne and River Blackwater SPA	Potential	Potential	Potential	Potential	Potential	Potential

Table 19: Summary of potential impacts on Qualifying Interests of Natura 2000 sites identified as at risk of impact

Site name	Qualifying Interest	Potential Impact
River Boyne and River Blackwater SAC	[7230] Alkaline fens	Habitat is located many kilometres upstream of proposed development – no impact foreseen
	[91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (priority)	Habitat is located many kilometres downstream of proposed development – no impact foreseen
	[1099] River Lamprey	Potential impacts associated with changes in hydrology/water quality
	[1106] Atlantic Salmon	Potential impacts associated with changes in hydrology/water quality
	[1355] Otter	Potential impacts associated with changes in hydrology/water quality, impacts on prey items, potential impacts through increased disturbance
River Boyne and River Blackwater SPA	A229 Kingfisher *Alcedo atthis*	Potential impacts associated with changes in hydrology/water quality, impacts on prey items, potential impacts through increased disturbance

2.7.6 Potential cumulative impacts in association with other plans

Article 6(3) of the Habitats Directive requires an assessment of a plan/project to consider other plans/projects that might, in combination with the proposed plan/project, have the potential to adversely impact upon Natura 2000 sites. A generic list of such plans/projects is indicated in Table 20.

Table 20: Potential cumulative impacts.

Plan	Purpose	Cumulative impact
EU Water framework Directive	Maintain and enhance water quality within the EU	None predicted
EU Freshwater Fish Directive	Protect freshwater bodies within the EU suitable for sustaining fish populations	None predicted
EU Groundwater Directive	Maintain and enhance the quality of groundwater within the EU	None predicted
EU Floods Directive	The Floods Directive applies to river basins and coastal areas at risk of flooding	None predicted
Nitrates Directive	Reducing water pollution within the EU	None predicted
Urban Waste-water treatment Directive	Protecting the environment from adverse impacts of waste-water discharge	None predicted
Sewage Sludge Directive	Regulate the use of sewage sludge	None predicted
The IPPC Directive	To achieve a high level of environmental protection	None predicted
National Development Plan	To promote more balanced spatial and economic development	None predicted
National Spatial Strategy	To achieve a better balance of social, economic and physical development across Ireland	None predicted
Eastern CRFAM	Long-term planning for reducing and managing flood risk	Potential in combination impacts on water quality in absence of mitigation measures.
Meath Development Plans	Sustainable development of Co. Meath	None predicted
Local Area Development Plans	Various	None predicted
Quarrying activities, water abstraction, discharge, etc	Various	Potential in-combination impacts on water quality in absence of mitigation measures
Current and future planning permissions –	Various	An Appropriate Assessment Screening exercise of any planning permission would be undertaken.
Meath Co. Council Part 8's	Various	An Appropriate Assessment Screening exercise of any Part 8 would be undertaken
Land spreading of organic waste by farmers in the locality	Fertilising land, disposing of organic waste	Potential in-combination impacts on water quality in absence of mitigation measures

A query of the EIA portal[2] would indicate that there are a number of recent projects requiring EIAR (see Figure 17). Owing to the dependence of the Qualifying Interests of the River Boyne and River Blackwater SAC/SPA either directly, or indirectly on water quality, it is key that the proposed development have no significant negative impact on local hydrology/water quality. A comprehensive hydrological assessment of the proposed development has been undertaken as a component of the Chapter 7 of the EIAR, which concludes that "…*This assessment has examined the potential impacts of the proposed buttress and its construction on water levels and water quality at the TSF and in the surrounding local water environment. Following implementation of the mitigation measures outlined in Section 7.7, no significant adverse impacts are anticipated as a result of the proposed works*…"

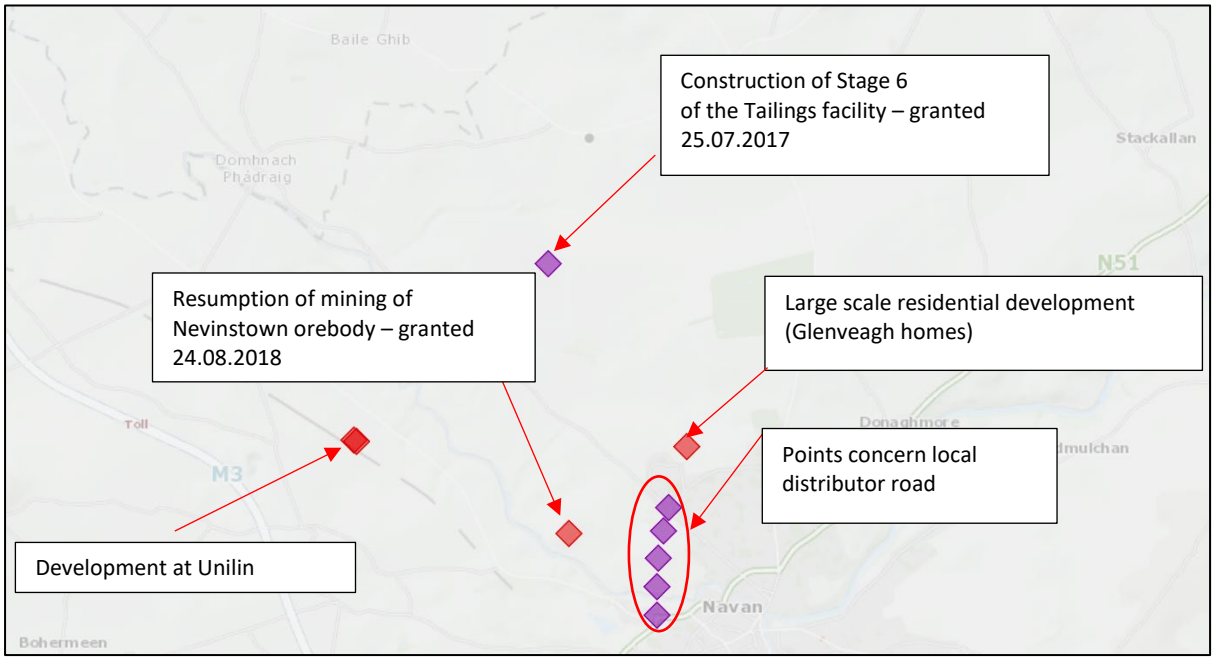

Figure 17: Query of EIA portal for projects requiring EIA in the vicinity of the proposed buttressing works

Any potential impacts on water quality must be avoided.

