

Natura Impact Statement for the Maintenance of Glyde & Dee Arterial Drainage Scheme 2023

Final Report

November 2022

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Office of Public Works

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OPW

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Contract

This report describes work commissioned by the Office of Public Works under contract 188877 Work Package 2- 2021 Environmental Consultancy services. Sophie Evans, Sky Wallis and Catherine Rodd of JBA Consulting carried out this work.

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Purpose

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Executive summary

JBA Consulting has been commissioned by the Office of Public Works (OPW) to carry out a Natura Impact Statement (NIS) for the Maintenance of the Glyde & Dee Arterial Drainage Scheme (the "Scheme"). The Scheme implements the legal duty on the OPW under the Arterial Drainage Acts of 1945 and 1995 to maintain scheme channels and bridge/culvert structures that form part of the scheme and provide drainage of the benefiting lands.

The Scheme consists of 761.0km of watercourse and 9.9km of embankment, in the River Glyde and Dee catchment, covering county Louth. The Scheme involves a range of standard maintenance activities, including in-channel vegetation management, silt removal, bridge/culvert maintenance and tree works. These are all carried out following detailed Environmental procedures (EPs) contained in OPW's Environmental Guidance: Drainage Maintenance and Construction (Brew & Gilligan 2019) which set out the minimum environmental and ecological standards that activities should follow.

A screening assessment had identified that the Scheme could have likely significant effects on three Natura 2000 sites, namely Dundalk Bay SAC (000455), Dundalk SPA (004026), and Stabannan-Braganstown SPA (004091). This report presents the examination of the Scheme to determine if it would result in an adverse effect on site integrity for any of these Natura 2000 sites, and if so whether avoidance and mitigation could be applied to the Scheme to reduce these below the level at which adverse impacts would occur. Details of the screened-in sites are presented including qualifying interest features, conservation objectives and threats and pressures.

A combination of desk-based assessments and field survey work were used to identify the baseline ecological conditions on and adjacent to the Scheme channels. Field assessment comprised of a walkover survey of all channels within SAC & SPA Natura 2000 sites and a small buffer. The surveys identified a range of Annex I habitats adjacent to scheme channels, and many Annex II species.

A detailed assessment of potential adverse impacts was carried out following Source-Receptor-Pathway approach. Assessment of potential adverse impacts of the Scheme on Natura 2000 sites highlighted a range of potential adverse impacts that require mitigation measures to ensure no adverse impact on the integrity of any Natura 2000 sites and their conservation objectives. The mitigation is contained within the additional environmental procedures and specify work details where particular ecological features may be impacted. A small number of additional avoidance and mitigation measures are also included that will need to be implemented during Scheme activities in specific channels, which include not accessing intertidal habitats within the SPA except on emergency occasions and timing of works to avoid impact on species from SPA sites.

An in-combination assessment was completed looking at relevant plans and projects. No plans or projects were identified which would give rise to any adverse impacts on the integrity of the relevant Natura 2000 sites, when assessed in combination with the proposed Scheme.

The NIS has concluded that, given the avoidance and mitigation measures proposed, the proposed drainage maintenance operations in the Glyde & Dee Arterial Drainage Scheme will not have an adverse impact on the integrity of any Natura 2000 site, in light of their conservation objectives and best scientific knowledge, either alone or in combination with other plans or projects.

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Abbreviations

AA	Appropriate Assessment
CIEEM	Chartered Institute of Ecology and Environmental Management
CJEU	Court of Justice of the European Union
DoEHLG	Department of Environment, Heritage and Local Government
COs	Conservation Objectives
EC	European Commission
EDM	Environmental Drainage Maintenance
EIA	Environmental Impact Assessment
EP	Environmental Procedure
EPA	Environmental Protection Agency
EREP	Environmental River Enhancement Programme
GIS	Geographic Information System
GWB	Groundwater body
HDPE	High Density Polyethylene
IFI	Inland Fisheries Ireland
INNS	Invasive Non-Native Species
IROPI	Imperative Reasons of Overriding Public Interest
LSE	Likely Significant Effect
MAC	Maintenance Access Corridor
NBDC	National Biodiversity Data Centre
NIS	Natura Impact Statement
NPWS	National Parks and Wildlife Service
OPW	Office of Public Works
OSi	Ordnance Survey Ireland
QI	Qualifying Interest
RBMP	River Basin Management Plan
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SOP	Standard Operating Procedure
SPA	Special Protection Area
SWD	Surface water dependent
WFD	Water Framework Directive
ZOI	Zone of Influence

1 Introduction

1.1 Background

JBA Consulting has been appointed by the Office of Public Works (OPW), to undertake environmental consultancy services in relation to Arterial Drainage. This report presents a review, completed once every five years, of the impacts of the maintenance of the Glyde & Dee Arterial Drainage Scheme, in relation to the European Communities (Birds and Natural Habitats) Regulations 2011-2021, which implements the Habitats Directive (Directive 92/43/EEC).

The proposed Scheme is the Maintenance of the Glyde & Dee Arterial Drainage Scheme, hereafter referred to as the "Scheme", and is required as part of maintenance activities under the Arterial Drainage Acts of 1945 and 1995, and includes the Rivers Glyde and Dee which drain into Dundalk Bay.

A review of the Appropriate Assessment (AA) screening undertaken in 2022 (JBA Consulting 2022) identified that further assessment is required at this location due to the presence of one Special Area of Conservation (SAC) and two Special Protection Areas (SPA) within the potential zone of influence (ZoI) of the proposed maintenance works at the Glyde & Dee Arterial Drainage Scheme.

Previous assessments were undertaken for the Scheme for the purposes of Appropriate Assessment by JBA in 2014 (JBA Consulting 2014) and 2017 (JBA Consulting 2017). Due to the identification of potentially significant effects from the recent screening, and consistent with the results of previous assessment, this Natura Impact Statement (NIS) has been prepared to re-assess the impacts on the Natura 2000 sites and the overall network, and review and update appropriate avoidance and mitigation measures where necessary.

1.2 Legislative Context

The Habitats Directive (Directive 92/43/EEC) aims to maintain or restore the favourable conservation status of habitats and species of community interest across Europe. The requirements of Articles 6(3) and 6(4) of the Habitats Directive have been transposed into Irish legislation by means of *inter alia* the European Communities (Birds and Natural Habitats) Regulations 2011-2021 as amended.

Under the Directive a network of sites of nature conservation importance have been identified by each Member State as containing specified habitats or species requiring to be maintained or returned to favourable conservation status. In Ireland, the network consists of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), and also candidate sites, which form the Natura 2000 network.

Article 6(3) of the Habitats Directive requires that, in relation to European designated sites (i.e. SACs and SPAs that form the Natura 2000 network), *"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"*.

A competent authority, in this case the OPW as a public body, can only agree to a plan or project after having determined that it will not adversely affect the integrity of any Natura 2000 site, in light of its conservation objectives and best scientific evidence, either alone or in combination with other plans or projects.

Under article 6(4) of the Directive, if adverse impacts are likely, and in the absence of alternative options, a plan or project must nevertheless proceed for imperative reasons of overriding public interest (IROPI), including social or economic reasons, a Member State is

required to take all compensatory measures necessary to ensure the overall integrity of the Natura 2000 site.

The Planning and Development Act 2000, and amendments, consolidates all planning legislation from 1963 to 1999 and is the basis for the Irish planning code, setting out the detail of regional planning guidelines, development plans and local area plans as well as the basic framework of the development management and consent system. The Act sets out the requirement of a Natura Impact Statement for a plan, to meet the requirements of article 6(3) of the Habitats Directive, the consideration of in-combination effects and classify any impacts in view of the conservation objectives of Natura 2000 sites.

1.3 Appropriate Assessment Process

Guidance on the AA process was produced by the European Commission (EC) in 2002, which was subsequently developed into guidance specifically for Ireland by the Department of Environment, Heritage and Local Government (DoEHLG) (2010). These guidance documents identify a staged approach to conducting an AA, as shown in Figure 1-1.



Figure 1-1. The Appropriate Assessment Process (DoEHLG, 2010)

1.3.1 Stage 1 - Screening for AA

The initial, screening stage of the Appropriate Assessment is to determine:

- whether the proposed plan or project is directly connected with, or necessary for, the management of the European designated site for nature conservation
- if it is likely to have a significant adverse effect on the European designated site, either individually or in combination with other plans or projects

For those sites where potential adverse impacts are identified, either alone or in combination with other plans or projects, further assessment is necessary to determine if the proposals will have an adverse impact on the integrity of a European designated site, taking into account the sites conservation objectives (i.e. the process proceeds to Stage 2).

1.3.2 Stage 2 - AA

This stage requires a more in-depth evaluation of the plan or project, and the potential direct and indirect adverse impacts arising from it on the integrity and the interest features of the European designated site(s), alone and in-combination with other plans and projects, taking into account the site's structure, function and conservation objectives and best scientific knowledge in the field. Where required, mitigation or avoidance measures will be suggested.

The competent authority can only agree to the plan or project after having ascertained that it will not adversely affect the integrity of the site(s) concerned. If this cannot be determined, and where mitigation cannot be achieved, then alternative solutions will need to be considered (i.e. the process proceeds to Stage 3).

1.3.3 Stage 3 and 4 – Alternative solutions and IROPI

Where adverse impacts on the integrity of Natura 2000 sites are identified, and mitigation cannot be satisfactorily implemented, alternative ways of achieving the objectives of the plan or project that avoid adverse impacts need to be considered. If none can be found, the process proceeds to Stage 4. Where adverse impacts of a plan or project on the integrity of Natura 2000 sites are identified and no alternative solutions exist, the plan or project will only be allowed to progress if imperative reasons of overriding public interest can be demonstrated. In this case compensatory measures will be required.

1.4 Arterial Drainage Maintenance background

Between 1945 and 1995, under the Arterial Drainage Act (1945), the OPW completed 34 Arterial Drainage Schemes on river catchments, along with five estuarine embankment schemes (over 11,500km of channel and 730km of embankments). The OPW is statutorily obligated to maintain arterial drainage channels under the 1945 Arterial Drainage Act, and since their completion, maintenance of these Arterial Drainage Schemes has been ongoing, with the majority of channels maintained every five years. However, larger channels tend to be only maintained every ten years, on average.

2 Methodology

2.1 Guidance

This NIS has been prepared having regard to the Birds and Habitats Directives, the European Communities (Birds and Natural Habitats) Regulations 2011-2021 as amended and relevant jurisprudence of the EU and Irish courts. The following documents have also been used to provide guidance for the assessment:

- DoEHLG (2010) *Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities*. Department of the Environment, Heritage and Local Government.
- European Commission (EC) (2019) *Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC*. Office for Official Publications of the European Communities, Luxembourg. European Commission.
- EC (2021) *Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC*. European Commission.
- EC (2013) *Interpretation Manual of European Union Habitats. Version EUR 28*. European Commission.
- Environmental Protection Agency (EPA) *epamaps* (<https://gis.epa.ie/EPAMaps/>)
- Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland - Terrestrial, Freshwater and Coastal, Version 2.1*.
- National Parks and Wildlife Service (NPWS) *National Parks & Wildlife Service* (<https://www.npws.ie/>), where site synopses, Natura 2000 data forms and conservation objectives were obtained along with Annex 1 habitat distribution data and status reports.
- NPWS (2019) *The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview*. Unpublished NPWS report.
- NPWS (2019) *The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments*. Unpublished NPWS report.
- NPWS (2019) *The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments*. Unpublished NPWS report.
- OPR (2021) *Appropriate Assessment Screening for Development Management. OPR Practice Note PN01*. Office of the Planning Regulator.
- Ryan Hanley (2014) *Stage 1: Appropriate Assessment Screening Methodology for the Maintenance of Arterial Drainage Schemes*. Ryan Hanley Consulting Engineers, Dublin.
- Ryan Hanley (2014) *Source » Pathway » Receptor Chains for Appropriate Assessment. Arterial Drainage Maintenance Categories*. Ryan Hanley Consulting Engineers, Dublin.

2.2 Ecological surveys

To inform the Appropriate Assessment process, a number of assessments and ecological surveys have been conducted, including:

- An ecological desk-based assessment to collate information on designated sites and protected and notable species, reported in detail in the AA screening (JBA 2022).
- An ecological walkover survey conducted on 4th and 5th October 2022, by JBA Ecologists Patricia Byrne, Mark Desmond and Michael Coyle.

During the ecological walkover the habitats previously mapped in 2017 were reviewed and where necessary updated or boundaries revised. Aerial photographs and site maps

assisted the habitat survey. Habitats have been named and described following Fossitt (2000). Nomenclature for higher plants principally follows Stace (2019).

Protected species, including mammals (e.g. Otter *Lutra lutra*, Badger *Meles meles*) and birds, were surveyed based upon sightings and signs of activity during the habitat survey and also by the identification of potentially suitable habitats. This included a preliminary assessment of features with suitability for roosting bats and recording of any Invasive Non-Native Species (INNS) found. All evidence of protected habitats and species was recorded in a digital database where relevant, and all information gathered was provided to the OPW on a separate GIS database.

2.3 The Adverse Effect on Site Integrity test

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of qualifying interest. The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Upon the conclusion of the AA, the competent authority should grant consent to the plan or project only after having ascertained that it will not adversely affect the integrity of the Natura 2000 site(s) concerned.

An assessment of whether there could be an adverse effect on site integrity is done using the source-pathway-receptor model which is a conventional model used for determining the risk of impact to a site or qualifying interest (OPR 2021; Ryan Hanley 2014b). Risk is the likelihood or expected frequency of a specified adverse consequence or impact. Applied to the Scheme, it expresses the likelihood of an adverse impact arising because of the Scheme activities. A hazard presents a risk when it is likely to affect something of value (i.e. the Natura 2000 sites and their Qualifying Interests (QIs)). It is the combination of the probability of the hazard occurring and its consequences that is the basis of a risk assessment which an NIS essentially is:

$$\text{Risk} = \text{probability of an event} \times \text{consequential damage}$$

The source-pathway-receptor model is a useful tool to determine if a risk is present, and to help quantify the risk to see if the threshold of an adverse effect on site integrity is reached. For a risk to be present, all three elements must be present.

Source: The source considered in this NIS is the proposed works or activity that will occur as a result of the Scheme. Key considerations in assessing the source are the nature and scale of the potential impacts that may arise, such as the type of contaminants that may arise, the contaminant loading and other physical attributes. The point of occurrence is a critical reference point for assessing the attributes of the source of any potential adverse impacts.

Pathway: Pathways are established by surface water, ground water and land and air connections. The pathway includes everything between the source and the receptor; from point of release of potential adverse impacts, such as contaminants, to the receptor. The location, nature, connectivity and extent of wells, groundwater dependent ecosystems, aquifers and faults can all influence the nature of a pathway. Rivers, streams and drainage ditches could all act as potential pathways for potential waterborne impacts. Where the pathway includes surface or groundwater bodies, the WFD status of that body is reviewed as this informs the ability of it to transfer impacts and its resistance and resilience of adverse impacts. Land and air pathways to be considered include those that may transfer direct physical impacts, noise and visual disturbance (vibrations) and dust or other airborne particles.

Receptor: The receptor is the QI features of the relevant Natura 2000 sites, their Conservation Objectives (COs) and the overall integrity of the Natura 2000 sites. To determine the significance of potential adverse impacts on the integrity of the Natura 2000 site, the COs of each site are assessed relative to the potential impacts that may

occur because of the proposed works. The conservation objectives are the fundamental unit on which the assessment is based. If the project were to undermine or make these objective more difficult to achieve, the conservation status of the QI features becomes harder to achieve, and the quality and condition of the site will be reduced, reducing the 'integrity' of the Natura 2000 site. Each Natura 2000 site will either have specific or generic conservation objectives. Detailed site-specific conservation objectives have now been provided for most SACs and SPAs throughout Ireland.

The overall aim of COs is to maintain or restore the favourable conservation conditions of the Annex I habitats and/or the Annex II species for which a SAC has been selected, under which the site-specific objectives contain more detailed attributes, measures and targets.

Favourable conservation status of a **habitat** is achieved when:

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

The favourable conservation status of a **species** is achieved when:

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

The conservation objectives for SPAs are also to maintain or restore the favourable conservation condition of the bird species listed as QIs for SPAs, which are defined by the following list of attributes and targets:

- Population trend: Measure of percentage change and whether the long-term population trend stable or increasing.
- Distribution: Number, range, timing and intensity of use of areas. There is to be no significant decrease in the range, timing or intensity of use of areas by specific or generic bird species, other than that occurring from natural patterns of variation.

