Final P04

ENVIRONMENTAL CONSTRAINTS STUDY

DUNDALK AND BLACKROCK FLOOD RELIEF SCHEME

Project no. 123160

Prepared for:

Louth County Council

Date 25/02/2022

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Details of document preparation and issue:

Version no.	Prepared	Checked	Reviewed	Approved	Issue date	Issue status
1	J Unwin	D Unsworth	A Burwood	J Reynolds	10.05.2021	Draft
2	J Unwin	D Unsworth	A Burwood	J Mason	06.10.2021	Final
3	J Unwin	D Unsworth	A Burwood	J Mason	15.12.2021	Final
4	J Unwin	D Unsworth	A Burwood	J Mason	25.02.2022	Final

Project no. 123160

File name: 123160-BUK-ZZ-00-RP-EN-00019

1. Introduction

1.1 Background

Binnies UK Ltd (BUK)/Nicholas O'Dwyer (NOD) have been commissioned to assess the options for a sustainable approach to develop a flood relief scheme within Dundalk and Blackrock. Working collaboratively with Louth County Council (LCC), the Office of Public Works (OPW), and local stakeholders, BUK-NOD will: develop and design a technically, socially, environmentally, and economically acceptable scheme to alleviate the risk of flooding to the town of Dundalk; submit the proposed Flood Relief Scheme for planning consent; and, procure, manage and oversee construction of the Scheme.

This document is the Environmental Constraints Study which has been undertaken to provide a proportionate analysis of the environmental constraints present within the likely project area. It highlights any vulnerable environmental features, provides a high-level consideration of potential impacts of short-listed options and sets out a clear approach to managing environmental risks through scheme design and management.

The Office of Public Works (OPW), in conjunction with Louth County Council and other local authorities, completed a North Western – Neagh Bann Catchment Flood Risk Assessment and Management (CFRAM) Study[1] in 2017. The purpose of this was to identify and create a better understanding of the areas with existing and potential future flood hazards and flood risks within an approximately 9,410km^2 study area across two international river basin districts (IRBD) within the boundary of Ireland. As part of the study, Flood Risk Management Plans (FRMP) were produced, detailing policies, strategies, measures and actions to be undertaken by relevant bodies to achieve cost-effective and sustainable management of the flood risks identified within the study area.

Table 1.1 below gives a summary of historical flood events within the region.

Table 1.1 - Historic Flood events within the Dundalk and Blackrock area. Adapted from Flood Maps[2] and the North Western – Neagh Bann CFRAM Study hydraulics report[3].

Location	Date	Event
Blackrock	March 2001	Localised flooding of small river flowing through part of Rock Court caused by heavy rainfall
Blackrock	February 2002	High tides caused severe flooding along the Blackrock Promenade, and damaged properties along the Main Street as well as areas of the Village Green and local roads.
Blackrock	January 2014	Flooding caused by high tides and surge resulting in the sea walls being overtopped. Affected the Main Street and adjacent retail properties.

[1] RPS, North Western Neagh Bann CFRAM Study, Final Report. BE0700Rp0052, November 2017.
[2] FloodMaps.ie (2021) Website accessed 23/04/2021.
[3] RPS, North Western Neagh Bann CFRAM Study: UoM6 Hydraulics Report, 2017

Dundalk	February 1977	Prolonged heavy rainfall resulted in the Ramparts River bursting its banks, inundating considerable areas of the urban area of Dundalk.
Dundalk	December 1978	Torrential rainfall caused widespread flooding throughout Dundalk. Flooding affected Ardee Road, McSwiney Street, Stapleton Place, and the Ramparts.
Dundalk	November 2000	Severe flooding in residential areas in North-West and West Dundalk, as well as flooding of commercial premises at Dundalk Brewery.
Dundalk	February 2002	Coastal flooding at Bellurgan Pier along the northern banks of the Dundalk Harbour area.
Dundalk	October 2004	Flooding occurred in the rural area located to the east of Dundalk town.
Dundalk	October 2011	Heavy rainfall led to flooding of the Castletown Road and flooding on the Ardee Road.
Dundalk	November 2014	The Ramparts River broke its banks, causing flooding to many industrial units in the Brewery Business Park and three residential properties in Mounthamilton Estate off the Ardee Road.