BTM intend to lodge an application in the immediate future for a solar farm to generate renewable electricity for use within the BTM Knockumber site providing for an electrical capacity of approximately 18-megawatts (advertised in Meath Chronicle date Saturday February 3rd). The development will consist of a ten-year planning permission for a solar energy development with the proposed development site extending to a total area of approximately 34 ha comprising (i) photovoltaic solar panels on steel mounting frames; (ii) electrical inverters; (iii) electrical power

[2] https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=d7d5a3d48f104ecbb206e7e5f84b71f1

stations; (iv) an electrical control building and associated electrical apparatus; (v) underground electrical and communications cabling; (vi) on-site access tracks; (vii) a temporary construction compound; (viii) security fencing and security gates; (ix) pole-mounted security cameras; and (x) all associated and ancillary site development, landscaping and reinstatement works. The operational lifetime of the proposed development is 35-years. The proposed development is related to an activity requiring an Industrial Emissions Licence. This planning application will be accompanied by an Environmental Impact Assessment Screening Report and a Natura Impact Statement.

An online review of the Meath Planning resource[3] indicates that there are two significant planning permissions within a distance of 2km of the proposed development (see Table 21).

Table 21: Significant development seeking planning permission within 2km of the proposed development

Application Number	Development Description	Address	App distance from site	Application Status
221558	Amendments to the south-eastern portion (0.71ha) of a residential development permitted under Meath County Council Reg. Ref. NA/181326.	Lands to the north of the Clonmagaddan Road, Clonmagaddan, Navan Co Meath	1500	APPEALED
22924	LARGE SCALE RESIDENTIAL DEVELOPMENT	Lands north of Clonmagaddan road, Clonmagaddan , Navan	850	APPLICATION FINALISED

The Competant Authority must ensure that **all** proposed developments with any potential to impact on the Natura 2000 network must undergo an Appropriate Assessment screening and EIA screening, to include a cumulative assessment. The primary concern as regards the proposed development is cumulative hydrological impacts.

In addition, Meath Co. Council recently granted planning permission (Planning Application Reference 23341) for the construction of a water treatment plant and ancillary infrastructure within the mine site complex at Knockumber. This planning permission relates to an activity covered by the Company's Industrial Emissions Licence Ref. No. P0 516-04. This granting of planning permission is currently being appealed.

[3] https://housinggovie.maps.arcgis.com/apps/webappviewer

The TSF at Randallstown has been constructed in six main stages during the period 1974 – present (*Table 22*). The facility is constructed as a ring-dike configuration, stages 1 to 5 are enclosed by earth fill embankment walls constructed from locally sourced natural materials, while Stage 6 is composite lined. The storage facility has an area of approximately 250 Hectares.

Table 22: Historical planning at the site

Tailings facility Planning by Stage	**Planning ref #**	**Construction Period**	**Status**
1	P 73/125	1975 to 1978	Filled and re-vegetated in 1988
2	P 74/732	1980 to 1983	Filled and re-vegetated in 1988
3	P 83/464	1985 to 1987	Filled in 2003
4	P 96/919	1998 to 2006	Raised facility over Stage 1, 2 and 3 tailings. Filled in 2006
5	NA 901452	2011 to 2016	Raised Facility over Stage 4A tailings. Filled in 2020
6	NA/160408 PL17.247707	2017 to 2022	Lateral extension to Stages 1 to 5 in a northern direction. Filling ongoing

2.7.7 "Do nothing" scenario

Any potential negative impacts associated with the proposed development would be avoided. Of note, increasing the Factor of Safety associated with the dam walls of the tailings facility will decrease the risk of any failure of the dam and as such have will have a positive future impact as regards the maintenance and enhancement of the ecological integrity of the adjacent water courses, the River Blackwater to which they discharge and the Natura 2000 sites of which it is a component.

2.7.8 Gauging of Impacts on Natura 2000 sites – Integrity of site checklist

The potential impacts of the proposed development on Natura 2000 sites are gauged using a checklist, which aids in determining the potential of development to have a significant impact on any Natura 2000 site. This checklist consists of a number of pertinent questions as set out in Table 23.

Table 23: Potential of the proposed development to impact on Natura 2000 sites in the absence of suitable mitigation/preventative measures

Does the Plan have the potential to:	**Yes/No**
Cause delays in progress towards achieving the conservation objectives of the Natura 2000 site?	YES
Interrupt progress toward achieving the conservation objectives of the Natura 2000 site?	YES
Disrupt those factors helping to maintain the favourable conditions at the Natura 2000 site?	YES
Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the Natura 2000 site?	YES
Cause changes to the vital defining aspects (e.g., nutrient balance) that determine how the Natura 2000 site functions as a habitat or ecosystem?	YES
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the Natura 2000 site?	YES
Interfere with predicted or expected natural changes to the Natura 2000 site (such as water dynamics or chemical composition)?	YES
Reduce the area of key habitats within the Natura 2000 site?	YES
Reduce the population of key species of the Natura 2000 site?	YES
Alter the balance between key species of the Natura 2000 site?	YES
Reduce the biodiversity of the Natura 2000 site?	YES
Result in disturbance that could affect population size or density or the balance between key species within the Natura 2000 site?	YES
Result in fragmentation?	YES
Result in the loss or reduction of key features of Natura 2000 sites?	YES

2.8 Conclusions of screening

According to the guidance published by the NPWS (DoEHLG, 2009), Screening for Appropriate Assessment can either identify that a Natura Impact Statement (NIS) is not required where:

(1) A project/proposal is directly related to the management of the site; or

(2) There is no potential for significant impacts affecting the Natura 2000 network

Where the screening process identifies that significant impacts are certain, likely or uncertain the project must either proceed to Stage II Appropriate Assessment or be rejected.

The potential impacts that could arise from the proposed development have been examined in the context of a number of factors that could potentially impact upon the integrity of the Natura 2000 network. On the basis of the findings of this Screening for Appropriate Assessment, it is concluded that the proposed development:

(1) Is not directly connected with or necessary to the management of a Natura 2000 site and

(2) May have significant impacts on one or more Natura 2000 sites.

Following an examination, analysis and evaluation of the relevant information and the potential for significant effects on the conservation objectives of Natura 2000 sites, and applying the Precautionary Principle, it is not possible to exclude (on the basis of objective information and in the absence of specific prescribed precautionary/mitigation measures) that the proposed plan individually or in combination with other plans or projects, has the potential to have significant negative impacts on the following Natura 2000 sites:

- River Boyne and River Blackwater SAC; and
- River Boyne and River Blackwater SPA

Screening having identified potential impacts of the proposed plan upon these Natura 2000 sites and in accordance with Article 6(3) of the Habitats Directive, a Stage 2 Appropriate Assessment is required, i.e., "*The consideration of the impact of the project or plan on the integrity of the Natura 2000 Site, either alone or in combination with other projects or plans to the sites structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts.*"

3 Appropriate Assessment

The potential for significant negative impacts of the proposed development on the ecological integrity of the River Boyne and River Blackwater SAC and River Boyne and River Blackwater SPA, in light of the conservation objectives of these sites, is examined in this section.