The conservation objectives for non-breeding birds QIs for SPAs are as follows:

- To maintain the favourable conservation condition of the non-breeding water bird Special Conservation Interest species listed for a SPA.
- To maintain the favourable conservation condition of the wetland habitat for a SPA as a resource for the regularly occurring migratory water birds that utilise it.

Some Natura 2000 sites do not have specific COs for each QI and instead have only the general objectives listed above. Where these sites are screened into the assessment, detailed COs have been derived from other nearby Natura 2000 sites with the same QIs. In these cases, the necessary assumption has been made that the sites have similar characteristics, and the conservation objectives are likely to be similar for the specific habitat or species type in terms of conservation requirements.

Site integrity is assessed on the basis of each conservation objective of each qualifying interest feature. Should any conservation objective be undermined by the proposed work, the site integrity will therefore be adversely affected. Low-impact effects that are too

small or short-lived to undermine the achievements of the conservation objectives are therefore not likely to adversely affect the site integrity.

2.3.1 Avoidance and mitigation measures

To ensure that any mitigation measures are sufficient and proven to be successful, they are designed in accordance with the most up to date best practice guidelines and tailored where necessary to the conditions on-site and nature of the relevant receptors. OPW have a detailed process to ensure ecological measures are included during project implementation, along with audits to check compliance. Any avoidance and mitigation measures are assessed for evidence of their effectiveness and the certainty with which they can be implemented, as well as certainty with which they will avoid or reduce impacts. This forms a critical part of the assessment of residual effects and whether these could still result in adverse impacts.

2.3.2 In-combination Assessment

The in-combination assessment followed the process for in-combination set out by the DTA Handbook (Chapman & Tyldesley, 2012). The in-combination impacts are considered only after the assessment of the project alone. If the result of this is that the Scheme will have no effect at all on a Natura 2000 site, then no in-combination assessment is necessary. However, where there is no adverse effect on site integrity, but some adverse effect, an assessment of this adverse effect in-combination with other plans or projects is carried out. Other plans or projects were identified within the relevant pathway screening distance set out in Ryan Hanley (2014a). Plans and projects were searched for using the National Planning Application Database, EIA portal and Myplan.ie databases (all accessible online), and any plans or projects that will take place from 2021 onwards (the period of assessment for the Scheme) were included, as well as projects completed before 2021 where the full impacts of that project are yet to be realised. If no other plans or projects are identified, then the assessment is complete. Where other plans or projects are identified then initially a review is made of its AA screening, or AA, and if the Competent Authority for the plan or project has made a final determination of no effect on the integrity of any Natura 2000 site, either alone or in-combination, this determination is used in this assessment. Where there is not a full AA, or the findings are unclear or out of date, the plan or project documentation is checked for credible evidence of real (not hypothetical) risk to a Natura 2000 site. Where these are identified then a detailed assessment is carried out. The impact assessment follows the method set out in Section 2.3 and applies mitigation where necessary to determine if adverse effects on site integrity are expected from the combination of plans and projects with the Scheme. A summary of the approach is presented in Figure 2-1. The final iteration of the in-combination assessment, including a search of relevant plans or projects, was completed on the 10th of October 2022.

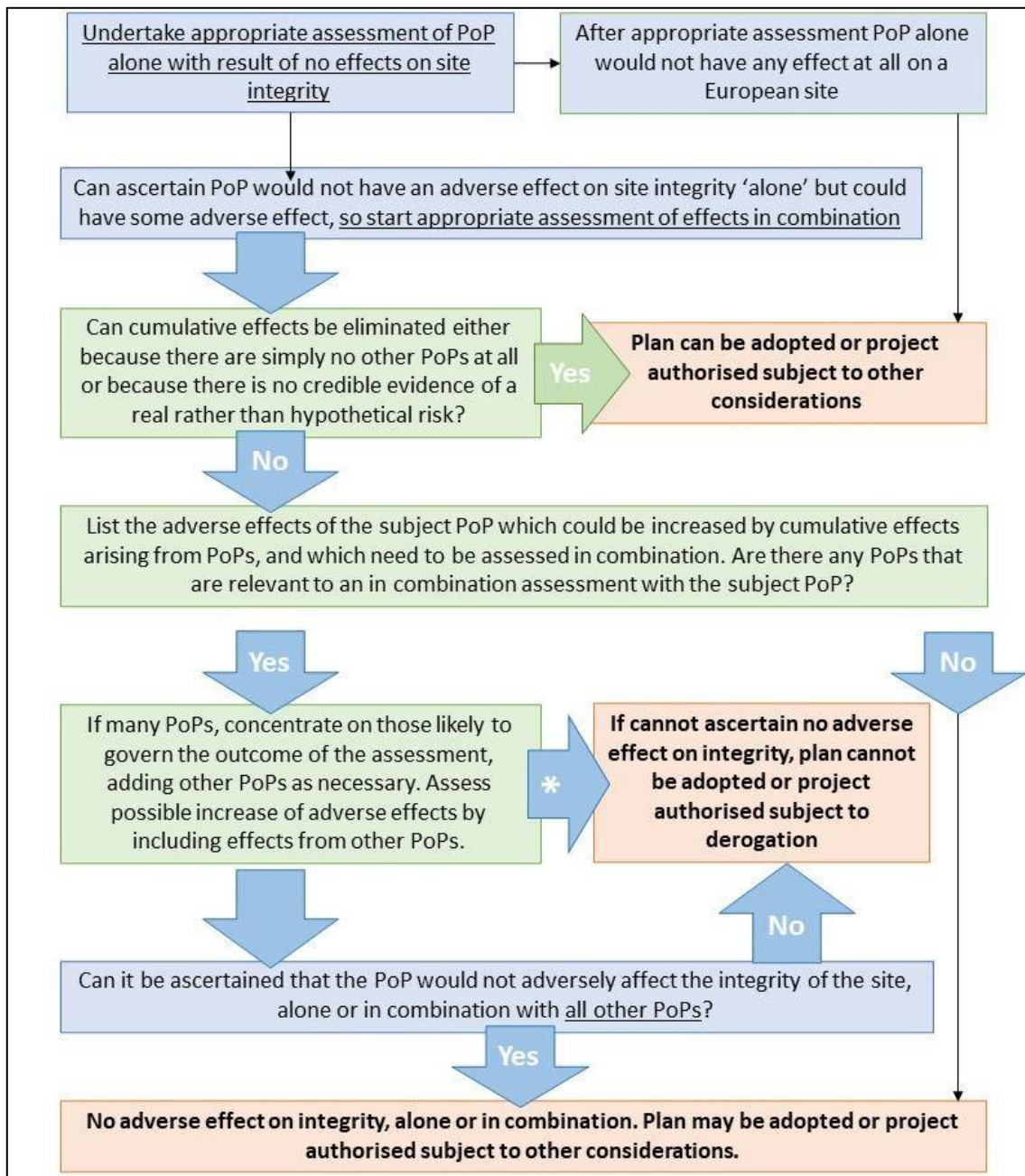


Figure 2-1. Flow diagram of process for in-combination assessment (modified from Tyldesley & Chapman, 2013)

2.3.3 Consultation

No formal consultations for this NIS were completed in preparation of this draft, although there is ongoing dialogue between the OPW, IFI and NPWS in relation to arterial drainage schemes. This draft will form the basis of a consultation with NPWS, as the Statutory Nature Conservation Body, prior to final determination by OPW.

This report has been produced using currently available information, with the most up-to-date versions used. Where new, or updated, information becomes available the OPW will consider and review the findings of this assessment, if necessary.

3 Project Description

3.1 The Glyde & Dee Scheme and Proposed Works

The Glyde and Dee Arterial Drainage Scheme is in County Louth. It includes 761.0km of watercourse and 13.9km of embankment (Figure 3-1). They drain primarily agricultural land from west to east, with the two main rivers, the Glyde and the Dee, forming a confluence by the coast before their outfall into Dundalk Bay. All of the embankments present in the Scheme fall within this coastal section. Details of the watercourse and embankments are shown in Figure 3-1, with details of the coastal section in Figure 3-2 and the location of accommodation bridges in Figure 3-3.

3.2 Drainage Maintenance Activities

Arterial Drainage Maintenance includes a range of operations such as silt and vegetation management, mowing and structure maintenance, and listed as channel, embankment or structure maintenance in Table 3-1 below. It is required to retain the arterial drainage scheme design capacity. For the purpose of the screening assessment, it is assumed that any of the activities shown in Table 3-1 could occur on any of the channels. Bridge works are also assessed where these take place out of the water. This includes vegetation management on the bridge, works, such as minor repairs and repointing to the above-water parts of the bridge that do not require entry into the water or creation of a dry area of riverbed and does not include maintenance where substances potentially toxic to the aquatic environment are used.

Table 3-1. OPW Drainage Maintenance Types

Category	Maintenance Type	Code
Channel Maintenance	Silt and vegetation management	A
	Aquatic vegetation cutting	B
	Bank protection	C
	Bush cutting/Branch trimming	D
	Tree cutting	E
	Other	K
Embankment Maintenance	Bush cutting/Branch trimming	D
	Tree cutting	E
	Mulching	F
	Mowing	G
	Gate installation	H
Structural Maintenance	Sluice maintenance	I
	Bridge maintenance	J
	Bank protection	C
	Bush cutting/Branch trimming	D
	Tree cutting	E