1.2 The Proposed Scheme

Dundalk is located in the north east of Ireland. There is a history of flooding in the area, with the most recent significant event occurring in Winter 2014. The sources of flooding in Dundalk and Blackrock are distinct by area. Blackrock is affected by a combination of fluvial and wave overtopping flooding (with a small influence from tidal inundation), and Dundalk, an estuarian town, is affected mostly by tidal inundation but does include flooding from other sources (groundwater, fluvial, and pluvial).

At the time of writing the proposed scheme is indicative and currently being developed by the design team. An indicative plan of the likely scheme layout is provided in Figure 1.1. This is based on the CFRAM Study and early feedback from the design team. The scheme is likely to comprise the installation of new flood defences and upgrading of existing defences. The key components of the indicative scheme which are considered in this constraints study are described below as follows:

- 1 a-d) Upgrading approximately 2.6km of the existing flood defences on the west side of the Flurry Estuary, or; the option of installing approximately 2.8km of new defences located further to the west allowing for an area of habitat enhancement between the line of the existing defences and the proposed new defences. Two small interventions to the north of these defences, one on either side of the R173 Road;

- 2) Upgrading approximately 1.8km of existing flood defences on the north side of the Castletown River Estuary from the tributary Flurry River to the N52 Road bridge;
- 3 a-b) Approximately 1km of new flood defences on the north bank of the Castletown River (set back between 100m to 250m for the river channel) running east west from Armagh Road;
- 4 a-c) On the south bank of the Castletown River upgrading approximately 100m of existing flood wall in the Saltown area and upgrading approximately 1.5km of existing flood wall between the Castletown River Railway bridge and St Marys College Grounds;
- 5) Approximately 1.3km of new defences on the south bank of the Castletown River Estuary running west east from the N52 Road Bridge followed by an upgrade of 1.5km of existing defences to Soldiers Point;
- 6) 450m of new defences running north south from Soldiers Point;
- 7 a-b) Upgrading of approximately 3.5km of existing defences running north south along the coast between Waterview Road and the R172 road at The Loakers. With a small intervention off Shore Road;
- 8) A new 280m flood defence running north south to the east of the R172 road at The Loakers; this option has the potential to develop an area of habitat enhancement to the east of the proposed flood defence;
- 9 a-d) Upgrading approximately 1km of existing flood defences along the coastline at Blackrock;
- 10 a-d) New small flood interventions on the north bank of the River Fane and the minor streams (Green Gates and Blackrock);
- 11 a-m) Smaller fluvial and pluvial interventions provided in eastern areas of Dundalk town at Mount Avenue, Clann Chullainn, The Brewery Business Park, Rampart Lane, South of Avenue Road and small interventions in the Castletown Area on the north and south sides of Castletown Road
- 12) A water storage area comprising a passive low maintenance flow control device restricting flow on a stream 500m to the west of the M1 on the south side of N53 road.