3.1 Stage 2 Appropriate Assessment background

Screening having identified potential impacts Stage 2 Appropriate Assessment is carried out to determine if the plan/project will have any significant negative impacts on the integrity of the Natura 2000 site(s) identified as being at risk. For the purposes of Appropriate Assessment, a significant effect is any effect that may affect the Conservation Objectives of the Qualifying Interest for which a site was designated but excluding inconsequential effects. If the effect is not relevant to the conservation objective, then it cannot be a significant effect for the purposes of Appropriate Assessment. A likely significant effect, for the purpose of Appropriate Assessment must be:

(a) Significant;

(b) Relevant to the conservation objective for that site; and

(c) The possibility of effects cannot be reasonably excluded.

This stage of the Appropriate Assessment process includes:

1) Impact Prediction - the potential impact of the proposed development on the ecological integrity of Natura 2000 sites in terms of the conservation objectives of those sites is assessed; and
2) Mitigation Measures – mitigation/preventative measures are identified (either in place or to be implemented) in relation to any significant negative impacts associated with the proposed development on the Natura 2000 sites as described herein.

This stage of the Appropriate Assessment process involves the identification of potentially impacted sites, the identification of the qualifying interests of those sites, and an assessment of the significance of impacts on the conservation objectives of those sites. Any negative impacts on the integrity of structure, function or conservation objectives of these sites will require the implementation of avoidance or mitigation measures to avoid progression to Stages 3 and 4 of the Appropriate Assessment process.

3.2 Summary of Natura 2000 sites relevant to the Stage Two Appropriate Assessment

3.2.1 River Boyne and River Blackwater SAC (Site synopsis version date 06/01/2014, Natura 2000 form update 09/19, Conservation Objectives (generic) version 7.0)

This site is described in the Natura 2000 data form as "*…This site comprises most of the freshwater element of the River Boyne from upriver of the Boyne Aqueduct at Drogheda, the Blackwater River as far as Lough Ramor and the principal Boyne tributaries, notably the Deel, Stoneyford and Tremblestown Rivers. This system drains a considerable area of Cos. Meath and Westmeath and smaller areas of Cavan and Louth. The underlying geology is Carboniferous Limestone for the most part with areas of Upper, Lower and Middle well represented. In the vicinity of Kells Silurian Quartzite is present while close to Trim are Carboniferous Shales and Sandstones. The rivers flow through a landscape dominated by intensive agriculture, mostly of improved grassland but also cereals. Much of the river channels were subject to arterial drainage schemes in the past. Natural floodplains now exist along only limited stretches of river, though often there is a fringe of reed swamp, freshwater marsh, wet grassland or deciduous wet woodland. Along some parts, notably between Drogheda and Slane, are stands of tall, mature mixed woodland. Substantial areas of improved grassland and arable land are included in site for water quality reasons. There are many medium to large sized towns adjacent to but not within the site. The main channel of the Boyne contains a good example of alluvial woodland of the Salicetum albo-fragilis type which has developed on three alluvium islands. Alkaline fen vegetation is well represented at Lough Shesk, where there is a very fine example of habitat succession from open water to raised bog. The Boyne and its tributaries is one of Ireland's premier game fisheries and offers a wide range of angling, from fishing for spring salmon and grilse to sea trout fishing and extensive brown trout fishing. The site is one of the most important in eastern Ireland for Salmo salar and has very extensive spawning grounds. The site also has an important population of Lampetra fluviatilis, though the distribution or abundance of this species is not well known. Lutra lutra is widespread throughout the site. Some of the grassland areas along the Boyne and Blackwater are used by a nationally important winter flock of Cygnus cygnus. Several Red Data Book plants occur within the site, with Pyrola rotundifolia, Poa palustris and Juncus compressus. Also occurring are a number of Red Data Book animals, notably Meles meles, Martes martes and Rana temporaria. The River Boyne is a designated Salmonid Water under the EU Freshwater Fish Directive…*"

NPWS has not yet drawn up a detailed Conservation Objectives document for this site.

3.2.2 The River Boyne and River Blackwater SPA (Site synopsis version date 25/11/10, Natura 2000 form update 09/2018, Conservation Objectives (generic) Version 7.0.

This site is described in the Natura 2000 data form as "*…The River Boyne and River Blackwater SPA is a long linear site that comprises stretches of the River Boyne and several of its tributaries: most of the site is in Co Meath but it extends also into Counties Cavan, Louth and Westmeath. It includes the following river sections: The River Boyne from the M1 motorway bridge, west of Drogheda, to the junction with the Royal Canal, west of Longwood, Co Meath; the River Blackwater from its junction with the River Boyne in Navan to the junction with Lough Ramor in Co Cavan; the Tremblestown River (and Athboy River) from the junction with the River Boyne at Kilnagross Bridge to the bridge in Athboy, Co Meath; the Stoneyford River from its junction with the River Boyne to Stonestone Bridge in Co. Westmeath; the River Deel from its junction with the River Boyne to Cummer Bridge, Co.Westmeath. The site includes the river channel and marginal vegetation. The River Boyne and River Blackwater SPA supports nationally important numbers of Alcedo atthis. Other species which occur within the site include Cygnus olor, Anas crecca, Anas platyrhynchos, Phalacrocorax carbo, Ardea cinerea, Gallinula chloropus, Gallinago gallinago and Riparia riparia.*

NPWS has not yet drawn up a detailed Conservation Objectives document for this site.

3.3 Summary of qualifying interests of Natura 2000 sites potentially exposed to significant negative impacts

Two Natura 2000 sites have been identified as being potentially exposed to significant negative impacts, which are directly or indirectly dependent on the water quality of the Rivers Boyne and Blackwater.

3.3.1 River Boyne and River Blackwater SAC

All of the qualifying interests of this Natura 2000 site are directly or indirectly dependent on the water quality/hydrology of the Rivers Boyne and Blackwater. Any habitats or species dependent on water quality/hydrological regime within this Natura 2000 site would potentially be at risk from changes in water quality/hydrology associated with the proposed works. A description of the national conservation status (taken from The Status of EU Protected Habitats and Species in Ireland, Vol 1, 2 and 3, 2019) of Qualifying Interest (Annex I habitat(s) and/or the Annex II species for which the SAC has been selected) is given as follows.