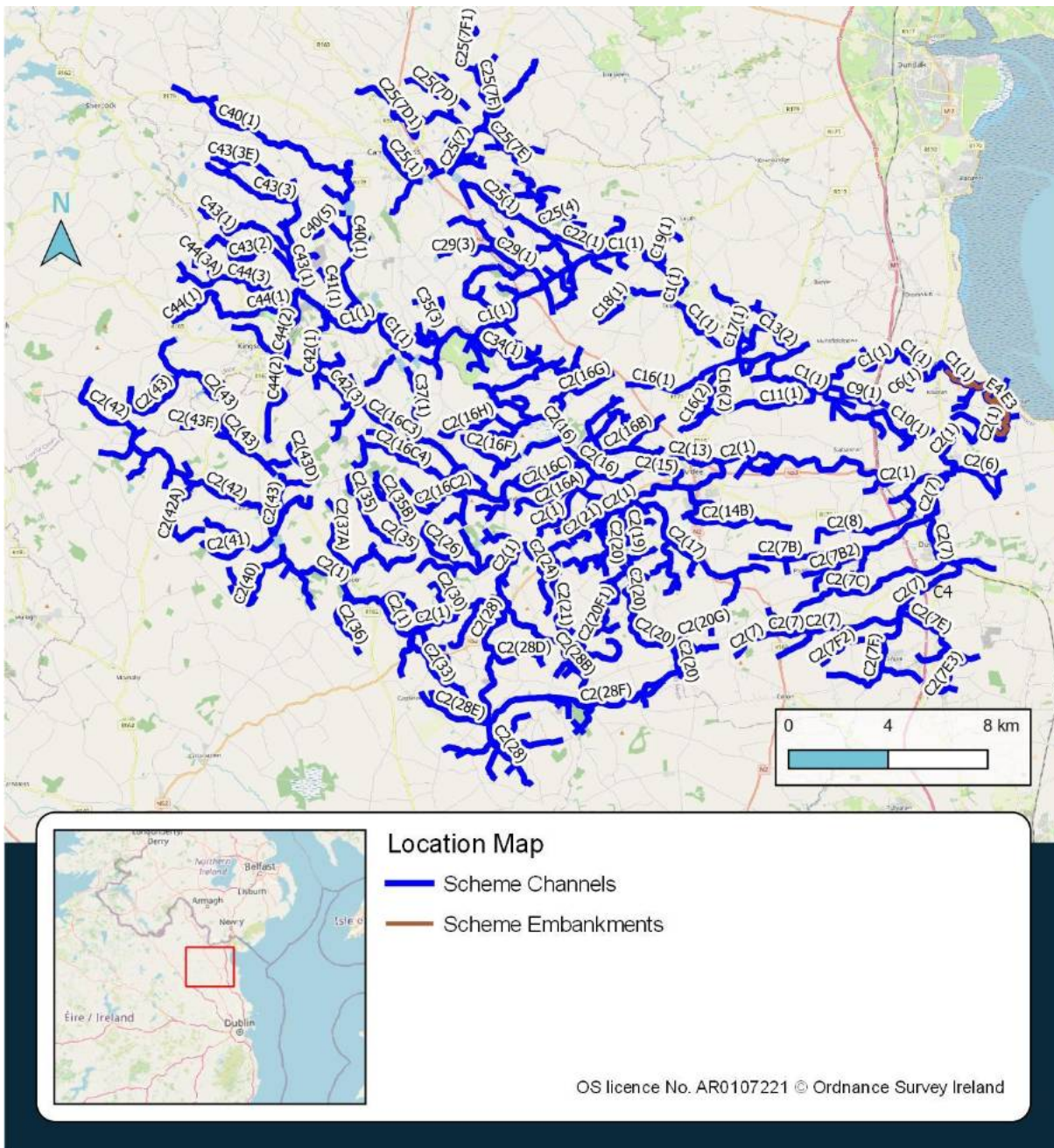


Figure 3-1. Location of Scheme channels and embankments

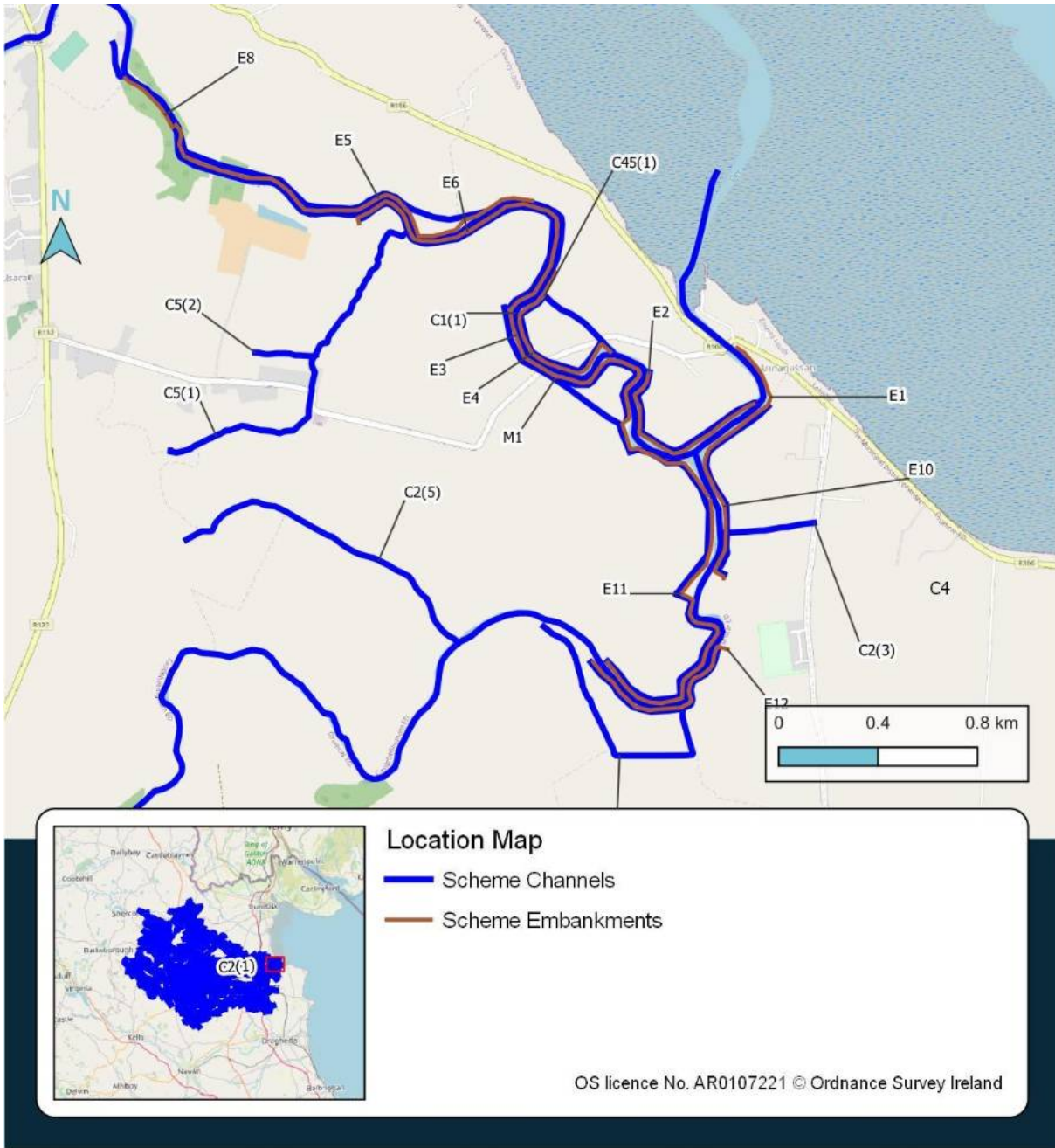


Figure 3-2. Location of Scheme channels and embankments near the coast

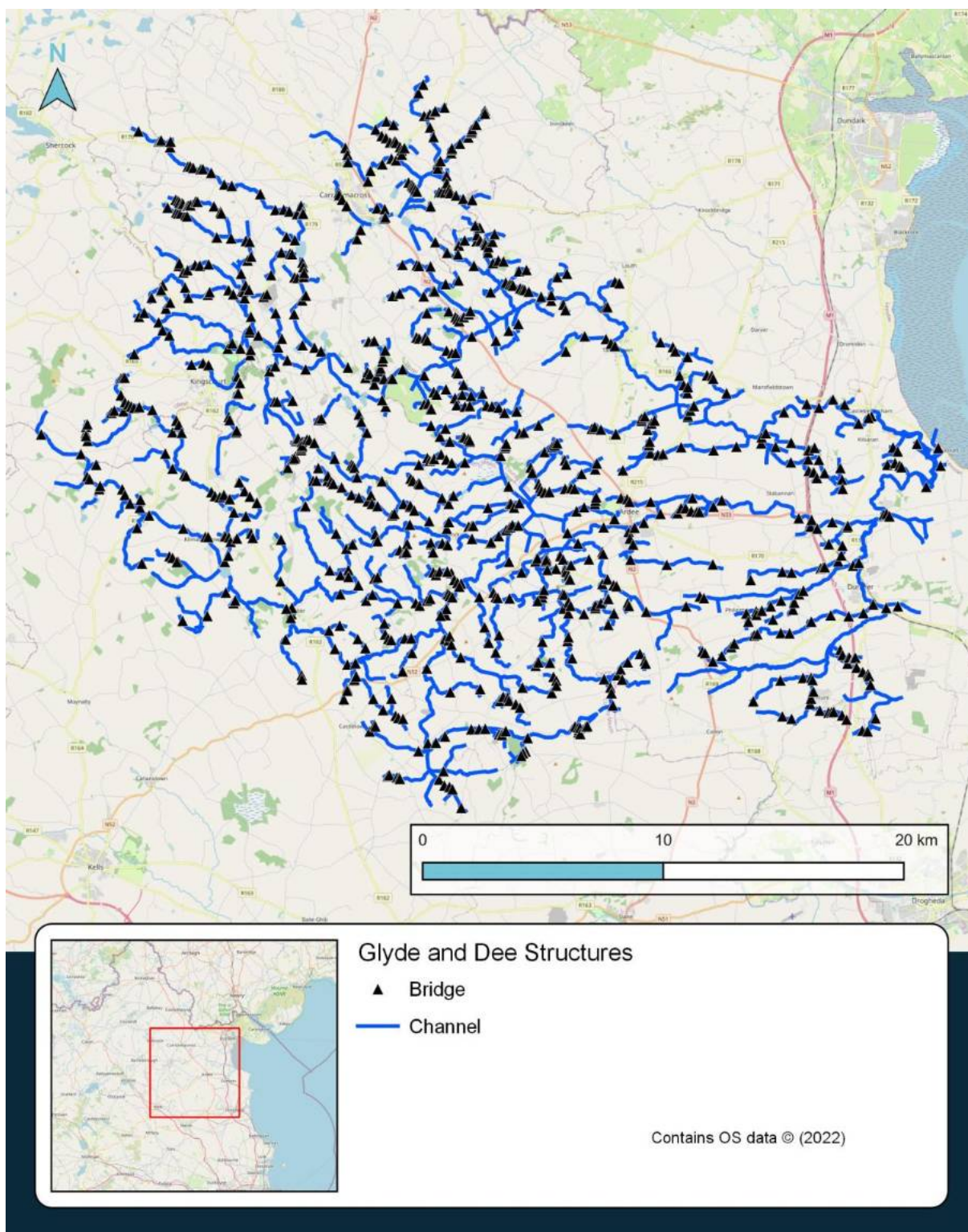


Figure 3-3. Location of Scheme structures

3.2.1 Channel Maintenance Activities

The majority of drainage maintenance activities are focused on channel maintenance. While the frequency of maintenance on an individual channel may vary, with some channels requiring maintenance annually and others only requiring maintenance every twenty years, the average channel requires maintenance every four to six years. In this

regard, approximately 2,000km of channels are maintained annually and nearly all of the 11,500km of channels across Ireland's Arterial Drainage Schemes will have been maintained at least once over a period of five years. Channel maintenance is organised on a regional basis, with OPW Arterial Drainage Maintenance Regional Offices in Limerick, Headford, Co. Galway and Trim, Co. Meath.

Scheme Design Standards

Arterial Drainage Schemes constructed under the Arterial Drainage Act, 1945 were designed to provide an outfall for drainage of agricultural lands, and generally provided protection for a 3-year flood event. Where the creation of an outfall dictated the design bed levels, greater protection than the 3-year flood event was achieved as a consequence. In the case of modern flood relief schemes, flood protection for a 100-year flood event would be the design objective.

The original Scheme designs, including the outfall datum for each of the Arterial Drainage Schemes, are available in the relevant OPW Arterial Drainage Maintenance Regional Office. This includes the mapped Scheme design, and the associated long sections and cross sections. These designs are used to inform channel maintenance.

Types of Channel Requiring Maintenance

In the years following the construction of a drainage scheme there is a tendency for the channel capacity to be progressively reduced due mainly to the transportation and deposition of bed materials, the accumulation of silt and the growth of in-channel vegetation. The resultant channel maintenance consists of repetitive works of a cyclical nature, to restore the Schemes design levels i.e. outfall datum in order to maintain the channel's designed capacity to convey water.

Channels are prioritised for maintenance based on the rate of deterioration and the risk arising. The selection takes account of requests from the general public and potential flooding risk to roads, properties, urban areas and sewage works (OPW 2011a).

Plane Bed to Low Gradient Channels

Some 60 – 70% of maintained channels are of gentle longitudinal gradient and subject to relatively rapid deposition of silt, especially those that are subject to prolific growth of in-channel vegetation. The majority of maintenance works are therefore located on smaller lower-lying channels, with 90% of works in channels with a base width of <3m (OPW 2011a). In such channels silt and in-channel vegetation may cause the low flow level to rise by 50-300mm above the Scheme design level. In such circumstances maintenance is focused on restoring both low-flow and flood-flow water levels to original Scheme design.

Medium to High Gradient Channels

A smaller proportion of channels are steep and fast flowing and are subject to flash floods, bank erosion and rapid movement of bed gravel. The steeper sections of channel normally require relatively little and infrequent maintenance works (OPW 2011a) as opposed to channels of low gradient which are subject to rapid accumulation of silt and proliferation of vegetation. These channels will have a greater requirement for bank protection works.

Periods and Cycles of Maintenance

The average channel requires silt and vegetation management every four to six years. However, channels with prolific weed growth may require maintenance annually, particularly where downstream bridges are at risk of being blocked due to a flow of decaying vegetation in autumn. Conversely, some channels may only require in-stream maintenance every twenty years due to the self-cleaning characteristics e.g. high gradient channels.

Where the period between previous channel maintenance works has been exceptionally long, dense scrub and woody vegetation can establish along the channel and within the maintenance access corridor. In such circumstances, drainage maintenance works will

include the removal of scrub/transitional woodland (code WS1 in the Fossitt Classification, 2000) that has developed along the banksides via bush cutting/branch trimming, tree cutting or mulching. This is undertaken between the 1st September and 28th February to avoid the residential bird nesting season (from the 1st March to 31st August as per the Wildlife Act (1976)).

In contrast, in-stream works for silt and vegetation management are carried out outside of the salmonid spawning season (May to September) and the times that early life stages of salmonid fish will be present as per Section 173 of the Fisheries (Consolidation) Act (1959) on channels with salmonid spawning habitat. Any works required during this period are carried out in consultation with IFI. As a result, there may be a two stage approach to the works, with silt and in-stream vegetation management carried out during the open season (i.e. summer months), while woody vegetation removal is carried out in the winter months.

Other restrictions on works may also apply in relation to the presence/absence of other protected species such as White-clawed Crayfish and Sea, River and Brook Lamprey which will influence the timing of works.

3.2.2 Embankment Maintenance Activities

A total of 5 No. Estuarine Embankment Schemes were constructed under the 1945 Act. In addition, a number of the Arterial Drainage Schemes have embanked sections.

Scheme Design Standards

As above for the Arterial Drainage Schemes, Estuarine Embankment Schemes constructed under the Arterial Drainage Act 1945 were designed to provide an outfall for drainage of agricultural lands, and generally provided protection for a 3-year flood event. Where the creation of an outfall dictated the design bed levels, greater protection than the 3-year flood event was achieved as a consequence. In the case of modern flood relief schemes, flood protection for a 100-year flood event would be the design objective.

The original Scheme designs are available in the relevant OPW Arterial Drainage Maintenance Regional Office. This includes the mapped Scheme design, and the associated long sections and cross sections.

Types of Embankments Requiring Maintenance

All embankments and associated sluice structures (see section 3.2.3) are inspected annually for signs of disrepair.

Regular inspections are carried out on sections of embankments, which are known from experience to be at risk, together with additional inspections after a storm surge at sea or a high tidal/flood event. Maintenance of embankments includes removal of vegetation to allow for inspection of the embankment, and in some cases the replacement of existing fencing with gates to allow for future access during maintenance.

3.2.3 Structural Maintenance Activities

Structural Design Standards

During the construction of the Arterial Drainage Schemes under the 1945 Act, some 18,500 No. accommodation bridges were identified and modified, or replaced as required. These bridges provide farmers owning land on both sides of a channels with farm vehicular and/or foot access from one side to the other. The type of bridge provided depended on the width, depth and required flow capacity of the channel, and ranged from concrete piped culverts to relatively large structures formed on concrete or masonry abutments spanned by structural steel beams, or lattice girders together with concrete or timber decking.

During the Estuarine Embankment Schemes under the 1945 Act, existing sluice structures were identified and modified, or replaced as required. Additional sluice structures were

constructed as required bringing the total number to approximately 750. The function of these sluice structures is to allow water from the floodplain behind the embankments to discharge to the main river or estuary.

Types of Structures Requiring Maintenance

In general, as channel maintenance proceeds, the bridges are examined by the supervisory industrial staff and if required, repairs/replacements are scheduled. The type of bridge structures, which are most likely to have fallen into a critical state of disrepair, are those with timber decking supported on steel beams, and those in which abutment foundations are being undercut. There is a standard type of design for the replacement of these structures, which consists essentially of mass concrete abutments with reinforced cast in-situ decking. This type of structure is simple to construct and under normal circumstances, it will last for many years with little or no maintenance.

On many occasions, it is not necessary to totally replace a bridge, and repairs such as underpinning the foundation or replacement of wing-walls, parapets or sections of the deck may be all that is required to extend the useful life of the structure. Where bridge maintenance may be required, a Bridge Inspection Form will be filled out by the Foreman, prior to the works. This will determine the need for further assessment and potentially, any mitigation measures that may be required. See Appendix E - Foreman's Bridge Inspection Report.

All embankments and associated structures are inspected annually for disrepair. Due to the time elapsed since scheme completion, some of these sluice structures have reached their design life and have started to fail. In this instance, full replacement is required. Typically, this involves the installation of pre-cast headwalls and back walls, and the replacement of existing corrugated galvanised steel pipes with PVC plastic pipes.

Sluice doors are the most frequent part of the sluice structure that are required to be repaired or replaced. Repairs to a sluice door consist of replacing the arms/hinges on the existing cast iron door. On occasion, the existing cast iron door would be replaced with a high-density polyethylene (HDPE) door. Blockages often occur at the doors of the sluices due to silt build up. These blockages are removed using a long reach excavator working from the bank of the channel.

It is not known where bridges, sluice doors or structures may require maintenance on the Glyde & Dee Scheme. Maintenance of bridges, structures and/or sluices will only occur within the scheme after following the relevant environmental procedures as detailed in the OPW Environmental Procedures document (Brew & Gilligan, 2019) and using specific mitigation measures where identified in environmental assessments. Works to bridges are included in this assessment in as far as works do not take place in the channel. This means that general repairs to the structure, vegetation management and inspections are considered.

3.2.4 Maintenance works considered outside of the Scheme Design Standards and outside of normal Arterial Drainage Maintenance Works

Occasionally, works are required that can be considered outside of the scope of the normal Arterial Drainage Maintenance Works to maintain a scheme. Works considered outside of the normal scope of statutory arterial drainage maintenance works are not assessed for impacts in this report.

Works that could be considered outside of the normal scope of works include those involving extensive bank protection measures, removal of mature woodland, unplanned bridge maintenance works or any other unplanned works within the zone of influence of a Natura 2000 site.

3.2.5 Plant and Machinery

The types of machinery typically utilised during maintenance works would include 360 hydraulic excavators (from 15-20 tonne excavators), mini-diggers, tractors and trailers, tipper lorries, hydraulic shears, hydraulic secateurs, chainsaws, mulchers and mowers; the machinery used is dependent on the maintenance activity being conducted.

The removal of dense in-stream silt and vegetation requires the use of a hydraulic excavator with a 1.5m wide (approximate) bucket (capacity approximate 500ltrs). For standard excavators, works progress at a rate of 700m to 900m per week. In relation to long-reach excavators, works progress at a slower rate of between 200m and 350m per week. Rates may change due to channel width or ground conditions.

3.2.6 Maintenance Access Corridors (MAC) and Working Zone

Maintenance sites are generally accessed via the public road and through farmland. A maintenance access corridor is utilised along one side of a channel for maintenance purposes. These established routes are used to track the hydraulic excavators for maintenance and for the disposal of spoil (see section 3.2.8). The same route is generally followed every maintenance cycle. This approach avoids disturbance of habitats on the opposite bank during works.

Where grasslands are present within the maintenance access corridor, the impact is predominantly temporary as the grasslands are trampled by machinery and can recolonise following completion of the maintenance activities. Within woodland and scrub habitats a linear path more typical of disturbed vegetation i.e. scrub/transitional woodland (WS1) will be evident along the maintenance access corridor due to regular machine access. In this regard, the disturbance regime associated with the tracking of plant machinery along the maintenance access corridors on the channel bank arrests succession to mature woodland such that scrub/transitional woodland (WS1) dominates. Where mature trees are present these are generally avoided by plant machinery.

Structures are generally accessed through farmland from the public road above. Plant machinery will utilise the same maintenance access corridor used for channel maintenance to gain access to the structure. Where individual trees, woodland and scrub habitats are present at the location of the structure, these may be removed to facilitate bridge inspection and works. Where mature trees are present these are generally avoided by plant machinery.

The location of drainage maintenance works is generally accessed via public roads and through farmland, with the siting of mobile short-term staff welfare facilities, plant storage and car parking agreed with local landowners. There is no requirement for temporary site lighting.

There is a requirement for water supply and disposal of wastewater from the welfare facilities (see section 3.2.8 in relation to waste disposal).

3.2.7 Site Compounds (Welfare Facilities), Access Routes and Haul Roads

Haul roads are generally not required to facilitate drainage maintenance activities. Where access is required in soft ground conditions, plant equipment will be brought in on tracks or temporary matting will be laid to provide a corridor for machinery access. Where matting is utilised, it will be completely removed post completion of works to allow vegetation to recolonise. All plant and machinery is confined to one defined access route to minimise disturbance.

All plant and machinery are regularly maintained and serviced to minimise release of hydrocarbons. All hydraulic excavators and other plant machinery use long life engine oil and biodegradable hydraulic oil. Fuelling and lubrication are conducted a minimum of 50m away from all channels. Spill kits are present in all plant used in maintenance activities.

Integrated submersible pumps are also deployed in the event of structural maintenance and the requirement for dewatering of excavations.

3.2.8 Waste Output/Disposal

The material removed from a channel during silt and vegetation management is normally spread thinly along the bank or on top of existing spoil heaps where present within the access corridor. All dead wood material is left on site to decompose or is removed off site under local landowner agreements. Where mulchers or mowers are deployed, the arisings are left on site to decompose or the mulched material is buried.