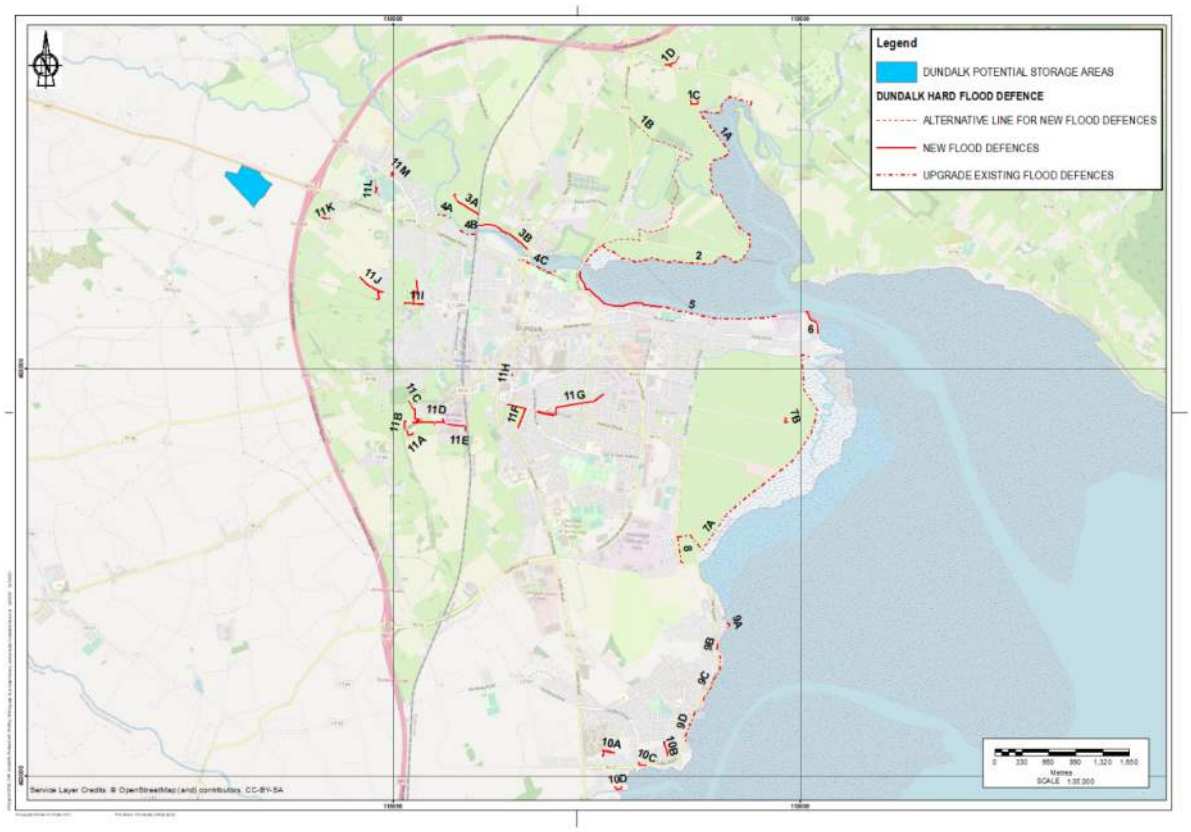


Figure 1.1 - The proposed indicative scheme (Flood Defences)