3.3.1.1 [7230] Alkaline Fens

Alkaline fens are groundwater-fed, generally peat-forming systems with extensive areas of species-rich small sedge and brown moss communities. They occur in areas where there is a high-water table and a base-rich, often calcareous water supply. Alkaline fens can develop in areas where vertical water movement predominates (topogenous), such as poorly drained basins or hollows and open water transitions; or where horizontal water movement is also important (soligenous), such as flushes, valley fens and the laggs of raised bogs. However, this distinction is not always clear (such as in large floodplain fens which can include both elements). Fen systems are often a complex mosaic of habitats, with tall sedge beds, reedbeds, wet grasslands, springs and open water co-occurring. Alkaline fens are relatively widespread in Ireland. The most extensive areas of alkaline fens are thought to occur in lowland basins associated with limestone groundwater bodies (often in midland areas). Alkaline fens associated with flushes and open water transitions tend to be smaller but may be more widespread than those in lowland basins. The main pressures facing the habitat in Ireland are land abandonment (and associated succession), overgrazing, drainage and pollution. The Overall Status is assessed as Bad with a deteriorating trend due to losses of area and habitat quality, as well as the pressures and threats faced by the habitat.

3.3.1.2 [91EO] Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) – PRIORITY HABITAT

A number of variants of Alluvial woodland habitat exist, of which riparian forests of ash (Fraxinus excelsior) and alder (*Alnus glutinosa*) (Alno-Padion) of temperate and Boreal Europe lowland and hill watercourses are the most common in Ireland. All types occur on heavy soils which are periodically inundated by the annual rise of river levels but otherwise well-drained and aerated during low water. The herbaceous layer includes many large species such as meadowsweet (*Filipendula ulmaria*), wild angelica (*Angelica sylvestris*), wood dock (*Rumex sanguineus*) and sedges (*Carex* spp.), vernal species such as lesser celandine (*Ficaria verna*) and wood anemone (*Anemone nemorosa*), and other indicative species such as remote sedge (*Carex remota*), gypsywort (*Lycopus europaeus*), common nettle (*Urtica dioica*) and water avens (*Geum rivale*). In addition, there are gallery forests of tall willows (Salicion albae) alongside river channels and occasionally on river islands, where the tree roots are almost continuously submerged. These are dominated by white willow (*Salix alba*), osier (*S. viminalis*) and almond willow (*S. triandra*), sometimes with grey willow (*S. cinerea*), but alder should be rare. There is a luxuriant herb layer of species such as reed canary-grass (*Phalaris arundinacea*), common nettle and meadowsweet. A number of pressures affect this habitat in Ireland, the most serious being invasive species, particularly sycamore (*Acer pseudoplatanus*), beech (*Fagus sylvatica*), Indian balsam (*Impatiens glandulifera*) and currant species (*Ribes nigrum* and *R. rubrum*). Some native species such as brambles (*Rubus fruticosus* agg.) and common nettle can also become over-vigorous. Small area losses due to clearfelling have also occurred. As a result, the Overall Status is Bad and the trend is declining. This poorer trend since the previous assessment is mainly due to the availability of more accurate data, and the decline is considered to have been ongoing since before the last assessment.

3.3.1.3 [1099] Lampetra fluviatilis

Given the large area of habitat availability and the likelihood that, in certain flow conditions, river lamprey are able to ascend many of the significant weirs on Irish rivers, it is possible that, in reality, they have a favourable conservation status. The inability to distinguish between *L. fluviatilis* and *L. planeri* larvae, however, and the challenges associated with sampling for adult river lamprey, means that an evaluation of their actual range and population size cannot be undertaken and status is assessed as unknown for the current reporting period. This represents a change from the previous reporting period (where a favourable status was assigned) but does not represent a downgrade in status. Data on larval *Lampetra* sp. were used to assign status in the previous reporting period. Records for adult river lamprey, although difficult to obtain, are considered more appropriate for

making a true assessment of this species. A targeted sampling programme for river lamprey will be required for assessing conservation status in the next reporting cycle.

3.3.1.4 [1106] Salmo salar

There is no evidence of a decline in range since the Directive came into force. The current range is considered sufficient for the long-term survival of the species. Therefore, Range has been assessed as Favourable. Increasing trends have been noted in Salmon population size in the last 5 years. However, the current population estimate is 78% of the Favourable Reference Population. Therefore, Population has been assessed as Inadequate. There is sufficient available habitat and ongoing pressures linked with habitat quality are not considered to be compromising the viability of the species. Therefore, Habitat for the species has been assessed as Favourable. Population estimates are unlikely to reach Favourable status in the next 12 years. Therefore, Future prospects have been assessed as Inadequate. The overall conservation status has been assessed as Inadequate with a stable trend. Although a short-term negative trend is reported for this species, the trend has reversed in the last 5 years. Therefore, an overall stable trend is reported.

3.3.1.5 [1355] Lutra lutra

The most recent distribution data shows that the otter continues to be widespread throughout Ireland and present nationwide in a wide variety of habitat types. Although recent studies on territory overlaps and animal movements suggest that refinements to the population estimation formula are needed, the otter population is considered to be stable and none of the threats or pressures identified is considered likely to impact significantly on the species. Overall, the species is assessed as Favourable, and the overall trend is demonstrating an on-going increase. There were no qualifiers for Favourable assessments in 2013.

3.3.2 River Boyne and River Blackwater SPA

Breeding Kingfisher, the Qualifying Interest of this site is dependent on the maintenance of the water quality (for prey items) and hydrological regime (changes could potentially impact on nesting sites of the River Boyne and Blackwater). This species would potentially be at risk from changes in water quality associated with the proposed works. There is currently no description of the national conservation status of Kingfisher.

3.4 Summary of Conservation Objectives of Natura 2000 sites potentially exposed to significant negative impacts

The focus of the Appropriate Assessment process at the second stage must be on the integrity of European sites "in light of their conservation objectives." A detailed analysis of Natura 2000 sites is given in Section 2.5 as regards:

- General Description;
- Qualifying Interests;
- Threats, Pressures and Activities with negative impacts;
- Conservation Objectives; and
- Conservation Status

A summary of the current conservation status of the qualifying interests (Nationally as indicated in the NPWS document "Status of EU Protected Habitats and Species in Ireland (2019)", and site specific as recorded in the individual Natura 2000 form) and conditions underpinning site integrity is presented in Table 24. A summary of the Conservation Objectives of each site is presented in Table 25.