Construction and demolition waste from structures includes broken concrete and stone. Steel railings are returned to the depot for recycling. Used engine oil and hydraulic oil is disposed of by a licensed waste handler. Toilet facilities are maintained by a licensed waste handler. Any waste generated on site is returned to the depot for segregation and disposal by a licensed waste handler.

3.2.9 Working Hours

All maintenance activities are undertaken during daylight hours. Standard working hours are 8.00am to 4.30pm, with lunch and tea breaks, Monday to Friday. There is no requirement for temporary site lighting to facilitate works. Machines are powered down when not in use.

3.2.10 Environmental Training

Environmental training of all staff involved in drainage maintenance is an ongoing process. Technical and Operational Staff completed formal training in Environmental Drainage Maintenance (EDM) in 2004. This training course was revised and expanded under the OPW's Environmental River Enhancement Programme (EREP) and was delivered to all staff in 2010. The training programme delivered included presentations in river corridor ecology, the Environmental Drainage Maintenance Guidance Notes (Ten Steps to Environmentally Friendly Maintenance), maintenance strategies involving both 'enhanced maintenance' and 'capital enhancement', and OPW's Environmental Management Protocols and Standard Operating Procedures (SOPs). Both sets of training were developed and delivered by IFI.

The formal approach to EDM Training was complimented with on-site training. Regular site visits from IFI and OPW's Environment Section provided further guidance and advice to operational staff. Auditing of operational staff on the implementation of the Environmental Drainage Maintenance Guidance Notes (Ten Steps to Environmentally Friendly Maintenance) was also carried out by both IFI and OPW's Environment Section.

In addition, other environmental training took place as deemed beneficial, e.g. in 2008, the majority of the technical and operational staff were trained in Otter Awareness. This course, provided by the Department of Zoology, Trinity College Dublin, included presentations on Otter ecology, and on-site identification of Otter signs and suitable habitat.

More recently, an environmental training course was designed and provided by JBA Consulting to all OPW staff in 2017 and 2018. It was given in three different stages. Management staff were given a more detailed 2-day course in Environmental and Ecological training. Ground staff were given 1.5 days of training in the environment and ecology. Modules were designed to assist staff in understanding the relevant legislation, recognising ecologically sensitive habitats and species, invasive non-native species identification and general environmental and ecological training relevant to their work. This included a half day practical session where ecologists demonstrated the identification of the elements taught in the classroom, in the field.

Training in the completion of an Environmental Risk Assessment and Bridge Inspections from an ecological perspective, was designed and provided by JBA Consulting to OPW Foremen and selected engineering staff in 2018. Further to this, all operational staff attended a 1-day environmental training course which included detailed guidance on the OPW's Environmental Management Procedures in 2019.

3.2.11 Environmental Audits

A portion of operational crews have been audited annually by the OPW Environment Section, IFI and since 2018 by independent consults for the implementation of the Environmental Drainage Maintenance Guidance Notes (Ten Steps to Environmentally Friendly Maintenance). The OPW's Environmental Management Protocol and EPs. Auditing is carried out by independent consults on a rotational basis to ensure all operational crews are audited at least once every three years. All audit results are forwarded to the relevant engineer for that Scheme within two working weeks. In the event of an audit showing elements of unreasonable non-compliance with procedures, the relevant Engineer will be notified within one working day. Audit results are also forwarded to OPW Environment Section for inclusion in monthly regional benchmarking reports. In the event of non-compliance audit, refresher training is provided to the staff (in Ten Steps to Environmentally Friendly Maintenance) and a re-audit is carried out within a short period of time.

3.2.12 Environmental Management Protocol and Environmental Procedures

The OPW's Environmental Management Procedures (Brew & Gilligan, 2019) (Appendix D) set out how regional management staff manage a range of environmental aspects, including programming of works to accommodate certain environmental windows or restrictions on timing of works, and recording of data. A total of 31 No. EPs are applied during operational works. The 31 EPs replace the previous SOPs (OPW 2011b). These EPs set out actions designed to eliminate, or substantially reduce, likely impacts to identified species and their associated habitats. A brief summary of these follow.

Planning EPs relevant to Management Staff:

- Including Environmental Risk Assessment Procedure; and
- Appropriate Assessment Procedure

Implementation EPs - relevant to all staff:

- Environmental Drainage Maintenance Guidance Notes (10 Steps to Environmentally Friendly Maintenance)
- Tree Management Procedure
- Silt Management Procedure
- Machinery related procedure

Invasive Species EPs - relevant to all staff:

- Spread of Invasive Plant (Low Biosecurity) Procedure
- Spread of Water Based Invasives (High Biosecurity) Procedure

Species EPs - relevant to all staff:

- Salmonid Procedure
- Otter Procedure
- Bats Procedure
- Freshwater Pearl Mussel Procedure

Habitat EPs - relevant to all staff:

- Alluvial (Wet Woodland) Procedure
- Wetland Procedure

The description of activities, assessment and mitigation measures described in this report relate to the content of the published OPW Environmental Procedures (Brew & Gilligan 2019). An Environmental Risk Assessment process has been developed by the OPW which will be filled in by the program producer for >3m base width main channels where maintenance has not occurred for 15 years and embankment works where maintenance has not occurred for 15 years.

4 Screening Assessment Results

4.1 Introduction

A screening for Appropriate Assessment, addressing Stage 1 of the AA process, has already been completed for the Glyde & Dee Arterial Drainage Scheme (JBA 2022). This identified that there were likely significant effects on Natura 2000 sites as a result of the proposed maintenance activities, and therefore a Stage 2 Appropriate Assessment is necessary.

From the screening exercise it has been determined that likely significant effects may arise on three Natura 2000 sites as a result of the Scheme. These sites and the pathways to impact are shown in Table 4-1, along with sites that were considered as they are within the Scheme ZOI but screened out.

Table 4-1. Screening Assessment summary

Site	Surface water	Land	Ground water	Comment
Boyne Coast and Estuary SAC (001957)	NA	No LSE	NA	Coastal and marine sites within 15km but no mobile receptors likely to be present in or near Scheme channels
Carlingford Shore SAC (002306)	NA	No LSE	NA	
Clogher Head SAC (001459)	NA	No LSE	NA	
Dundalk Bay SAC(000455)	LSE	LSE	No LSE	Habitats at Dundalk Bay SAC have been deemed vulnerable to maintenance works which may reach the site via surface water and land and air pathways.
Dundalk Bay SPA (004026)	LSE	LSE	No LSE	Bird species within Dundalk Bay SPA have been deemed vulnerable to maintenance works which may reach the site via surface water and land and air pathways.
Stabannan-Braganstown SPA (004091)	No LSE	LSE	No LSE	Bird species within this SPA have been deemed vulnerable to maintenance works which may reach the site land and air pathways only.
Carlingford Mountain SAC (000453)	NA	NA	No LSE	No significant impacts, via any of the three pathways, have been identified as part of this assessment.
Carlingford Lough SPA (004078)	NA	NA	No LSE	
River Boyne and River Blackwater SPA (004232)	No LSE	NA	No LSE	
River Boyne and River Blackwater SAC (002299)	No LSE	NA	No LSE	

The QIs that have been identified as having Likely Significant Effects and require further assessment are:

Dundalk Bay SAC:

- Estuaries
- Perennial vegetation of stony banks
- Mudflats and sandflats not covered by seawater at low tide
- Salicornia and other annuals colonizing mud and sand
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- Mediterranean salt meadows (*Juncetalia maritimi*)

Dundalk Bay SPA:

- Light-bellied Brent Goose *Branta bernicla hrota*
- Shelduck *Tadorna tadorna*
- Teal *Anas crecca*
- Mallard *Anas platyrhynchos*
- Pintail *Anas acuta*
- Red-breasted Merganser *Mergus serrator*
- Oystercatcher *Haematopus ostralegus*
- Ringed Plover *Charadrius hiaticula*
- Golden Plover *Pluvialis apricaria*
- Grey Plover *Pluvialis squatarola*
- Lapwing *Vanellus vanellus*
- Knot *Calidris canutus*
- Dunlin *Calidris alpina*
- Black-tailed Godwit *Limosa limosa*
- Bar-tailed Godwit *Limosa lapponica*
- Curlew *Numenius arquata*
- Redshank *Tringa totanus*
- Black-headed Gull *Chroicocephalus ridibundus*
- Common Gull *Larus canus*
- Herring Gull *Larus argentatus*

Stabannan-Braganstown SPA:

- Greylag Goose *Anser anser*

The screening assessment also identified which Scheme activities were potential sources of impact resulting in likely significant effects. The sources of impact to be considered in the NIS are set out in Table 4-2.

Table 4-2. Details of potential sources of impact

Activity	Impact
Disturbance of species and habitats	
Vehicle movement along maintenance access corridor and during operation; vehicle	Habitat disturbance/compaction
	Species disturbance from adjacent habitat:

Activity	Impact
operations in bridge and sluice maintenance	Noise Visual Vibration
Release of suspended solids	
Silt and vegetation management; sluice maintenance	Release of solids downstream – impacting FWPM, other aquatic and riparian species
Release of nutrients/changes in nutrient levels	
Silt and vegetation maintenance	Release from dredged material into bankside habitat
	Re-suspension of deposited nutrients
Vegetation cutting	Release from decaying cut material into embankment and channel
	Release from plant material cut and floating downstream in channel

5 Existing Environment

5.1 Overview

This section summarises the findings of the ecological walkover surveys of the embankments and channels along the Glyde & Dee rivers relative to the proposed works for the Scheme.

5.2 General ecology of the site

The Glyde and Dee Rivers rise in Co Monaghan and Co. Cavan and flow south-eastwards and north-eastwards respectively. The confluence of the two rivers occurs just inland of the seaside village of Annagassan, and the watercourse then drains into Dundalk Bay. The description from 2017 surveys (JBA 2017), which remains accurate and relevant (as verified by a 2022 walkover survey) also states the following:

"Within the Glyde and Dee scheme, the watercourses include sections of depositing lowland river, tidal river and drainage ditches. Most of the surrounding land is improved agricultural grassland, with reedbeds fringing the watercourses in places. Small areas of saltmarsh occur in the lower reaches of the tidal river sections of both rivers.

Both rivers were slow and meandering and approximately 10 m wide. Bank vegetation reflected adjacent habitats and varied between reedbeds, wet grassland and improved agricultural grassland."

5.3 Habitats

Habitat data is compiled from walkover surveys completed by JBA Consulting in October 2022 along with NPWS data on habitat distribution. A range of Fossit habitats were identified during the walkover surveys. They are listed in Table 5-1. Only Annex 1 habitats, or habitats within Natura 2000 sites are discussed in detail.

Table 5-1. Habitats recorded within surveyed areas

Habitat Type	Fossit code	Potential Annex I
Arable crops	BC1	No
Buildings and artificial surfaces	BL3	No
Depositing/lowland rivers	FW2	No
Drainage ditches	FW4	No
Dry calcareous and neutral grassland	GS1	No
Estuary	MW4	No
Hedgerow	WL1	No
Improved agricultural grassland	GA1	No
Lower saltmarsh	CM1	Yes
(Mixed) broadleaved woodland	WD1	No
Mixed sediment shores	LS5	No
Muddy sand shores	LS3	No
Mud shores	LS4	No
Reed and large sedge swamps	FS1	No
Riparian woodland	WN5	No
Sand shores	LS2	No
Scrub	WS1	No
Shingle and gravel banks	CB1	Yes
Tall-herb swamps	FS2	No

Habitat Type	Fossit code	Potential Annex I
Tidal rivers	CW2	No
Treeline	WL2	No
Upper saltmarsh	CM2	Yes

Of these habitats, there are three possible Annex I habitats recorded, listed in Table 5-2. The locations of these habitats are shown in Appendix A.

Table 5-2. Annex 1 habitats recorded within surveyed areas

Annex I Habitat Type	Equivalent Fossit Habitats	Location and source
Perennial vegetation on stony banks [1220]	CB1	High up the shore at Dunalk Bay (Field surveys 2022 & 2017).
<i>Salicornia</i> and other annuals colonizing mud and sand [1310]	CM1/CM2	At mouth of the estuary on the left bank (Field surveys 2022 & 2017).
Mudflats and sandflats not covered by seawater at low tide [1140]	LS3/LS2/LS5	At the mouth of the estuary, just beyond Annagassan pier (Field surveys 2022 & 2017).

5.3.1 Perennial vegetation on stony banks [1220]

A narrow band of shingle and gravel with Sea Beet *Beta vulgaris* was recorded high up the shoreline, just above the area of saltmarsh at the mouth of the estuary.

5.3.2 *Salicornia* and other annuals colonizing mud and sand [1310]

An extensive area of saltmarsh was found at the mouth of the estuary on the left bank. Plants included Common Saltmarsh Grass *Puccinellia maritima*, Sea-purslane *Atriplex portulacoides* and Sea Aster *Tripolium pannonicum*. This area is part of the extensive saltmarsh habitat of Dundalk Bay.

5.3.3 Mudflats and sandflats not covered by seawater at low tide [1140]

At the mouth of the estuary, just beyond Annagassan pier, littoral sediments varied between muddy sand shores, sand shores and mixed sediment shores.

5.4 Fauna

Evidence of ecologically sensitive fauna found along the surveyed channels during ecological surveys is described in the following sections. Past records of protected fauna collated from the NBDC website, recorded as being present within approximately 10 km of the survey area within the last 10 years are found in Appendix C.

5.4.1 Aquatic species

It is likely that a range of aquatic species, particularly fish, use the Scheme channels. The presence of fish is important for maintaining the overall ecosystem of the Glyde and Dee rivers and supporting the SPA bird species and Otter which are known to use the channels.

5.4.2 Mammals

Badger *Meles meles* field signs, including droppings and mammal paths were recorded in several areas with thick vegetation on the embankments of the Glyde and Dee. The active Badger sett recorded in 2017 (JBA, 2017) in a drainage ditch in Stabannan was still

present. Impacts on, and avoidance and mitigation for Badgers does not form part of the NIS, but EP23 Badgers will be implemented which includes maintaining a 30m exclusion zone, increased to 50m during breeding season (December – June).

Otter *Lutra lutra* spraint was recorded in numerous locations along the embankments, as well as feeding remains and otter slides. As in 2017, the OPW embankments offer good commuting and foraging routes for Otter though no otter holts were recorded.

5.4.3 Birds

Several bird species were observed foraging along the watercourses. These included Cormorant *Phalacrocorax carbo*, Kingfisher *Alcedo atthis*, Mute Swan *Cygnus olor*, Curlew *Numenius arquata* and Mallard *Anas platyrhynchos*.

5.5 Invasive Non-native Species

Water Fern *Azolla filiculoides* was recorded on the River Glyde below the upper weir among river bank vegetation. Where water movement was slow it extended across the whole river.

Stands of Japanese Knotweed *Fallopia japonica* and Giant Hogweed *Heracleum mantegazzianum* were recorded on the embankments of the River Glyde.