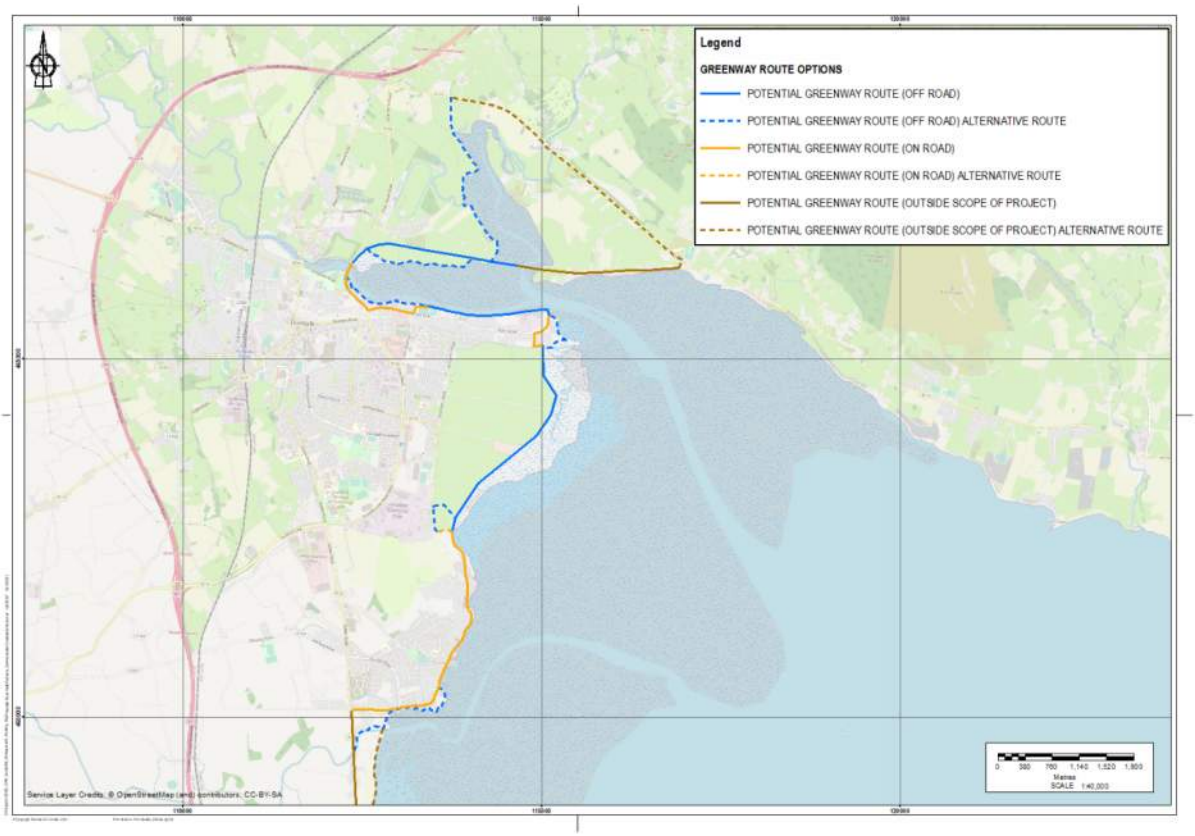


Figure 1.2 - The proposed indicative scheme (Greenway)

The scheme also provides an opportunity to develop an integrated Greenway along the East coast which contributes to the Louth County Council Development Plan for sustainable tourism development that would build on the success of the Carlingford Lough Greenway. The Great Eastern Greenway would enable off-road access between Belfast and Dublin for cyclists and walkers (Figure 1.2).

The potential construction methodologies of the above options are currently unknown but will be considered further as part of the selection process for the preferred options.

1.3 Study Area

The study areas that have been used for this constraints report are shown on Figure 1.3 and 1.4 (overleaf). These comprise a focused study area (within 2km of the CFRAM Study areas) in the in the near vicinity of the works themselves and a wider study area for receptors/issues not directly in the vicinity of the works comprising a 15km study area that extends into Northern Ireland. The 15km study area has been used for Natura 2000 Sites. Upon selection of the preferred options, as part of any detailed environmental assessments the extent of the study area may be refined to focus more accurately on those areas which could be affected.