Table 24: Summary of Conservation Status of Qualifying Interests and conditions underpinning site integrity

SITE NAME/CODE	QUALIFYING INTERESTS HABITAT/SPECIES CODE	NATIONAL CONSERVATION STATUS (2019)		SITE ASSESSMENT OF CONSERVATION STATUS (NATURA 2000 DATA FORM)		CONDITIONS UNDERPINNING SITE INTEGRITY
RIVER BOYNE AND RIVER BLACKWATER SAC						
	[7230]	RANGE	FAVOURABLE	REPRESENTATIVITY	B	• WATER QUALITY • APPROPRIATE AGRICULTURAL PRACTICES • SURFACE AND GROUND WATER QUALITY • APPROPRIATE LEVELS OF DISTURBANCE • WATER LEVELS • AIR QUALITY • TIDAL CURRENTS (LOWER REACHES)
		AREA	INADEQUATE ↓	RELATIVE SURFACE	C	
		STRUCTURES AND FUNCTIONS	BAD (unknown)	CONSERVATION	B	
		FUTURE PROSPECTS	UNFAVOURABLE/BAD	GLOBAL	B	
		OVERALL STATUS	BAD (↓)			
		OVERALL TREND	DETERIORATING			
	91E0 (PRIORITY HABITAT)	RANGE	FAVOURABLE (=)	REPRESENTATIVITY	B	
		AREA	BAD (↓)	RELATIVE SURFACE	B	
		STRUCTURES AND FUNCTIONS	INADEQUATE (↓)	CONSERVATION	B	
		FUTURE PROSPECTS	BAD	GLOBAL	B	
		OVERALL STATUS	BAD↓			
		OVERALL TREND	DETERIORATING			
	[1099]	RANGE	UNKNOWN	REPRESENTATIVITY	C	
		POPULATION	UNKNOWN	RELATIVE SURFACE	B	
		HABITAT	FAVOURABLE (=)	CONSERVATION	C	
		FUTURE PROSPECTS	UNKNOWN	GLOBAL	B	
		OVERALL STATUS	UNKNOWN			
		OVERALL TREND	UNKNOWN			
	[1106]	RANGE	FAVOURABLE (=)	REPRESENTATIVITY	C	
		POPULATION	INADEQUATE (↓)	RELATIVE SURFACE	B	
		HABITAT	FAVOURABLE (=)	CONSERVATION	C	
		FUTURE PROSPECTS	UNFAVOURABLE/INADEQUATE	GLOBAL	B	
		OVERALL STATUS	INADEQUATE (=)			
		OVERALL TREND	STABLE			

SITE NAME/CODE	QUALIFYING INTERESTS HABITAT/SPECIES CODE	NATIONAL CONSERVATION STATUS (2019)		SITE ASSESSMENT OF CONSERVATION STATUS (NATURA 2000 DATA FORM)		CONDITIONS UNDERPINNING SITE INTEGRITY
	[1355]	RANGE	FAVOURABLE (=)	REPRESENTATIVITY	C	
		POPULATION	FAVOURABLE (↑)	RELATIVE SURFACE	A	
		HABITAT	FAVOURABLE (=)	CONSERVATION	C	
		FUTURE PROSPECTS	FAVOURABLE	GLOBAL	A	
		OVERALL STATUS	FAVOURABLE (↑)			
		OVERALL TREND	IMPROVING			
RIVER BOYNE AND RIVER BLACKWATER SPA						
	[A229]	N/A	N/A	POPULATION	C	• WATER QUALITY • APPROPRIATE AGRICULTURAL PRACTICES • SURFACE AND GROUND WATER QUALITY • APPROPRIATE LEVELS OF DISTURBANCE • WATER LEVELS • AIR QUALITY • TIDAL CURRENTS (LOWER REACHES)
		N/A	N/A	CONSERVATION	B	
		N/A	N/A	ISOLATION	C	
		N/A	N/A	GLOBAL	B	

Table 25: Summary of Conservation Objectives of relevant Natura 2000 sites

SITE NAME/CODE	QUALIFYING INTERESTS	CONSERVATION OBJECTIVE
RIVER BOYNE AND RIVER BLACKWATER SAC		
	ALKALINE FENS [7230]	To maintain or restore favourable conservation condition
	ALLUVIAL FORESTS WITH ALNUS GLUTINOSA AND FRAXINUS EXCELSIOR [91E0] (PRIORITY HABITAT)	To maintain or restore favourable conservation condition
	RIVER LAMPREY [1099]	To maintain or restore favourable conservation condition
	ATLANTIC SALMON [1106]	To maintain or restore favourable conservation condition
	OTTER [1355]	To maintain or restore favourable conservation condition
RIVER BOYNE AND RIVER BLACKWATER SPA		
	KINGFISHER [A229]	To maintain or restore favourable conservation condition

3.5 Summary of pressures, threats and activities with potential for negative impacts on qualifying interests of sites

Using the standard Natura 2000 form for each of the Natura 2000 sites potentially at risk of impact from the proposed works, a summary of the threats, activities, and pressures with negative impacts on qualifying interests of the sites in question is presented in Table 26.

Table 26: Summary of threats, pressures and activities on relevant Natura 2000 sites

SITE NAME/CODE	PRESSURE/THREAT/ACTIVITY	INSIDE/OUTSIDE /BOTH	RANK
RIVER BOYNE AND RIVER BLACKWATER SAC			
	GRAZING	BOTH	HIGH
	CULTIVATION	BOTH	HIGH
	FERTILISATION	BOTH	HIGH
	SYLVICULTURE/AGRICULTURE	OUTSIDE	MEDIUM
	FISHING	INSIDE	HIGH
	NAUTICAL SPORTS	INSIDE	MEDIUM
	WALKING, HORSERIDING AND NON-MOTORISED VEHICLES	INSIDE	MEDIUM
	HUMAN INDUCED CHANGES IN HYDRAULIC CONDITIONS	INSIDE	MEDIUM
	SYLVICULTURE/AGRICULTURE	INSIDE	HIGH
	ROADS, MOTORWAYS	BOTH	HIGH
	DISPERSED HABITATION	OUTSIDE	HIGH
	URBANISED AREAS, HUMAN HABITATION	OUTSIDE	HIGH
	DISCHARGES	INSIDE	MEDIUM
RIVER BOYNE AND RIVER BLACKWATER SPA			
	ROADS, MOTORWAYS	BOTH	HIGH
	HUMAN INDUCED CHANGES IN HYDRAULIC CONDITIONS	INSIDE	MEDIUM
	URBANISED AREAS, HUMAN HABITATION	OUTSIDE	HIGH
	DISPERSED HABITATION	OUTSIDE	HIGH

3.6 Impact Prediction

3.6.1 Identified Pathways

The primary pathways identified are:

- Impacts on the water quality/hydrology of the Yellow River and/or Simonstown stream (including through the importation and spread of propagules of Alien Invasive Plant species listed on Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended);
- Impacts through disturbance of Qualifying interests of the River Boyne and River Blackwater SAC/SPA utilising the Yellow River and/or the Simonstown stream; and
- Secondary impacts on important populations of overwintering birds (through disturbance) such as Whooper Swan and Golden Plover; and
- Disturbance of habitats known to the be frequented by species of conservation concern, including Irish Hare, Badger and several species of Bat.