6 Natura 2000 sites within the Zone of Influence of the scheme

6.1 Introduction

This chapter provides baseline information on the Natura 2000 sites within the ZoI of the drainage maintenance activities, Descriptions of the sites are provided, along with details of the qualifying interests, conservation objectives and site vulnerabilities. The screened in sites are:

- Dundalk Bay SAC (000455)
- Dundalk Bay SPA (004026)
- Stabannan-Braganstown SPA (004091)

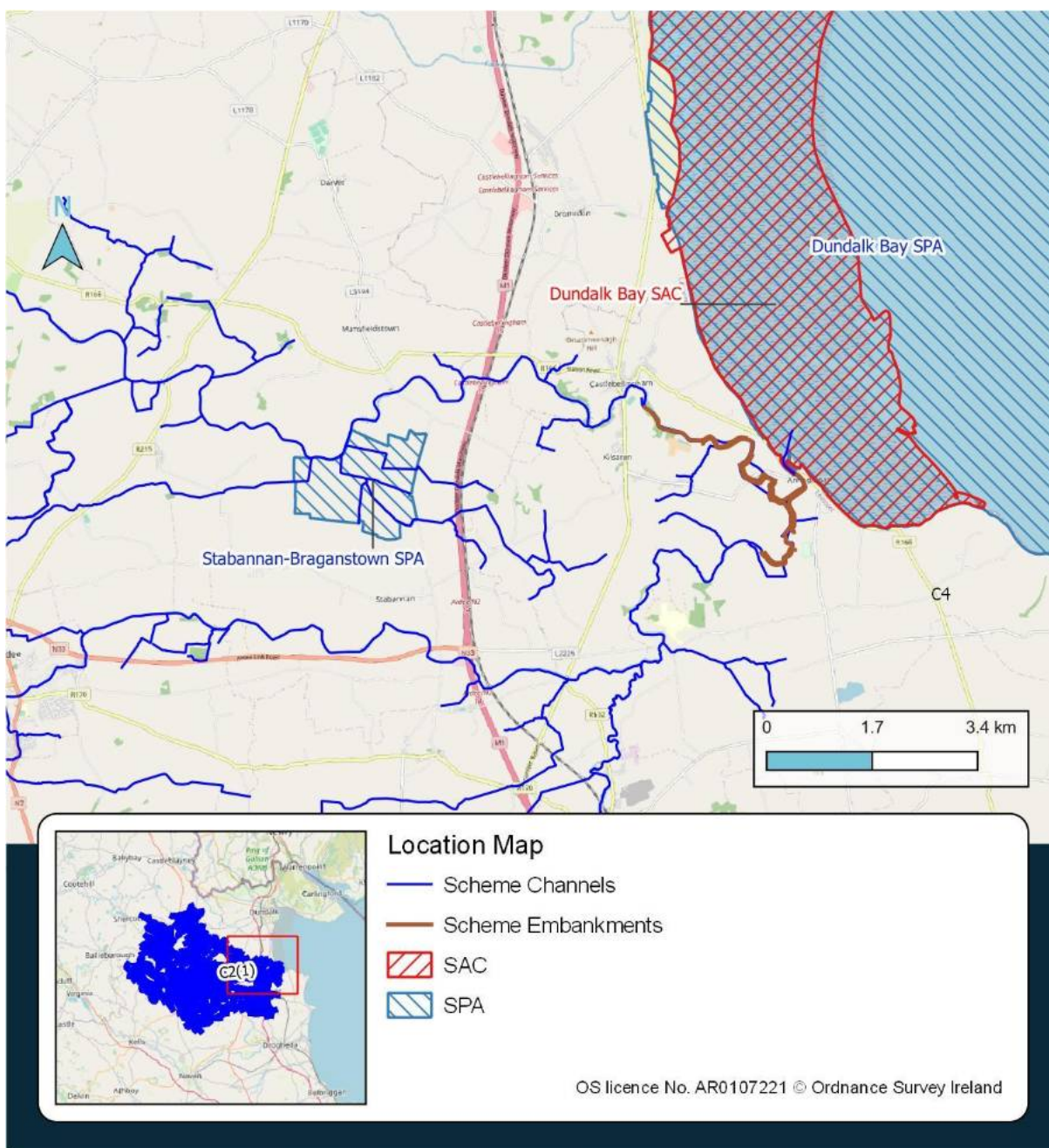


Figure 6-1. Natura 2000 sites screened in

6.2 Dundalk Bay SAC (000455)

Dundalk Bay, Co. Louth, is a very large open, shallow sea bay with extensive saltmarshes and intertidal sand/mudflats, extending some 16 km from Castletown River on the Cooley Peninsula in the north, to Annagassan/Salterstown in the south. The bay encompasses the mouths and estuaries of the Rivers Dee, Glyde, Fane, Castletown and Flurry. The SAC contains a range of coastal habitats including estuaries, shingle beaches, sandflats and mudflats. The site is also internationally important for waterfowl.

6.2.1 Qualifying Interests

The site is a Special Area of Conservation (SAC) selected for the habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority), as detailed in Table 6-1.

Table 6-1. Qualifying Interests of Dundalk Bay SAC

Code	Qualifying Interest	Screened in?
1130	Estuaries	No
1140	Tidal Mudflats and Sandflats	Yes
1220	Perennial Vegetation of Stony Banks	Yes
1310	<i>Salicornia</i> Mud	Yes
1330	Atlantic Salt Meadows	Yes
1410	Mediterranean Salt Meadows	Yes

6.2.2 Conservation Objectives

The overall Conservation Objective for Dundalk Bay SAC 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. In order to achieve this, the following specific Conservation Objectives for the site are outlined:

Mudflats and sandflats not covered by seawater at low tide

- The permanent habitat area is stable or increasing, subject to natural processes
- The Muddy fine sand community and Intertidal fine sand community complex should be conserved in a natural condition

Perennial vegetation of stony banks

- Area stable, subject to natural processes, including erosion and succession
- No decline, subject to natural processes
- Maintain the natural circulation of sediment and organic matter, without any physical obstructions
- Maintain range of habitat zonations including transitional zones, subject to natural processes including erosion and succession
- Maintain the presence of species-poor communities with characteristic species: *Honckenya peploides*, *Beta vulgaris ssp. maritima*, *Crithmum maritimum*, *Tripleurospermum maritimum*, *Glaucium flavum* and *Silene uniflora*
- Negative indicator species (including non-natives) to represent less than 5% cover

***Salicornia* and other annuals colonizing mud and sand**

- Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site surveyed: 35.00ha

- No decline, subject to natural processes
- Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions
- Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession
- Maintain natural tidal regime
- Maintain range of saltmarsh habitat zonations including transitional zones, subject to natural processes including erosion and succession
- Maintain structural variation within sward
- Maintain more than 90% of area outside creeks vegetated
- Maintain range of sub- communities with characteristic species listed in Saltmarsh Monitoring Project (McCorry & Ryle, 2009)
- No significant expansion of *Spartina*. No new sites for this species and an annual spread of less than 1% where it is already known to occur

Atlantic salt meadows

- Area stable or increasing, subject to natural processes, including erosion and succession. For the sub-site (357.57ha) and potential areas (22.42ha) mapped: 379.98ha
- No decline, subject to natural processes
- Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions
- Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession
- Maintain natural tidal regime
- Maintain range of saltmarsh habitat zonations including transitional zones, subject to natural processes including erosion and succession
- Maintain structural variation within sward
- Maintain more than 90% of area outside creeks vegetated
- Maintain range of sub- communities with characteristic species listed in Saltmarsh Monitoring Project (McCorry & Ryle, 2009)
- No significant expansion of *Spartina*. No new sites for this species and an annual spread of less than 1% where it is

Mediterranean salt meadows (*Juncetalia maritima*)

- Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: 0.045ha
- No decline, subject to natural processes
- Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions
- Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession
- Maintain natural tidal regime
- Maintain range of saltmarsh habitat zonations including transitional zones, subject to natural processes including erosion and succession
- Maintain structural variation within sward

- Maintain more than 90% of area outside creeks vegetated
- Maintain range of sub- communities with characteristic species listed in Saltmarsh Monitoring Project (McCorry & Ryle, 2009)
- No significant expansion of *Spartina*. No new sites for this species and an annual spread of less than 1% where it is already known to occur

6.3 Dundalk Bay SPA (004026)

Dundalk Bay is a large open shallow sea bay with extensive saltmarshes and intertidal sand/mudflats, extending some 16 km from Castletown River on the Cooley Peninsula, in the north, to Annagassan/Salterstown in the south. The extensive sand flats and mud flats have a rich fauna which provides the food resource for divers, grebes and sea duck. The bay is used at night for roosting by wintering flocks of Geese. In spring and autumn, the site attracts a range of passage migrants, including Little Stint, Curlew Sandpiper and Ruff.

6.3.1 Qualifying Interests

The site is an SPA selected for the habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority), as detailed in Table 6-2.

Table 6-2. Qualifying Interests of Dundalk Bay SPA

Code	Qualifying Interest	Screened In?
A005	Great Crested Grebe <i>Podiceps cristatus</i>	No
A043	Greylag Goose <i>Anser anser</i>	No
A046	Light-bellied Brent Goose <i>Branta bernicula hrota</i>	Yes
A048	Shelduck <i>Tadorna tadorna</i>	Yes
A052	Teal <i>Anas crecca</i>	Yes
A053	Mallard <i>Anas platyrhynchos</i>	Yes
A054	Pintail <i>Anas acuta</i>	Yes
A065	Common Scoter <i>Melanitta nigra</i>	No
A069	Red-breasted Merganser <i>Mergus serrator</i>	Yes
A130	Oystercatcher <i>Haematopus ostralegus</i>	Yes
A137	Ringed Plover <i>Charadrius hiaticula</i>	Yes
A140	Golden Plover <i>Pluvialis apricaria</i>	Yes
A141	Grey Plover <i>Pluvialis squatarola</i>	Yes
A142	Lapwing <i>Vanellus vanellus</i>	Yes
A143	Knot <i>Calidris canutus</i>	Yes
A149	Dunlin <i>Calidris alpina</i>	Yes
A156	Black-tailed Godwit <i>Limosa limosa</i>	Yes
A157	Bar-tailed Godwit <i>Limosa lapponica</i>	Yes
A160	Curlew <i>Numenius arquata</i>	Yes
A162	Redshank <i>Tringa totanus</i>	Yes
A179	Black-headed Gull <i>Chroicocephalus ridibundus</i>	Yes
A182	Common Gull <i>Larus canus</i>	Yes
A184	Herring Gull <i>Larus argentatus</i>	Yes
A999	Wetlands & Waterbirds	Yes

6.3.2 Conservation Objectives

The overall Conservation Objective for Dundalk Bay SPA is to maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SPA has been selected. In order to achieve this, the following specific Conservation Objectives for the site are outlined (NPWS, 2011):

- The permanent area occupied by the wetland habitat is stable and not significantly less than the areas of 8136, 4374 and 649 hectares respectively for subtidal, intertidal, and supratidal habitats, other than that occurring from natural patterns of variation
- Long term species population trends stable or increasing
- No significant decrease in the numbers or range of areas used by waterbird species, other than that occurring from natural patterns of variation

6.4 Stabannan-Braganstown SPA (004091)

Stabannan-Braganstown SPA is situated approximately 4 km inland from Dundalk Bay in Co. Louth. It is a small, flat alluvial plain adjacent to the River Glyde and is bounded to the north and south by low, rolling hills. In winter this site is utilised by an internationally important wintering population of Greylag Goose.

6.4.1 Qualifying Interests

The site is a Special Protection Area (SPA) selected for the habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority), as detailed in Table 6-3.

Table 6-3. Qualifying Interests of Stabannan and Braganstown SPA

Code	Qualifying Interest	Screened in?
A043	Greylag Goose <i>Anser anser</i>	Yes

6.4.2 Conservation Objectives

The overall Conservation Objective for Stabannan-Braganstown SPA is to maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SPA has been selected. In order to achieve this, the following specific Conservation Objectives for the site are outlined (NPWS, 2022):

- Maintain or restore the favourable conservation condition of Greylag Goose

7 Appropriate Assessment

7.1 Introduction

The following chapter assesses the potential for an adverse impact on the screened in Natura 2000 site in more detail, using the detailed information assembled from the baseline ecology and designated site details, and examines where adverse impacts may arise from the sources of impact from the Scheme. Where potentially significant adverse impacts are identified, avoidance and mitigation measures are proposed to offset these impacts. These are discussed in the following sections.

7.2 Identification of Potential Sources of Impact

The potential sources of impact were set out in the screening assessment and summarised in Table 4-2.

7.3 Impact Assessment

All combinations of impact sources and ecological receptors are assessed to see if there are adverse effects on site integrity. The assessment and results are presented in Table 7-1.

7.3.1 Do nothing scenario

There is a legal requirement from the Arterial Drainage Acts to maintain the Scheme, so in the absence of a change in the legislation, there is no option to not to maintain the scheme. In some cases sites have been developed behind the embankments or in the benefitting lands within the scheme. In the absence of maintenance, the conveyance of the channels would reduce and blockages would likely develop, raising upstream water levels, bank failure would be likely and there would be increased wetness of adjacent habitats including increased flood risk to land and properties.

Table 7-1 Assessment of Impacts

Qualifying Interest	Potential Source of Impact	Relevant COs to impact	Impact on Attribute and Target Prior to Mitigation / Avoidance	Avoidance / Mitigation Measures	Residual Impact Assessment
Dundalk Bay SAC (000455)					
1130 Estuaries 1140 Perennial vegetation on stony banks 1140 Mudflats and sandflats not covered by seawater at low tide 1310 <i>Salicornia</i> and other annuals colonizing mud and sand	Release of suspended solids Release or changes in nutrient levels/pollutants <i>Surface Water</i>	Habitat area, extent and distribution for all habitats Physical structure and sediment supply	Estuarine habitats and transitional waterbodies can be sensitive to nutrient enrichment where the development of a blanket of algae leads to smothering of vegetation and mudflat habitat and the creation of an anoxic layer of sediment. This would occur where Scheme activities cause a large amount of nutrient-rich solids to wash downstream. By following the EPs which apply to all Scheme activities as standard (and are considered as project description), activities will not impact on water quality in these habitats, and species they support, through the release of suspended solids, nutrients and pollutants, particularly given the small-scale works and the high dilution factor by the time the suspended material reaches the estuary.	Not required	No adverse impacts
	Changes in water levels/channel morphology <i>Surface Water</i>	Habitat area, extent and distribution for all habitats Physical structure and sediment supply	These intertidal habitats are dependent on specific physical regime attributes, including the flooding regime. Drainage maintenance activities, such as silt vegetation management can result in the deepening and widening of channels which could impact on surface water flows. This could have adverse impacts on these habitats and a number of attributes, including habitat area, habitat distribution and vegetation composition. However, significant changes to the hydrological regime are unlikely as the works will restore the system to the design standard and no channels will be altered to an extent that the tidal regime would change, particularly as only 15-30% of channels will be maintained in any given year.	Not required	No adverse impact
	Physical disturbance of habitats <i>Land</i>	Habitat extent Physical structure	Intertidal habitats (i.e. mudflats/sandflats, and <i>Salicornia</i> and other annuals colonising mud and sand), perennial vegetation on stony banks and salt meadows (saltmarsh) are all potentially vulnerable to adverse impacts via land pathways, are likely to be vulnerable to physical disturbance arising from	Channel C1 0-800 chains extends through intertidal habitats into the estuary. There will be no silt management in this intertidal section unless there is a significant emergency. In this	No adverse impact

Qualifying Interest	Potential Source of Impact	Relevant COs to impact	Impact on Attribute and Target Prior to Mitigation / Avoidance	Avoidance / Mitigation Measures	Residual Impact Assessment
			drainage maintenance with the Glyde and Dee scheme.	situation the blockage will be removed by boat or access at low tide using low ground-pressure machines that make only a single return journey to clear any blockage. This will avoid any long-term impacts on the intertidal habitats	
1330 Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) 1410 Mediterranean salt meadows (<i>Juncetalia maritima</i>)	Physical disturbance of habitats <i>Land</i>	Habitat extent Physical structure	Some of the channel sections include areas of channel surrounded by saltmarsh and without mitigation adverse impacts would occur where vegetation is crushed by vehicle movements or where the vegetation is removed as part of vegetation management activities which would decrease extent and alter physical structure.	There will be no machine access into areas of saltmarsh. This applies to channels C1(1) 400-800 & 1500-2500 chains, C2(1) 0-100 & 350-650 chains, C46(1) 300-371 chains.	
Dundalk Bay SPA (004026)					
A005 Great Crested Grebe (<i>Podiceps cristatus</i>) A043 Greylag Goose (<i>Anser anser</i>) A046 Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) A048 Shelduck (<i>Tadorna tadorna</i>) A052 Teal (<i>Anas crecca</i>) A053 Mallard (<i>Anas platyrhynchos</i>) A054 Pintail (<i>Anas acuta</i>) A065 Common Scoter (<i>Melanitta nigra</i>)	Physical disturbance of habitats <i>Land</i>	Population trend Distribution Habitat area	The bird species for which the SPA is designated are vulnerable to drainage maintenance activities via land pathways. The habitats that support these species, including mud flats and sandflats and salt marsh, are present within Dundalk Bay SPA, and are likely to be vulnerable to physical disturbance arising from drainage maintenance activities, such as silt and vegetation management. This could be through disturbance via access tracks or from direct removal of vegetation within the maintenance access corridor. This could impact on a range of attributes including loss of habitat as well as the modification of roosting/ feedings sites.	Channel C1 0-800 chains extends through intertidal habitats into the estuary. There will be no silt management in this intertidal section unless there is a significant emergency. In this situation the blockage will be removed by boat or access at low tide using low ground-pressure machines that make only a single return journey to clear any blockage. This will avoid any long-term impacts on the intertidal habitats. There will be no machine access into areas of saltmarsh. This applies to channels C1(1) 400-800 & 1500-2500 chains, C2(1) 0-100 & 350-650 chains, C46(1) 300-371 chains	No adverse impact