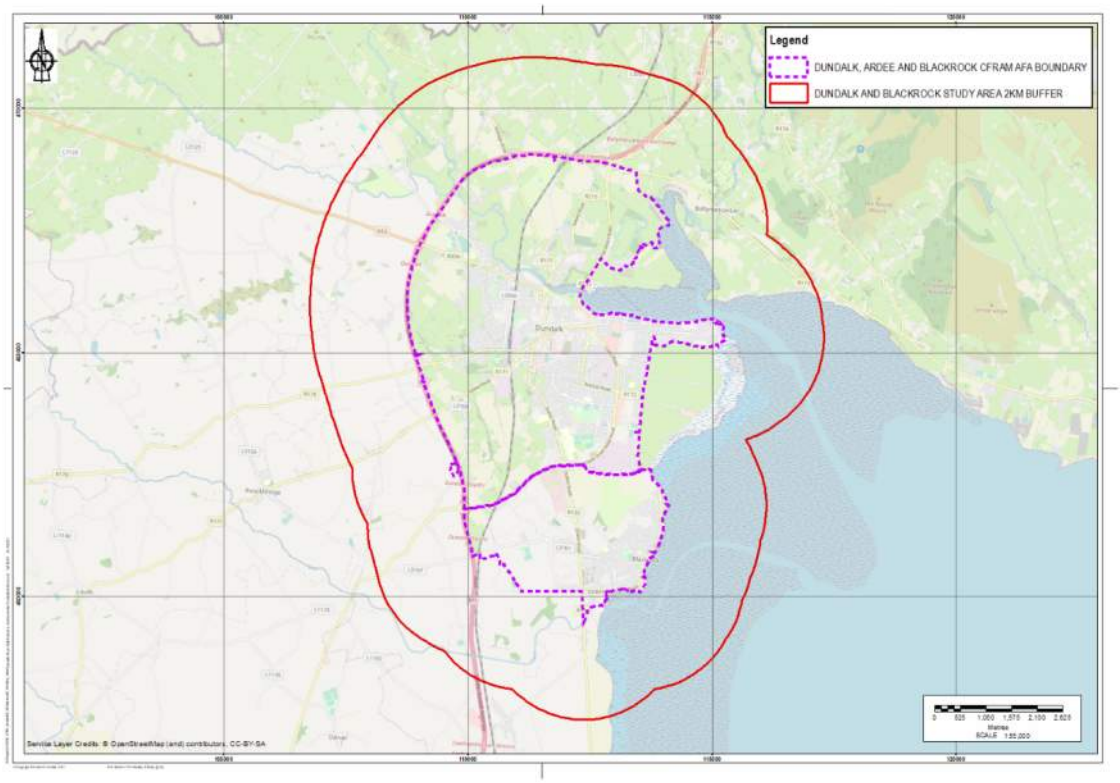


Figure 1.3 – The 2km Focused Study Area

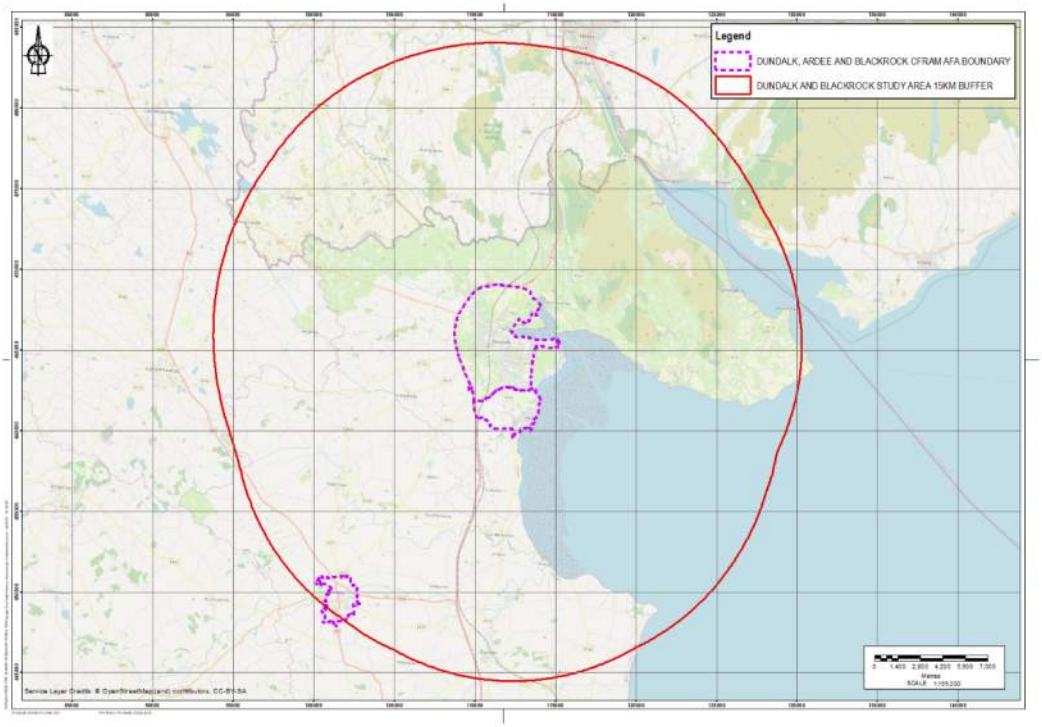


Figure 1.4 – The 15km Wide Study Area

1.4 Methodology

There are a range of environmental constraints to be considered during the development and implementation of the Flood Relief Scheme. The purpose of this report is to assist the options appraisal process for the scheme design by identifying the key environmental issues likely to be of most relevance to the project. This report also identifies the focus for future environmental work required to support the Planning Application. Baseline data collection and review of background information has been undertaken in order to define and confirm the current state of the environment. This included the use of publicly available web-based data sources including (but not limited to):

- Google Earth aerial photography
- The National Parks and Wildlife Service (NPWS) (https://www.npws.ie/)
- National Biodiversity Data Centre (http://www.biodiversityireland.ie/)
- National Monument Service (https://www.archaeology.ie/)
- Historic Environment Viewer (http://webgis.archaeology.ie/historicenvironment/)
- The Environmental Protection Agency Geo-Portal (http://gis.epa.ie/)
- Co-ordinated Information for the Countryside (CORINE) database (https://www.eea.europa.eu/publications/COR0-landcover).
- GIS Layers provided by OPW and Louth County Council.

In addition, an ecological site visit has been undertaken to provide an ecological scoping appraisal of the site. The purpose was to identify detailed ecological survey requirements and to highlight ecological constraints at an early stage of project design.

In order to inform the assessment a project specific ArcGIS online mapping system has been developed and used as a tool for data collection.