The data presented in the Climate Chapter of this EIAR indicates that there is no significant negative impact of the proposed development as regards climate change. Indeed, the proposed development will decrease the vulnerability of the TSF to impacts associated with climate change such as increased frequency and strength of rainstorms.

3.6.2 Potential Impacts on Qualifying Interests of sites

The Qualifying Interests (habitat/species), Primary Location of Qualifying Interests, Sensitivities of Qualifying Interests and Potential Impacts affecting Qualifying Interests is indicated in Table 27. The location of the Primary Locations of two Qualifying Interest habitats (both within the River Boyne and River Blackwater SAC – [7230] and [91E0]) are indicated in Figure 18 and Figure 19.

Table 27: Summary of potential impacts on Qualifying Interests of relevant Natura 2000 sites

SITE NAME/CODE	QUALIFYING INTERESTS	PRIMARY LOCATION	SENSITIVITIES	POTENTIAL IMPACTS (INCLUDING THOSE ASSOCIATED WITH CLIMATE CHANGE)
RIVER BOYNE AND RIVER BLACKWATER SAC				
	ALKALINE FENS [7230]	LOUGH SHESK, FREEHAN LOUGH AND NEWTOWN LOUGH - APPROXIMATELY 30 KM (UPSTREAM) FROM OPERATIONS (SEE MAP A)	• DISRUPTION TO AND/OR ACIDIFICATION OF WATER FEEDING FEN	• CHANGES IN HYDROLOGICAL REGIME
	ALLUVIAL FORESTS WITH ALNUS GLUTINOSA AND FRAXINUS EXCELSIOR [91E0] (PRIORITY HABITAT)	BOYNE ISLANDS, 2.5 KM WEST OF DROGHEDA, APPROIXIMATELY 22 KM (DOWNSTREAM) FROM OPERATIONS (SEE MAP B)	• CHANGES IN HYDROLOGICAL REGIME • ALIEN INVASIVE PLANT SPECIES	• CHANGES IN HYDROLOGICAL REGIME
	RIVER LAMPREY [1099]	THROUGHOUT	• CHANGES IN HYDROLOGICAL REGIME • CHANGES IN WATER QUALITY • ALIEN INVASIVE PLANT SPECIES	• CHANGES IN HYDROLOGICAL REGIME • CHANGE IN CHEMICAL AND/OR NUTRIENT STATUS OF WATER AND/OR SILT • CHANGES IN DEPOSITION OF SILT IN HABITAT • IMPACTS ON FEEDING AMMOCOETES THROUGH SILTATION AND/OR BIOACCUMULATION
	ATLANTIC SALMON [1106]	THROUGHOUT	• CHANGES IN HYDROLOGICAL REGIME • CHANGES IN WATER QUALITY • ALIEN INVASIVE PLANT SPECIES	• CHANGES IN HYDROLOGICAL REGIME • CHANGE IN CHEMICAL AND/OR NUTRIENT STATUS OF WATER • BIOACCUMULATION OF CONTAMINANTS

SITE NAME/CODE	QUALIFYING INTERESTS	PRIMARY LOCATION	SENSITIVITIES	POTENTIAL IMPACTS (INCLUDING THOSE ASSOCIATED WITH CLIMATE CHANGE)
River Boyne and River Blackwater SPA	OTTER [1355]	THROUGHOUT	• CHANGES IN HYDROLOGICAL REGIME • CHANGES IN WATER QUALITY • ALIEN INVASIVE PLANT SPECIES • DISTURBANCE	• CHANGES IN HYDROLOGICAL REGIME • CHANGE IN CHEMICAL/NUTRIENT STATUS COULD IMPACT ON PREY SPECIES • BIOACCUMULATION OF CONTAMINANTS
	KINGFISHER [A229]	THROUGHOUT	• CHANGES IN HYDROLOGICAL REGIME • CHANGES IN WATER QUALITY • ALIEN INVASIVE PLANT SPECIES • DISTURBANCE	• CHANGES IN HYDROLOGICAL REGIME • CHANGE IN CHEMICAL/NUTRIENT STATUS COULD IMPACT ON PREY SPECIES • BIOACCUMULATION OF CONTAMINANTS

Figure 18 Map illustrating location of three loughs within the River Boyne and River Blackwater where [7230] occurs