Qualifying Interest	Potential Source of Impact	Relevant COs to impact	Impact on Attribute and Target Prior to Mitigation / Avoidance	Avoidance / Mitigation Measures	Residual Impact Assessment
A069 Red-breasted Merganser (<i>Mergus serrator</i>) A130 Oystercatcher (<i>Haematopus ostralegus</i>) A137 Ringed Plover (<i>Charadrius hiaticula</i>) A140 Golden Plover (<i>Pluvialis apricaria</i>) A141 Grey Plover (<i>Pluvialis squatarola</i>) A142 Lapwing (<i>Vanellus vanellus</i>)	Noise and disturbance <i>Land</i>		These bird species will be sensitive to disturbance from machinery and workforces conducting Scheme activities during the over-wintering period (typically October to March, inclusive). This disturbance could cause displacement of populations which can require significant energy expenditure for the birds, which, if undertaken during the cold winter months when birds are already stressed by recent migrations and difficulties in finding food, could have an adverse impact on population trend and distribution. Much of the Scheme is screened from the estuary by roads and embankments, but Channel C1(1) extends into the estuary.	EP25 birds will be implemented and there will be no works between October to March inclusive on C1(1) from 0-800 chains, where this overlaps with the SPA boundary. Where works are required in October or March, these may be permitted where an ecologist determines that there are not significant numbers of SPA birds present. Emergency works may be completed at any time where they are completed in one day or less.	No adverse impact
A143 Knot (<i>Calidris canutus</i>) A149 Dunlin (<i>Calidris alpina</i>) A156 Black-tailed Godwit (<i>Limosa limosa</i>) A157 Bar-tailed Godwit (<i>Limosa lapponica</i>) A160 Curlew (<i>Numenius arquata</i>) A162 Redshank (<i>Tringa totanus</i>) A179 Black-headed Gull (<i>Chroicocephalus ridibundus</i>) A182 Common Gull (<i>Larus canus</i>) A184 Herring Gull (<i>Larus argentatus</i>) A999 Wetland and Waterbirds	Release or changes in nutrient level/ pollutants <i>Surface Water</i>		Estuarine habitats and transitional waterbodies can be sensitive to nutrient enrichment where the development of a blanket of algae leads to smothering of vegetation and mudflat habitat and the creation of an anoxic layer of sediment. This would occur where Scheme activities cause a large amount of nutrient-rich solids to wash downstream. By following the EPs which apply to all Scheme activities as standard (and are considered as project description), activities will not impact on water quality in these habitats, and species they support, through the release of suspended solids, nutrients and pollutants, particularly given the small-scale works and the high dilution factor by the time the suspended material reaches the estuary.	Not required	No adverse impacts

Qualifying Interest	Potential Source of Impact	Relevant COs to impact	Impact on Attribute and Target Prior to Mitigation / Avoidance	Avoidance / Mitigation Measures	Residual Impact Assessment
Stabannan-Braganstown SPA (004091)					
A043 Greylag Goose (<i>Anser anser</i>)	Physical disturbance of habitats <i>Land</i>	Population trend Distribution Habitat area	The bird species for which the SPA is designated are vulnerable to drainage maintenance activities via land and air pathways. However, the land within the SPA is entirely arable land which is cultivated annually. Even areas mapped as grassland in 2017 are now arable, such that the habitats are subject to annual disturbance. The access and maintenance will therefore have only a small, temporary impact on habitats within the SPA that will not result in adverse impacts on Greylag Goose habitats.	Not required	No adverse impact
	Noise and disturbance <i>Land</i>		Greylag Goose will be sensitive to disturbance from machinery and workforces conducting Scheme activities during the over-wintering period (typically October to March, inclusive). This disturbance could cause displacement of populations which can require significant energy expenditure for the birds, which, if undertaken during the cold winter months when birds are already stressed by recent migrations and difficulties in finding food, could have an adverse impact on population trend and distribution. Greylag Geese are sensitive to disturbance at up to 300m (Ryan Hanley 2014a)	EP25 birds will be implemented on all Scheme channels within 300m of Stabannan - Braganstown SPA. This means that no works will be carried out on the channels inside or within the buffer of the SPA between October and March. Where works are required in October or March, these may be permitted where an ecologist determines that there are no significant numbers of Geese present. Emergency works may be completed at any time where they are completed in one day or less. This applies to channels C1(1) 12300-14300, C9(1) 0-2000 chains, C10(1) 0-2400 chains, all of C10(3) and C10(4), C11(1) 0-900 chains.	No adverse impact

7.4 Site specific mitigation measures

Table 7-2 summarises the specific measures identified in Table 7-1 that are necessary to avoid or mitigate any adverse impacts on the above Natura 2000 site. These site-specific mitigation measures should be read in conjunction with the Scheme description detailed in Section 3.2, to understand the full scheme of works and all of the required mitigation measures.

Table 7-2. Specific mitigation measures

Potential Impact	Specific Avoidance and Mitigation Measures
<p>Dundalk Bay SAC: 1130 Estuaries 1140 Perennial vegetation on stony banks 1140 Mudflats and sandflats not covered by seawater at low tide 1310 Salicornia and other annuals colonizing mud and sand 1330 Atlantic salt meadows 1410 Mediterranean salt meadows</p> <p>Dundalk Bay SPA All QI</p> <p>Physical disturbance of habitats (intertidal)</p>	<p>Channel C1 0-800 chains extends through intertidal habitats into the estuary. There will be no silt management in this intertidal section unless there is a significant emergency. In this situation the blockage will be removed by boat or access at low tide using low ground-pressure machines that make only a single return journey to clear any blockage. This will avoid any long-term impacts on the intertidal habitats.</p> <p>There will be no machine access into areas of saltmarsh. This applies to channels C1(1) 400-800 & 1500-2500 chains, C2(1) 0-100 & 350-650 chains, C46(1) 300-371 chains.</p>
<p>Dundalk Bay SPA All QI</p> <p>Noise and disturbance</p>	<p>EP25 birds will be implemented and there will be no works between October to March inclusive on C1(1) from 0-800 chains, where this overlaps with the SPA boundary. Where works are required in October or March, these may permitted where an ecologist determines that there are not significant numbers of SPA birds present. Emergency works may be completed at any time where they are completed in one day or less.</p>
<p>Stabannan-Braganstown SPA Greylag Goose</p> <p>Noise and disturbance</p>	<p>EP25 birds will be implemented on all Scheme channels within 300m of Stabannan - Braganstown SPA. This means that no works will be carried out on the channels inside or within the buffer of the SPA between October and March. Where works are required in October or March, these may permitted where an ecologist determines that there are no significant numbers of Geese present. Emergency works may be completed at any time where they are completed in one day or less.</p> <p>This applies to channels C1(1) 12300-14300, C9(1) 0-2000 chains, C10(1) 0-2400 chains, all of C10(3) and C10(4), C11(1) 0-900 chains.</p>

With this mitigation in place the Scheme activities will not adversely affect the integrity of the Natura 2000 site, in light of its conservation objectives and best scientific evidence. To confirm this conclusion, the following checklist, taken from DoEHLG (2010) has been completed (Table 7-3 and Table 7-4).

Table 7-3. Integrity of Site Checklist- Conservation Objectives

Conservation objectives: does the project or plan have the potential to:	Y/N
Cause delays in progress towards achieving the conservation objectives of the sites?	N
Interrupt progress towards achieving the conservation objectives of the sites?	N
Disrupt those factors that help to maintain the favourable conditions of the site?	N
Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?	N

Table 7-4. Integrity of Site Checklist- Other Objectives

Other objectives: does the project or plan have the potential to:	Y/N
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystem?	N
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	N
Interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?	N
Reduce the area of key habitats?	N
Reduce the population of key species?	N
Change the balance between key species?	N
Reduce diversity of the site?	N
Result in disturbance that could affect population size or density or the balance between key species?	N
Result in fragmentation	N
Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding etc.)?	N

8 In-combination impacts

Projects and Plans that have the potential to contribute in-combination impacts and cumulative impacts upon Natura 2000 designated sites are considered in this section, as described in the *Guidelines for the Assessment of Indirect and Cumulative Impacts, as well as Impact Interactions* (Walker and Johnston 1999). Key points considered when assessing cumulative and in-combination impacts include the nature and scale of the potential impacts, including their potential magnitude and significance, the availability and quality of data, and the impacts that may have occurred with similar projects in the area, where available or observed.

The impact assessment identified two possible impacts which do not meet the threshold of adverse effect on site integrity alone, and these are examined to see if they could result in an adverse effect in-combination with other plans or projects. The impacts are:

- Physical disturbance of intertidal habitats in the Dundalk Bay SPA
- Changes in suspended solids and nutrient levels or pollutants for Stabannan-Braganstown SPA

Noise and disturbance in Dundalk Bay SPA and Stabannan-Braganstown SPA are short-term temporary disturbances that are further reduced by application of EP25, and therefore the impact alone is so small that no in-combination impact is possible and these are not considered further.

Information on all plans and projects within 5km of the Scheme were gathered, and these were assessed to see if they could potentially result in similar impacts to the Scheme and, if so, the possibility of the impacts acting in-combination were considered.

8.1 Plans

In general, Plans rarely have foreseeable and real (not theoretical) impacts with Scheme implementation. However, where there is spatial and temporal overlap in actions and land designations in Plans, these are examined for potential impacts with the Scheme. The following Plans are considered for in-combination impacts as they either have spatial overlap with the scheme or affect similar ecological receptors:

- River Basin Management Plan for Ireland
- Louth County Development Plan

8.1.1 River Basin Management Plan for Ireland 2018-2021 and 2022-2027

The core objectives of the Water Framework Directive are to prevent deterioration, restore good status, reduce chemical pollution and achieve the water related objectives of protected areas. The River Basin Management Plan (RBMP) for Ireland 2018-2021 shows the ecological status of all monitored waters in the 2010-2015 period are as follows: 10.4% are High status, 46.3% are Good status, 25.5% are Moderate status, 17.6% are Poor status and 0.2% are Bad status (DHLGH, 2018). The plan is now being updated and the 2022-2027 plan is out for public consultation. It maintains the same aims of bringing rivers into good ecological status in line with WFD requirements.

The plan aims to improve the management and water quality of the River Basin, and hence the waterbodies inside the Glyde & Dee Scheme. **Therefore, no in combination impacts with the proposed arterial drainage maintenance works have been identified.**

8.1.2 Louth County Development Plan

Louth County Development Plan (2021-2027) has specific policies and objectives that contribute to the conservation and protection of Natura 2000 sites in accordance with the Habitats Directive. The AA of the development plan (CAAS, 2021) has been carried out

and found that there are not likely to be significant, potentially significant or uncertain impacts on the network of Natura 2000 sites as a result of the County Development Plan.

Therefore, no in-combination effects of the Louth County Development Plan (2021-2027) and proposed OPW arterial drainage maintenance operations have been identified.

8.2 Projects

8.2.1 Agricultural activities

Farmers and landowners may also undertake general agricultural operations in areas adjacent to the Glyde & Dee Scheme Channels, which could potentially give rise to impacts of a similar nature to those arising from the planned OPW works. This could potentially result in additional periods of disturbance and a risk to water quality. Many agricultural operations are periodic, not continuous in nature, and qualify as a Notifiable Action that requires consultation with NPWS in advance of the works e.g. reclamation, infilling or land drainage within 30m of the river, removal of trees or any aquatic vegetation within 30m of the river, and harvesting or burning of reed or willow (NPWS 2018).

Agricultural operations must also comply with the EC (Environmental Impact Assessment) (Agriculture) Regulations 2011 and amendment 2017 S.I. No. 456/2011 and 407/2017 in relation to activities covered by the regulations:

- restructuring of rural land holdings,
- commencing use of uncultivated land or semi-natural areas for intensive,
- land drainage works on lands used for agriculture.

A NIS is required under Regulation 9 if it is likely to have a significant effect on a Natura 2000 site. The drainage or reclamation of wetlands is controlled under the Planning and Development (Amendment) (No. 2) Regulations 2011 and the European Communities (Amendment to Planning and Development) Regulations 2011.

Therefore, no in-combination effects of the proposed works and agricultural operations have been identified.

8.2.2 OPW arterial drainage maintenance operations

Maintenance operations have been ongoing since the construction of the schemes following the 1945 Arterial Drainage Act, potentially resulting in adverse cumulative effects. However, as the maintenance operations are undertaken to restore the design level only, the hydrological and hydrogeological impact should be no greater than originally occurred upon the scheme's construction; no further deepening or widening will occur.

On a regional scale, neighbouring Arterial Drainage Schemes could be considered to have an adverse impact on Natura 2000 sites, particularly where large sites fall across two, or more scheme areas. However, this is not considered to be an issue for the Glyde & Dee Scheme works where the closest scheme is the Boyne Arterial Drainage Scheme, but these Schemes are only in close proximity to the south-west of the Glyde & Dee Scheme over 10km inland of the coast.

Therefore, no in-combination effects of the proposed works and other OPW arterial drainage maintenance operations have been identified.

8.3 EIA and Local Planning Projects

There are 20 EIA projects within 5km of the Scheme. None of these are near or on channels upstream of Stabannan-Braganstown SPA. There is an Environmental Impact Assessment application relating to alteration to the way an existing landfill is used at

Castlebellingham, around 2km from Dundalk Bay that will not impact on intertidal habitats. Therefore no EIA projects have the potential to act in-combination with the Scheme.

There are 2741 planning applications that are potentially still valid within 5km of the Scheme. Of these there are two new dwelling houses (rather than modification of existing houses) with waste water that would flow into Scheme channels within 1km of Stabannan-Braganstown SPA, potentially acting in-combination with the Scheme to alter water quality in the SPA. These are discussed in Table 8-1. There are a significant number of applications around Annagassan, but all relate to existing properties or land away from the intertidal habitat. There are no applications that would potential act in-combination to disturb intertidal habitat.

Table 8-1. In-combination assessment details

Scheme non-significant residual impact	Other project and potential in-combination impact	Additional mitigation required?
Changes in suspended solids and nutrient levels or pollutants for Stabannan-Braganstown SPA	<p>Louth County Council Planning numbers: 18771, 205510</p> <p>New residential houses. Waste water drainage will be to scheme channels, including C9(1) and C11(1) within 1km of the SPA. The applications for these developments include careful consideration of the water management, and although no AA could be found for the applications, the change in water quality will be negligible given the way they have been designed, so there is no possibility of in-combination impacts.</p>	Not required

8.4 Significance of in-combination impacts and additional mitigation

There were no projects identified with the potential for in-combination impacts, so no additional mitigation is required.