Upon completion of the optioneering stage a preferred option will be taken forward. This report informs Louth County Council of any potential issues that may impose constraints on the design and construction of the preferred option and which could involve further, more detailed assessment as part of the Environmental Impact Assessment (EIA), Appropriate Assessment (AA) or Water Framework Directive (WFD) assessment processes.

2. Key Environmental Issues

2.1 Summary

This section provides a summary of the environmental constraints likely to be of most relevance to the proposed works. Table 3.2 in Chapter 3 provides a summary of likely environmental impacts and possible mitigation measures and further surveys that may be required for the scheme option currently being considered.

2.2 Biodiversity

The desk-based study involved compiling a list of existing biological receptors within the focussed 2km study area, plus searching for Natura 2000 sites within the 15km wide study area. The following source were used:

- NPWS - National Parks & Wildlife Service: Data request for 10km square encompassing Dundalk and Blackrock [J00]; and surround 10km squares were also reviewed [H90, H91, J01, J10, J11, N99, O09].
- NBDC - National Biodiversity Data Centre - Biodiversity Maps: 2km report polygon report.
- BCI – Bat Conservation Ireland: Data request.
- BWI – BirdWatch Ireland: Data request for IWeBS data.

Potential for connectivity between the project area and sites designated for nature conservation was investigated utilising the NPWS map viewer and EPA map viewer. For Natura 2000 sites (SPA and SAC) where ecological or hydrological connectivity was identified the potential for significant effects on Qualifying Interests (QIs) of those designated was then assessed.

Field surveys were undertaken at the site by Woodrow Sustainable Solutions on 15-Feb-2021, 06-Mar-2021, 24-Mar-2021 and 25-Mar-2021. Field survey data was recorded using EcoLog (an ecological field data app developed by Woodrow), enabling ecological information and photographs to be georeferenced and subsequently incorporated into a Geographical Information System (GIS). Surveys undertaken included:

- Habitat mapping and identification of non-native plant species – a habitat survey of the development area was undertaken following Fossitt (2000) habitat classification system[4]. Any non-native species were recorded and potential locations requiring further summer (growing season) surveys were identified. In particular surveyors aimed to search for signs of plant species listed on Schedule III Part I of S.I. No. 477/2011- European Communities (Birds and Natural Habitats) Regulations 2011 occurring within or adjacent to the site. This Act makes it an offence to plant, spread, or otherwise cause to grow any of the plant species listed in this Schedule (Department of Arts, Heritage and the Gaeltacht (2011).
- Aquatic surveys – preliminary salmonid habitat suitability survey were undertaken; however, fisheries information relies on desk-based information.
- Invertebrate surveys – habitat suitability was assessed for potential to support protected invertebrate species, including marsh fritillary and Vertigo species. No aquatic invertebrate surveys were undertaken and investigation of the occurrence of any notably sensitive species such freshwater crayfish or freshwater pearl mussels relies on the desk-based study.
- Amphibians – habitat suitability was assessed for common frog and smooth newt.
- Reptiles – habitat suitability was assessed for common lizard.

[4] Fossitt, J. A. (2000) A Guide to Habitats in Ireland. The Heritage Council

- Birds – habitat suitability was assessed and a species list was compiled during the visit (winter visit). Maximum annual counts for IWeBS count sections has been reproduced to provide indicative numbers of wintering waterbirds occurring adjacent to the project area

- Mammals – protected mammal surveys focussing on badgers and otters were conducted within the lands identified for the project and extended the appropriate distances beyond the project area in some cases (30m for badger and 150m for otter). These were field signs surveys using standard methodologies appropriate to different species (e.g. for badger, the field survey included a systematic searches of all fence lines, woodland and scrub habitats within 30m of the project area for evidence of badgers, such as setts, feeding signs, guard hairs, latrines, prints and paths). While coverage of the site was complete, check of all suitable habitat for badgers was beyond the survey scope and results should be viewed as indicative.

- Bat potential roost features (PRFs) and an assessment of commuting/foraging habitat was undertaken within the project area and an area extending 30m beyond. Assessment of roost and forging/commuting habitat followed those outlined in Collins (2016)[5]

(a) Designated Sites

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, better known as "The Habitats Directive", provides legal protection for habitats and species of European importance. Articles 3 to 9 provide the legislative means to protect habitats and species of Community interest through the establishment and conservation of an EU-wide network of sites known as Natura 2000. These are Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Conservation of Wild Birds Directive (79/409/ECC) as codified by Directive 2009/147/EC. These designated areas present the most pertinent constraints to the proposed works.