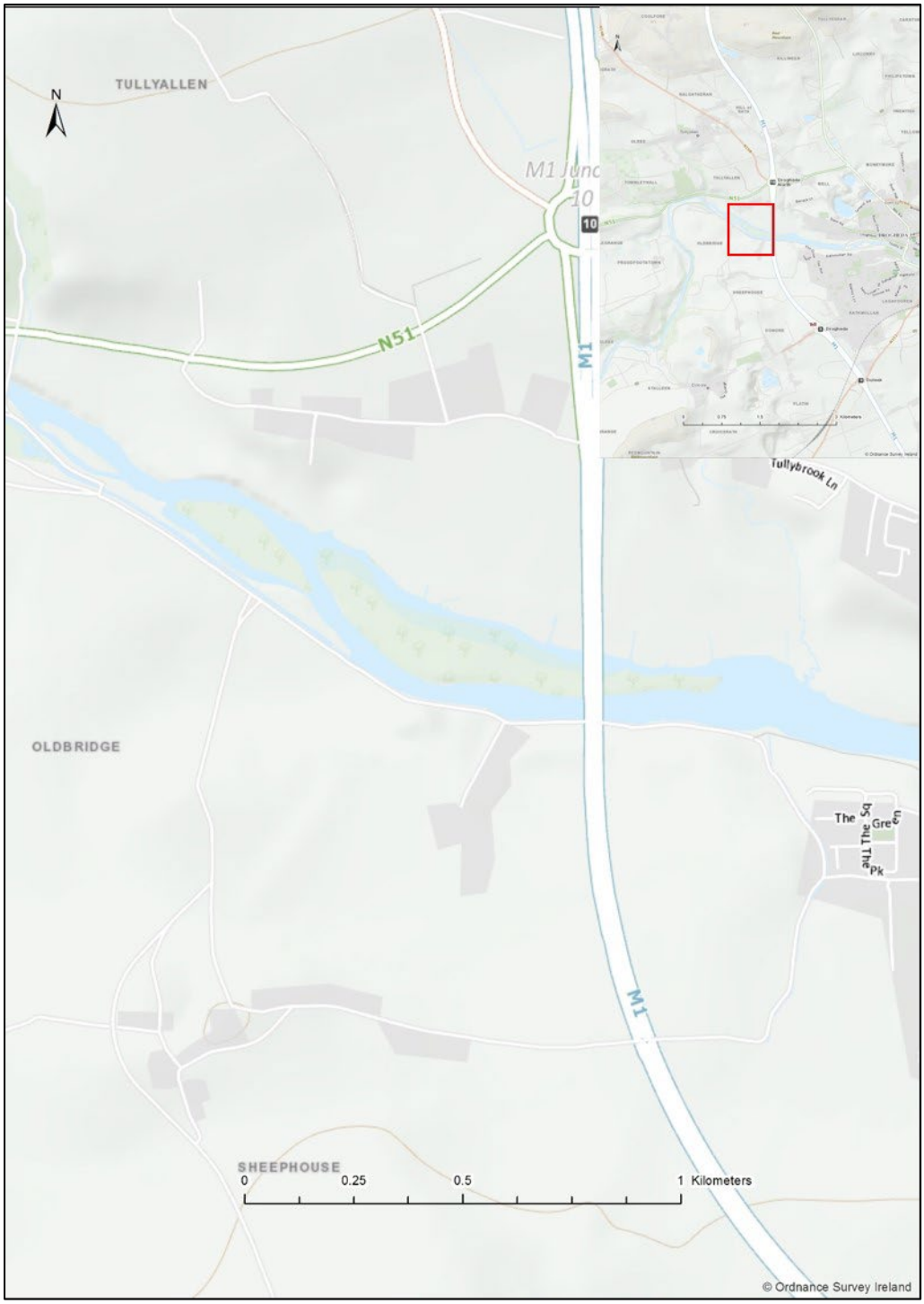

Figure 19: Map illustrating location of Boyne Islands, on which [91E0], a priority habitat occurs

3.6.3 Sources of Potential Impacts associated with proposed buttressing works

The sources of potential Direct and Indirect impacts related to the proposed plan are identified in Section 2. The sources of impacts are primarily associated with:

- Direct Impacts on Qualifying Interests of River Boyne and River Blackwater SAC/SPA;
- Impacts on water quality;
- Impacts associated with disturbance; and
- Impacts associated with the spreading/introduction of propagules of Alien Invasive Plant Species (primarily Third Schedule-listed species).

A summary of potential impacts on Qualifying Interests of relevant Natura 2000 sites and the sources of potential impacts are provided in Table 28.

Table 28: Summary of potential impacts on Qualifying Interests of relevant Natura 2000 sites and the sources of potential impacts

SITE NAME/CODE	QUALIFYING INTERESTS	POTENTIAL IMPACTS	SOURCE(S) OF IMPACT(S) ASSOCIATED WITH PROPOSED PLAN
RIVER BOYNE AND RIVER BLACKWATER SAC			
	ALKALINE FENS [7230]	• CHANGES IN HYDROLOGICAL REGIME	• None foreseen
	ALLUVIAL FORESTS WITH ALNUS GLUTINOSA AND FRAXINUS EXCELSIOR 91E0 (PRIORITY HABITAT)	• CHANGES IN HYDROLOGICAL REGIME	• None foreseen
	RIVER LAMPREY [1099]	• CHANGE IN CHEMICAL AND/OR NUTRIENT STATUS OF WATER AND/OR SILT • CHANGES IN EROSION/DEPOSITION OF SILT IN HABITAT • IMPACTS ON FEEDING AMMOCOETES THROUGH SILTATION AND/OR BIOACCUMULATION • CHANGES IN HYDROLOGICAL REGIME	• CONTAMINATION OF SURFACE WATER DURING CONSTRUCTION/OPERATION • CONTAMINATION OF GROUND WATER DURING CONSTRUCTION/OPERATION • CHANGES IN EROSION/SEDIMENTATION PROCESSES ASSOCIATED WITH ALIEN INVASIVE PLANT SPECIES
	ATLANTIC SALMON [1106]	• CHANGE IN CHEMICAL AND/OR NUTRIENT STATUS OF WATER • CHANGES IN EROSION/DEPOSITION OF SILT IN HABITAT • BIOACCUMULATION OF CONTAMINANTS • CHANGES IN HYDROLOGICAL REGIME	• CONTAMINATION OF SURFACE WATER DURING CONSTRUCTION/OPERATION • CONTAMINATION OF GROUND WATER DURING CONSTRUCTION/OPERATION • CHANGES IN EROSION/SEDIMENTATION PROCESSES ASSOCIATED WITH ALIEN INVASIVE PLANT SPECIES
	OTTER [1355]	• CHANGE IN CHEMICAL/NUTRIENT STATUS COULD IMPACT ON PREY SPECIES • BIOACCUMULATION OF CONTAMINANTS • INCREASED DISTURBANCE IMPACTING ON HABITAT USAGE • CHANGES IN HYDROLOGICAL REGIME	• CONTAMINATION OF SURFACE WATER DURING CONSTRUCTION/OPERATION • CONTAMINATION OF GROUND WATER DURING CONSTRUCTION/OPERATION • DISTURBANCE/LOSS OF HABITAT • IMPACTS ON PREY ITEMS AS A RESULT OF CHANGES IN EROSION/SEDIMENTATION PROCESSES ASSOCIATED WITH ALIEN INVASIVE PLANT SPECIES

SITE NAME/CODE	QUALIFYING INTERESTS	POTENTIAL IMPACTS	SOURCE(S) OF IMPACT(S) ASSOCIATED WITH PROPOSED PLAN
RIVER BOYNE AND RIVER BLACKWATER SPA	KINGFISHER [A229]	• CHANGE IN CHEMICAL/NUTRIENT STATUS COULD IMPACT ON PREY SPECIES • CHANGES IN EROSION/DEPOSITION OF SILT IN HABITAT • BIOACCUMULATION OF CONTAMINANTS • CHANGES IN HYDROLOGICAL REGIME	• CONTAMINATION OF SURFACE WATER DURING CONSTRUCTION/OPERATION • CONTAMINATION OF GROUND WATER DURING CONSTRUCTION/OPERATION • DISTURBANCE/LOSS OF HABITAT • IMPACTS ON PREY ITEMS AS A RESULT OF CHANGES IN EROSION/SEDIMENTATION PROCESSES ASSOCIATED WITH ALIEN INVASIVE PLANT SPECIES

3.7 Mitigation Measures – avoiding potential impacts

The three primary sources of potential impacts associated the proposed buttressing works are:

- Impacts on the water quality/hydrology of water courses discharging to the River Blackwater, with consequent impacts on (water quality dependent) Qualifying Interests of River Boyne and River Blackwater SAC/SPA;
- Impacts associated with increased disturbance; and
- Import/spread of Third Schedule listed Alien Invasive Plant Species.

3.7.1 Impacts on water quality

One of the primary sources of potential negative impacts on the conservation objectives of both the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA regards the potential for impacts on ground and/or surface waters discharging to the Natura 2000 site.