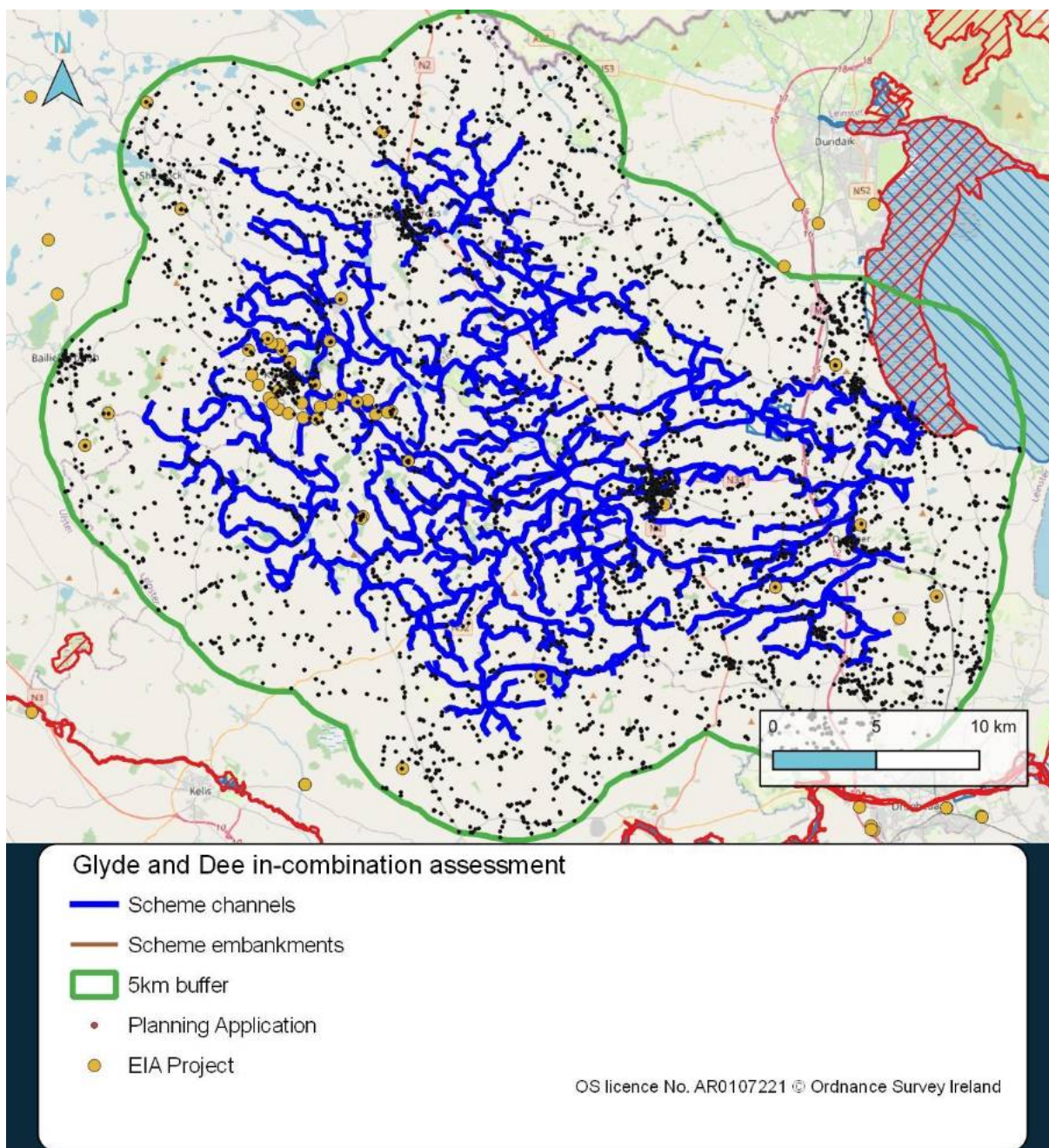


Figure 8-1. Location of planning permissions and EIA projects in relation to Scheme channels

9 Conclusion

Following a comprehensive evaluation of the potential direct, indirect and in-combination impacts on the qualifying interests and conservation objectives for all Natura 2000 sites in the zone of influence of the Scheme, once relevant mitigation measures have been applied, it has been concluded that the Scheme will have no adverse impacts on the integrity of Natura 2000 sites or coherence of the Natura 2000 network in light of their conservation objectives and best scientific evidence, either alone or in combination with other plans and projects.

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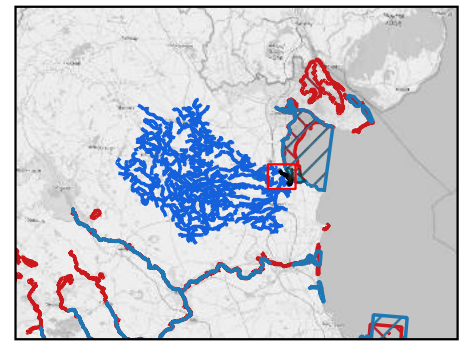
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Appendices

A Scheme Channel Maps

The following maps present a detailed view of the Scheme channels. They include the location of the Natura 2000 sites and the Annex 1 habitats present in and around these sites. The absence of Annex 1 habitats on the maps, particularly away from the Natura 2000 site boundaries, does not necessarily imply the absence of such habitats.

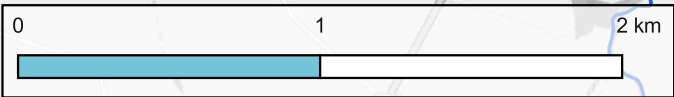
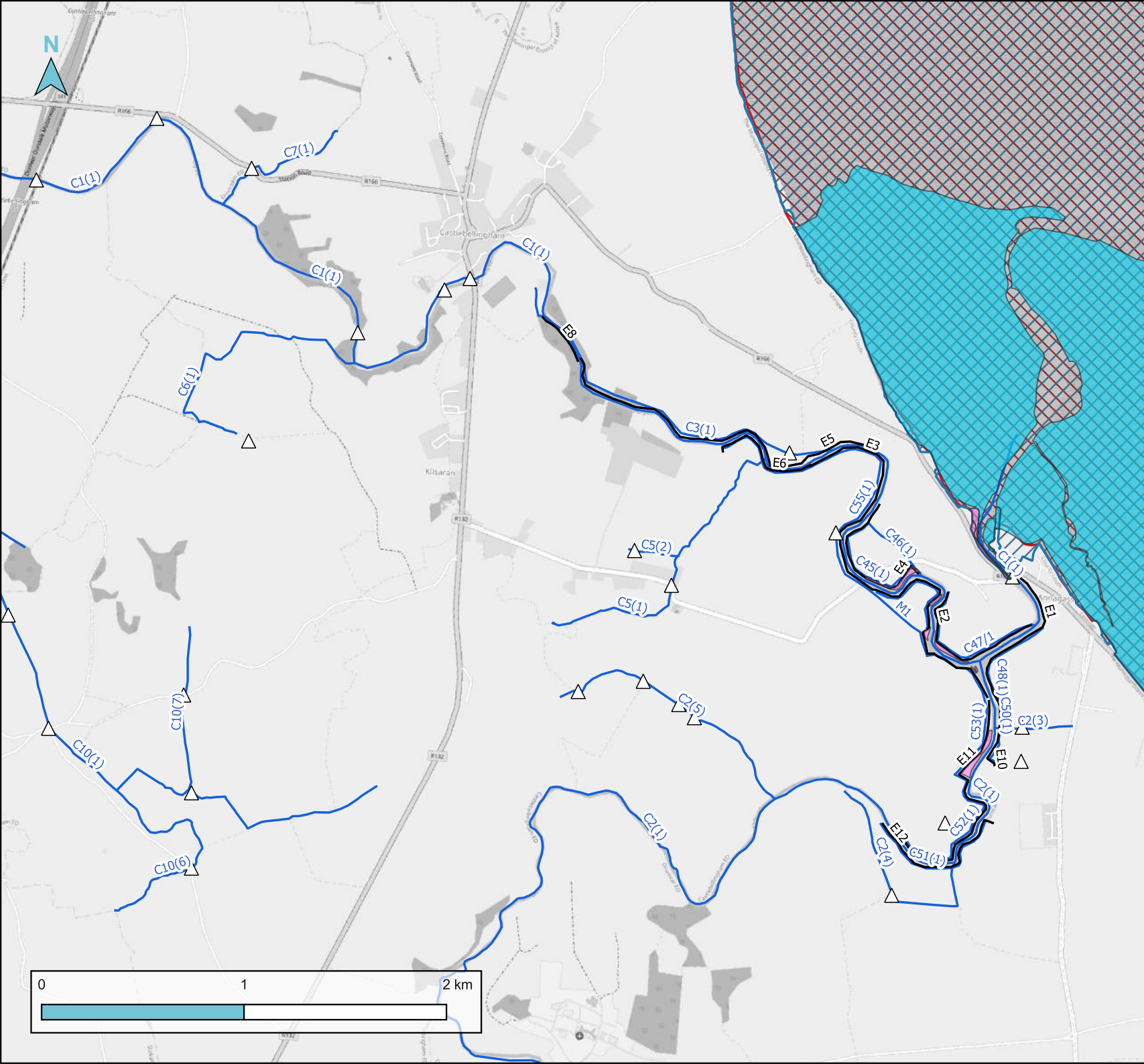


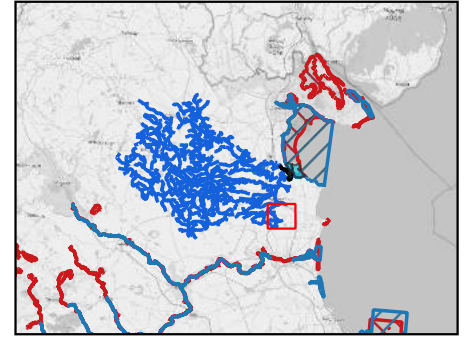
**Glyde & Dee Scheme
 Channels Map 2 of 5**

- △ Glyde & Dee Bridges
- Glyde & Dee Scheme Embankments
- Glyde & Dee Scheme Channels
- ▨ SPA
- ▨ SAC
- Annex 1 habitat**
- 1310
- 1140

Drawn By: SE **Date:** 29/11/2022
Checked By: **Date:** 29/11/2022
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Figure Title: Glyde & Dee Scheme Bridges
File Name: Glyde & Dee mapping 2022

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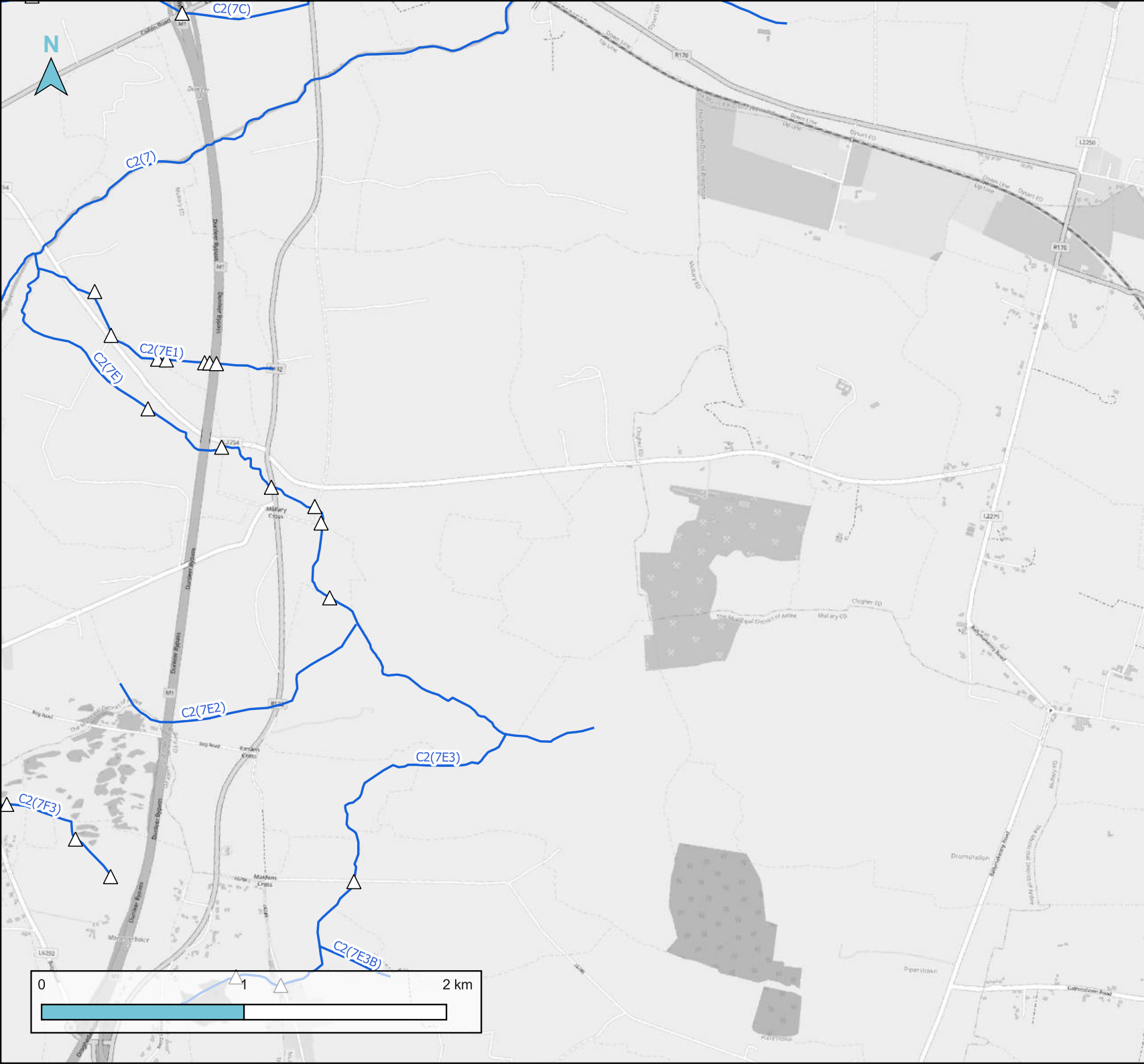


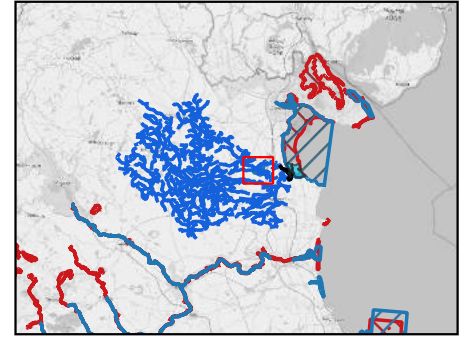
Glyde & Dee Scheme
Channels Map 4 of 5

- △ Glyde & Dee Bridges
- Glyde & Dee Scheme Channels

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Figure Title: Glyde & Dee Scheme Bridges
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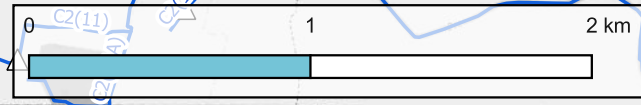
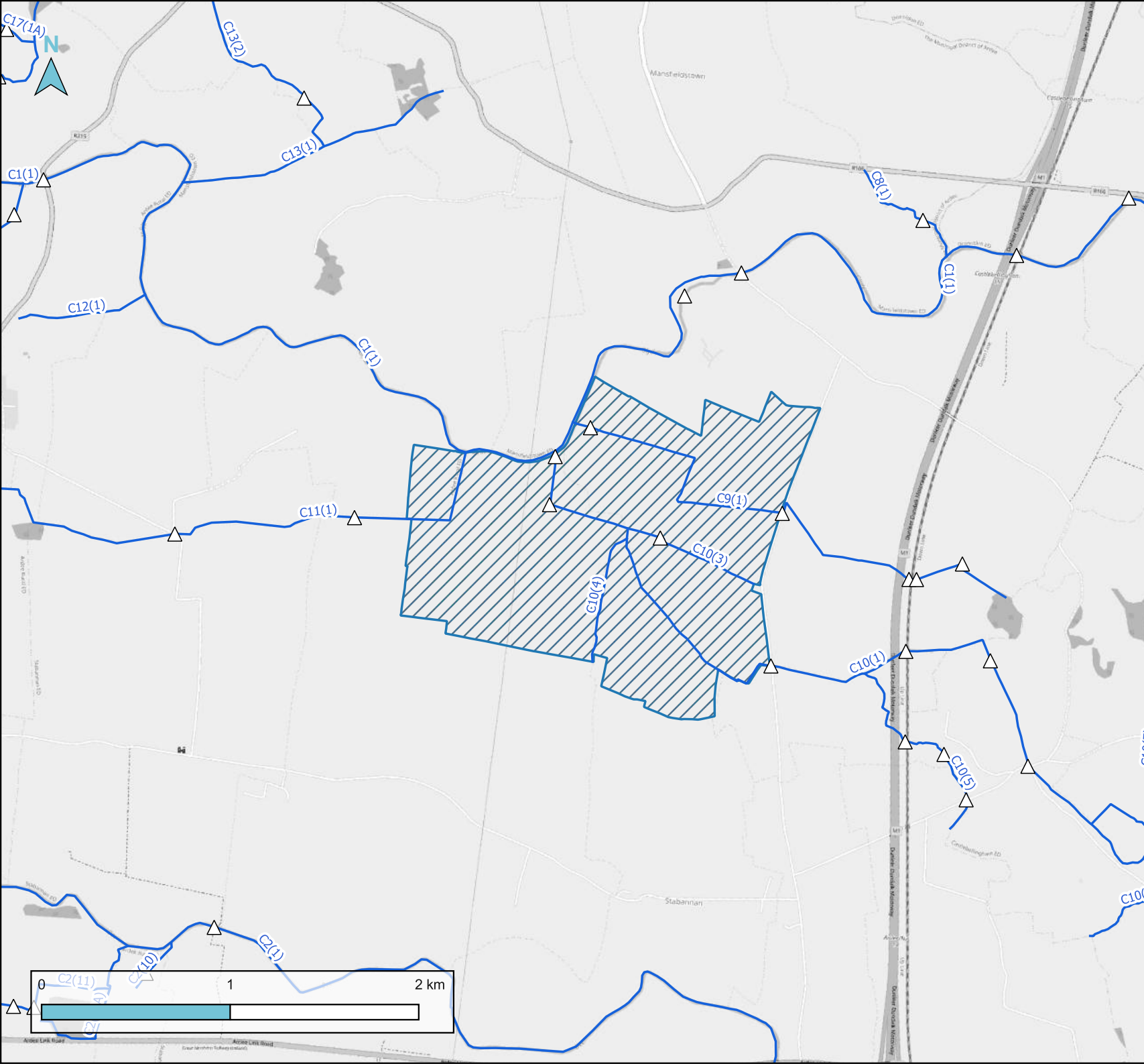


Glyde & Dee Scheme Channels Map 5 of 5

- △ Glyde & Dee Bridges
- Glyde & Dee Scheme Channels
- ▨ SPA

Drawn By: SE **Date:** 29/11/2022
Checked By: **Date:** 29/11/2022
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Status: S1 **Revision:** P01
Figure Title: Glyde & Dee Scheme Bridges
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B Designated Site Details for Natura 2000 sites in the Appropriate Assessment

B.1 Dundalk Bay SAC (000455)

Dundalk Bay, Co. Louth, is a very large open, shallow sea bay with extensive saltmarshes and intertidal sand/mudflats, extending some 16 km from Castletown River on the Cooley Peninsula in the north, to Annagassan/Salterstown in the south. The bay encompasses the mouths and estuaries of the Rivers Dee, Glyde, Fane, Castletown and Flurry.

Saltmarsh vegetation occurs in four main areas: at Lurgangreen, Marsh South, Dundalk Harbour and Bellurgan. Two types are represented – Atlantic and Mediterranean salt meadows. The Atlantic salt meadows are commonest and are characterised by Sea-purslane (*Halimione portulacoides*) (often as a dominant band), along with Common Saltmarsh-grass (*Puccinellia maritima*), Thrift (*Armeria maritima*), Red Fescue (*Festuca rubra*), Common Scurvygrass (*Cochlearia officinalis*), Sea Plantain (*Plantago maritima*) and Sea Rush (*Juncus gerardi*). Common Cord-grass (*Spartina anglica*) is frequent and often dominant over substantial areas. Glassworts (*Salicornia* spp.) occur on the lower zones of the saltmarshes, and in places extend out onto the sandflats. Mediterranean salt meadows are mostly confined to the upper levels of the saltmarshes or along stream sides where they merge with grassland habitats (though the transitional zone is now absent in many places). The habitat contains Sea Rush (*Juncus maritimus*), Sea Arrowgrass (*Triglochin maritima*) and Sea Aster (*Aster tripolium*). The saltmarshes at Lurgangreen and Marsh South are partially fenced and grazed by sheep.

Shingle beaches are particularly well represented in Dundalk Bay, occurring more or less continuously from Salterstown to Lurgan White House in the south bay, and from Jenkinstown to east of Giles Quay in the north bay. The shingle is mostly stable, occurring on post-glacial raised beaches. The shingle often occurs in association with intertidal shingle, saltmarsh and or shingle-based grassland. The shingle supports Version date: 31.01.2014 2 of 2 000455_Rev13.Doc species such as Spear-leaved Orache (*Atriplex prostrata*), Sea Mayweed (*Matricaria maritima*), Sea Beet (*Beta vulgaris* subsp. *maritima*), Sea Rocket (*Cakile maritima*), Wild Carrot (*Daucus carota*), Sea-holly (*Eryngium maritimum*), Sea Sandwort (*Honkenya peploides*) and Sea Radish (*Raphanus raphanistrum* subsp. *maritimus*). Yellow Hornedpoppy (*Glaucium flavum*) and Lyme-grass (*Leymus arenarius*) occur here at their most northern locality on the east coast, while the Red Data Book species Sea-kale (*Crambe maritima*) has recently been recorded.

The extensive sandflats and mudflats (over 4,000 ha) occur and are comprised of ecological communities such as muddy fine sand communities and fine sand community complexes. In the centre of Dundalk Bay there is a gravel community dominated by polychaetes. These habitats host a rich fauna of bivalves molluscs, marine worms and crustaceans and are the main food resource of the tens of thousands of waterfowl (including waders and gulls) which feed in the intertidal area of Dundalk Bay. The saltmarshes are used as high-tide roosts by all of these species, while the grazing birds (notably Brent Goose and Wigeon) feed on the saltmarsh grasses, areas of *Zostera* and other grassland vegetation. Brent Goose also feed on the mats of green algae on the mudflats. At night the wintering Greylag and Greenland White-fronted Goose, and Whooper Swans, from Stabannan/Braganstown (inland from Castlebellingham) roost in Dundalk Bay.

The site is internationally important for waterfowl (numbers in brackets refers to the average maximum over the period 1994/95 to 1997/98) because it regularly holds over 20,000 birds (up to 57,000 have been recorded) and supports over 1% of the North-West European/East Atlantic Flyway populations of Brent Goose (366), Bartailed Godwit (2,312) and Knot (11,948). Additionally, it is nationally important for Golden Plover (4,266), Great Crested Grebe (193), Greylag Goose (312), Shelduck (463), Mallard (657), Pintail (100), Red-breasted Merganser (148), Oystercatcher (6,940), Grey Plover (218), Ringed Plover (133), Wigeon (565), Dunlin (9,112), Blacktailed Godwit (754), Curlew (1,593), Lapwing (4,822),

Greenshank (20) and Redshank (1,455). Both Golden Plover and Bar-tailed Godwit are Annex I species. The site has been designated a Special Protection Area (SPA) under the E.U. Birds Directive and it is also a designated Ramsar site.

This is a site of significant conservation value because it supports good examples of a range of coastal habitats listed on Annex I of the E.U. Habitats Directive, as well as large numbers of bird species, some of which are listed in the Birds Directive. (Source: NPWS, 2014a)

B.2 Dundalk Bay SPA

Dundalk Bay is a large open shallow sea bay with extensive saltmarshes and intertidal sand/mudflats, extending some 16 km from Castletown River on the Cooley Peninsula, in the north, to Annagassan/Salterstown in the south.

The extensive sand flats and mud flats have a rich fauna of bivalves, molluscs, marine worms and crustaceans which provides the food resource for most of the wintering waterfowl. The outer part of the bay provides excellent shallow-water habitat for divers, grebes and sea duck. In summer, it is thought to be a major feeding area for auks from the Dublin breeding colonies. The bay is used at night for roosting by wintering flocks of Greylag Goose, Greenland White-fronted Goose and Whooper Swan from Stabannan/Braganstown (inland of Castlebelligham) and other inland sites.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Great Crested Grebe, Greylag Goose, Light-bellied Brent Goose, Shelduck, Teal, Mallard, Pintail, Common Scoter, Redbreasted Merganser, Oystercatcher, Ringed Plover, Golden Plover, Grey Plover, Lapwing, Knot, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Black-headed Gull, Common Gull and Herring Gull. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

The site is of international importance because it regularly supports an assemblage of over 20,000 wintering waterbirds. It also qualifies as a site of international importance for supporting populations of Light-bellied Brent Goose (370), Knot (9,710), Black-tailed Godwit (1,100) and Bar-tailed Godwit (1,950) - all figures, unless stated otherwise, are five year mean peaks for the period 1995/96 to 1999/2000. A variety of other species occur in numbers of national importance, i.e. Great Crested Grebe (303), Greylag Goose (435), Shelduck (522), Teal (538), Mallard (765), Pintail (117), Common Scoter (581 - five year mean peak for the period 2000/01 to 2004/05), Red-breasted Merganser (121), Oystercatcher (8,746), Ringed Plover (151), Golden Plover (5,967), Grey Plover (204), Lapwing (4,892), Dunlin (11,518), Curlew (1,264) and Redshank (1,659). Other wintering species which occur include Red-throated Diver, Great Northern Diver, Cormorant, Grey Heron, Little Egret, Mute Swan, Wigeon, Goldeneye, Greenshank and Turnstone.

The site also supports nationally important populations of three wintering gull species - Black-headed Gull (6,643), Common Gull (551) and Herring Gull (754).

In spring and autumn the site attracts a range of passage migrants, including Little Stint, Curlew Sandpiper and Ruff.

Dundalk Bay SPA is one of the most important wintering waterfowl sites in the country and one of the few that regularly supports more than 20,000 waterbirds. Four species occur in numbers of international importance and a further 19 species in numbers of national importance. The regular occurrence of Golden Plover, Bar-tailed Godwit, Red-throated Diver, Great Northern Diver and Little Egret is of particular note as these species are listed on Annex I of the E.U. Birds Directive. Dundalk Bay is a Ramsar Convention site and parts of Dundalk Bay SPA are designated as Wildfowl Sanctuaries. (Source: NPWS, 2014b)

B.3 Stabannan-Braganstown SPA

Stabannan-Braganstown SPA is situated approximately 4 km inland from Dundalk Bay in Co. Louth. It is a small, flat alluvial plain adjacent to the River Glyde and is bounded to the north and south by low, rolling hills.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Greylag Goose.

In winter this site is utilised by an internationally important wintering population of Greylag Goose (1,391) – all figures are five year mean peaks for the period 1995/96 to 1999/2000. The population of Greylag Goose utilising the site has declined in recent years but is still of national importance. The site also supports smaller populations of Greenland White-fronted Goose (24) and Whooper Swan (60). Small numbers of Bewick's Swan (2) have also been recorded at the site. At night most of the geese and swans roost in Dundalk Bay. Other species typical of agricultural land also occur, notably Golden Plover (876) and Lapwing (300).

The site is of ornithological importance as it supports an important population of Greylag Goose, which on occasion occurs in numbers of international importance. It is of note that three species that regularly occur at the site are listed on Annex I of the E.U. Birds Directive, i.e. Greenland White-fronted Goose, Whooper Swan and Golden Plover. (Source: NPWS, 2010)

C Protected Flora and Fauna and Invasive Species

Protected flora and fauna present or adjacent to the Scheme within the last 10 years, compiled from the National Biodiversity Data Centre map database.

Common name	Latin Name	Date of last record	Designation
Birds			
Barn Owl	<i>Tyto alba</i>	31/12/2011	Birds of Conservation Concern - Red List
Barn Swallow	<i>Hirundo rustica</i>	31/12/2011	Birds of Conservation Concern - Amber List
Bar-tailed Godwit	<i>Limosa lapponica</i>	31/12/2011	Birds of Conservation Concern - Amber List
Black Guillemot	<i>Cephus grylle</i>	31/12/2011	Birds of Conservation Concern - Amber List
Black-headed Gull	<i>Larus ridibundus</i>	31/12/2011	Birds of Conservation Concern - Red List
Black-tailed Godwit	<i>Limosa limosa</i>	31/12/2011	Birds of Conservation Concern - Amber List
Common Greenshank	<i>Tringa nebularia</i>	31/12/2011	Birds of Conservation Concern - Amber List
Common Kestrel	<i>Falco tinnunculus</i>	31/12/2011	Birds of Conservation Concern - Amber List
Common Linnet	<i>Carduelis cannabina</i>	31/12/2011	Birds of Conservation Concern - Amber List
Common Redshank	<i>Tringa totanus</i>	31/12/2011	Birds of Conservation Concern - Red List
Common Snipe	<i>Gallinago gallinago</i>	31/12/2011	EU Birds Directive >> Annex II, Section II Bird Species Birds of Conservation Concern - Amber List
Common Starling	<i>Sturnus vulgaris</i>	31/12/2011	Birds of Conservation Concern - Amber List
Dunlin	<i>Calidris alpina</i>	31/12/2011	EU Birds Directive >> Annex I Species Birds of Conservation Concern - Amber List
Eurasian Curlew	<i>Numenius arquata</i>	31/12/2011	EU Birds Directive >> Annex II, Section II Bird Species Birds of Conservation Concern - Red List
Eurasian Oystercatcher	<i>Haematopus ostralegus</i>	31/12/2011	Birds of Conservation Concern - Amber List
Eurasian Teal	<i>Anas crecca</i>	31/12/2011	EU Birds Directive >> Annex II, Section II Bird Species Birds of Conservation Concern - Amber List
Eurasian Tree Sparrow	<i>Passer montanus</i>	31/12/2011	Birds of Conservation Concern - Amber List
Eurasian Wigeon	<i>Anas penelope</i>	31/12/2011	EU Birds Directive >> Annex II, Section II Bird Species Birds of Conservation Concern - Amber List

Common name	Latin Name	Date of last record	Designation
European Golden Plover	<i>Pluvialis apricaria</i>	31/12/2011	EU Birds Directive >> Annex II, Section II Bird Species Birds of Conservation Concern - Red List
European Shag	<i>Phalacrocorax aristotelis</i>	31/12/2011	Birds of Conservation Concern - Amber List
Gadwall	<i>Anas strepera</i>	31/12/2011	EU Birds Directive >> Annex II, Section II Bird Species Birds of Conservation Concern - Amber List
Great Black-backed Gull	<i>Larus marinus</i>	31/12/2011	Birds of Conservation Concern - Amber List
Great Cormorant	<i>Phalacrocorax carbo</i>	31/12/2011	Birds of Conservation Concern - Amber List
Great Northern Diver	<i>Gavia immer</i>	31/12/2011	Birds of Conservation Concern - Amber List
Grey Plover	<i>Pluvialis squatarola</i>	31/12/2011	Birds of Conservation Concern - Amber List
Hen Harrier	<i>Circus cyaneus</i>	15/11/2021	Birds of Conservation Concern - Amber List
Herring Gull	<i>Larus argentatus</i>	31/12/2011	Birds of Conservation Concern - Red List
House Sparrow	<i>Passer domesticus</i>	31/12/2011	Birds of Conservation Concern - Amber List
Mew Gull	<i>Larus canus</i>	31/12/2011	Birds of Conservation Concern - Amber List
Mute Swan	<i>Cygnus olor</i>	31/12/2011	Birds of Conservation Concern - Amber List
Northern Lapwing	<i>Vanellus vanellus</i>	31/12/2011	EU Birds Directive >> Annex II, Section II Bird Species Birds of Conservation Concern - Red List
Red Knot	<i>Calidris canutus</i>	31/12/2011	Birds of Conservation Concern - Red List
Red-breasted Merganser	<i>Mergus serrator</i>	31/12/2011	EU Birds Directive >> Annex II, Section II Bird Species
Ringed Plover	<i>Charadrius hiaticula</i>	31/12/2011	Birds of Conservation Concern - Amber List
Velvet Scoter	<i>Melanitta fusca</i>	31/12/2011	EU Birds Directive >> Annex II, Section II Bird Species
Whooper Swan	<i>Cygnus cygnus</i>	31/12/2011	EU Birds Directive >> Annex I Bird Species Birds of Conservation Concern - Amber List
Mammals			
Common Porpoise	<i>Phocoena phocoena</i>	10/10/2014	EU Habitats Directive >> Annex II EU Habitats Directive >> Annex IV Protected Species: Wildlife Acts Threatened Species: OSPAR Convention
Cuvier's Beaked	<i>Ziphius cavirostris</i>	29/12/2015	EU Habitats Directive >> Annex IV

Common name	Latin Name	Date of last record	Designation
Whale			Protected Species: Wildlife Acts
Long-finned Pilot Whale	<i>Globicephala melas</i>	10/09/2017	EU Habitats Directive >> Annex IV Protected Species: Wildlife Acts
Striped Dolphin	<i>Stenella coeruleoalba</i>	24/04/2014	EU Habitats Directive >> Annex IV Protected Species: Wildlife Acts
Eurasian Badger	<i>Meles meles</i>	31/12/2014	Protected Species: Wildlife Acts
Pine Marten	<i>Martes martes</i>	08/06/2018	EU Habitats Directive >> Annex V Protected Species: Wildlife Acts
West European Hedgehog	<i>Erinaceus europaeus</i>	20/02/2021	Protected Species: Wildlife Acts
Invertebrates			
Moss Carder-bee	<i>Bombus (Thoracombus) muscorum</i>	29/04/2011	Threatened Species: Near threatened
Invasive species			
Jenkins' Spire Snail	<i>Potamopyrgus antipodarum</i>	25/07/2018	Medium Impact Invasive Species
American Mink	<i>Mustela vison</i>	19/04/2013	High Impact Invasive Species Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Brown Rat	<i>Rattus norvegicus</i>	02/06/2013	High Impact Invasive Species Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)

D Details of Planned Maintenance Activities

No details of planned maintenance were available for the preparation of the NIS, but they are assumed to follow a similar frequency, duration and nature to the works considered from the previous 5-year review (JBA 2017). However, the planned works are not a comprehensive list of works, and as explained in the project description, there is likely to be the need for unplanned and sometimes emergency maintenance works. These are considered in the assessment in so far as they fall within the described activities of the Scheme.

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