The primary mitigation measures to be implemented relate to the potential hydrological impacts of the proposed works. These are outlined in Chapter 7 of the EIAR (Hydrology and Hydrogeology). One of the key mitigation measures outlined is that

> "*…Prior to construction, a Construction Environmental Management Plan (CEMP) will be prepared by the Contractor in conjunction with the BTM environmental management team, to be approved by the planning authority. The CEMP will detail the measures necessary to avoid, prevent and reduce adverse effects where possible upon the local water environment…*"

All mitigation measures and monitoring as indicated in Chapter 7 of the EIAR must be implemented in full. Chapter 7 of the EIAR concludes that

> "*…This assessment has examined the potential impacts of the proposed buttress and its construction on water levels and water quality at the TSF and in the surrounding local water environment. Following implementation of the mitigation measures outlined in Section 7.7, no significant adverse impacts are anticipated as a result of the proposed works…*"

3.7.2 Impacts associated with disturbance

There is potential for increased disturbance of both Qualifying Interests of the relevant Natura 2000 sites (primarily Otter and Kingfisher) and other fauna of conservation concern – in particular, bats. In order to mitigate against disturbance impacts, a comprehensive Habitat and Biodiversity Management

and Conservation Plan[4] (which is presented as an attachment to Chapter 6 of this EIAR) has been drawn up and will be implemented in full by Boliden Tara Mines DAC. Please note that the CEMP must be informed by this Habitat and Biodiversity Management and Conservation Plan. The Habitat and Biodiversity Management and Conservation Plan prescribes a suite of mitigation/preventative measures and a monitoring regime to ensure that there is no significant impact on Qualifying Interests of the relevant Natura 2000 sites or other flora, fauna/habitats of conservation concern. The measures to be implemented within the Habitat and Biodiversity Management and Conservation Plan ensure that any impacts on local flora and fauna are minimised. It is important to note that all mitigation pertaining to ecology are required to be of a clear and enforceable nature, in order to facilitate the effective implementation of said mitigation on the ground during all phases of the proposed development. In order to ensure implementation of all mitigation measures as required to minimise any ecological impacts, and indeed to enhance the environment, an Ecological Clerk of Works (ECoW) must be appointed in advance of the proposed development to oversee the management of ecological risks on site and ensure that all mitigation measures as relating to ecological issues are implemented effectively on the ground.

3.7.3 Impacts associated with Import/spread of Third Schedule listed Alien Invasive Plant Species

A detailed Alien Invasive Species Management and Control Plan[5] has been drawn up and will be implemented by Boliden Tara Mines DAC (this plan will also inform the CEMP). The Plan prescribes the mitigation measures and monitoring protocol required to be put in place in order to prevent the Import/spread of Third Schedule listed Alien Invasive Plant Species to the site.

The significance of potential impacts on the conservation objectives of qualifying interests following the implementation of mitigation measures is outlined in Table 29.

[4] Habitat and Biodiversity Management Plan as Regards Proposed Buttressing Works at the Tailings Storage Facility, Randalstown/Simonstown/Sillogue, Navan Co. Meath. FERS Ltd, September 2022, updated January 2024.

[5] Invasive Alien Plant Species Management and Control Plan (species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) regulations 2011 (as amended), as regards proposed buttressing works at the tailings storage facility, Randalstown/Simonstown/Sillogue, Navan, Co. Meath. FERS LTD, August 2022.

Table 29: Significance of potential impacts following implementation of mitigation measures

SITE NAME/CODE	QUALIFYING INTERESTS	POTENTIAL IMPACTS	SIGNIFICANCE OF IMPACTS ON QI FOLLOWING IMPLEMENTATION OF MITIGATION MEASURES
RIVER BOYNE AND RIVER BLACKWATER SAC			
	ALKALINE FENS [7230]	• NO IMPACTS FORESEEN	NOT SIGNIFICANT
	ALLUVIAL FORESTS WITH ALNUS GLUTINOSA AND FRAXINUS EXCELSIOR [91E0] (PRIORITY HABITAT)	• NO IMPACTS FORESEEN	NOT SIGNIFICANT
	RIVER LAMPREY [1099]	• CHANGE IN CHEMICAL AND/OR NUTRIENT STATUS OF WATER AND/OR SILT • CHANGES IN DEPOSITION OF SILT IN HABITAT • IMPACTS ON FEEDING AMMOCOETES THROUGH SILTATION AND/OR BIOACCUMULATION	NOT SIGNIFICANT
	ATLANTIC SALMON [1106]	• CHANGE IN CHEMICAL AND/OR NUTRIENT STATUS OF WATER • BIOACCUMULATION OF CONTAMINANTS	NOT SIGNIFICANT
RIVER BOYNE AND RIVER BLACKWATER SPA	OTTER [1355]	• CHANGE IN CHEMICAL/NUTRIENT STATUS COULD IMPACT ON PREY SPECIES • BIOACCUMULATION OF CONTAMINANTS	NOT SIGNIFICANT
	KINGFISHER [A229]	• CHANGE IN CHEMICAL/NUTRIENT STATUS COULD IMPACT ON PREY SPECIES • BIOACCUMULATION OF CONTAMINANTS	NOT SIGNIFICANT

4 Conclusions

In order for AA to comply with the criteria set out in the Habitats Directive and the Planning and Development Act 2000, an AA undertaken by the Competent Authority must include an examination, analysis, evaluation, findings, conclusions, and a final determination.

Following the identification of a potential impact(s) upon one or more Natura 2000 sites through an Appropriate Assessment Screening exercise, a Stage 2 Appropriate Assessment of the proposed development has been carried out in accordance with the requirements of Article 6(3) of the Habitats Directive (Council Directive 92/43/EEC). The information to enable the Competent Authority to perform its statutory function in this regard is presented within this NIS.

Following an examination, analysis, and evaluation of the relevant information, and applying the precautionary principle, it is the professional opinion of the author of this report that there will be no adverse impact on the integrity of any of relevant Natura 2000 sites, assuming the implementation of all mitigation/preventative measures as outlined (in particular the hydrological assessment of the proposed buttressing works and the Habitat and Biodiversity Management Plan).

Consequently, there will be no risk of adverse effects on Qualifying Interest habitats or species, nor the attainment of specific conservation objectives, either alone or in-combination with other plans or projects, for the relevant Natura 2000 sites. The ecological integrity of the Natura 2000 sites concerned (connected with qualifying interests for which the sites have been designated) will not be significantly impacted upon.

Of note, the proposed buttressing works will increase the Factor of Safety of the existing dam walls, decreasing any risk associated with dam-failure and as such, will have a positive impact on the continued ecological integrity of the adjacent Natura 2000 sites.

5 References and Bibliography

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www.meath.ie – official website of Meath County Council.

www.npws.ie – website of the National Parks and Wildlife Service, source of information for data regarding Natura 2000 sites and Article 17 Conservation Assessments.

www.europa.eu – official website of the European Union, source of information on EU Directives.