Figure 2.1 below shows the Natura 2000 sites within the potential impact zone of the proposed works. A 15 km buffer zone from the edge of the CFRAMS area was used as a precautionary measure, to ensure that all potentially affected Natura 2000 sites are considered. This is in line with Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities produced by the Department of the Environment, Heritage and Local Government (DEHLG, 2010[6]).

[5] Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edition). The Bat Conservation Trust, London

[6] DEHLG. 2009. Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (Revised February 2010). Department of the Environment, Heritage and Local Government.

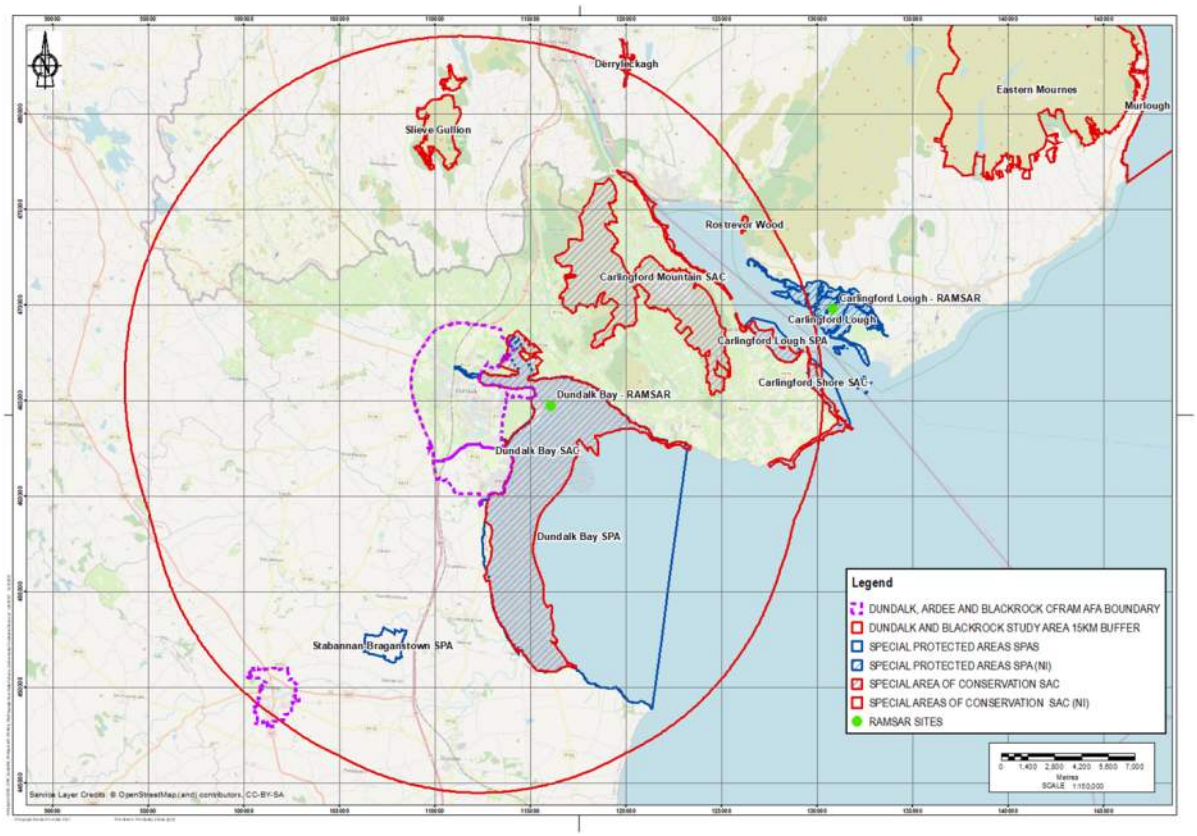


Figure 2.1 – Natura 2000 sites and RAMSAR sites within 15km of the Dundalk and Black Rock Flood Relief Scheme.

Figure 2.2 below shows the Natura 2000 site detail within the focused Study Area, showing the Dundalk Bay SAC and SPA.

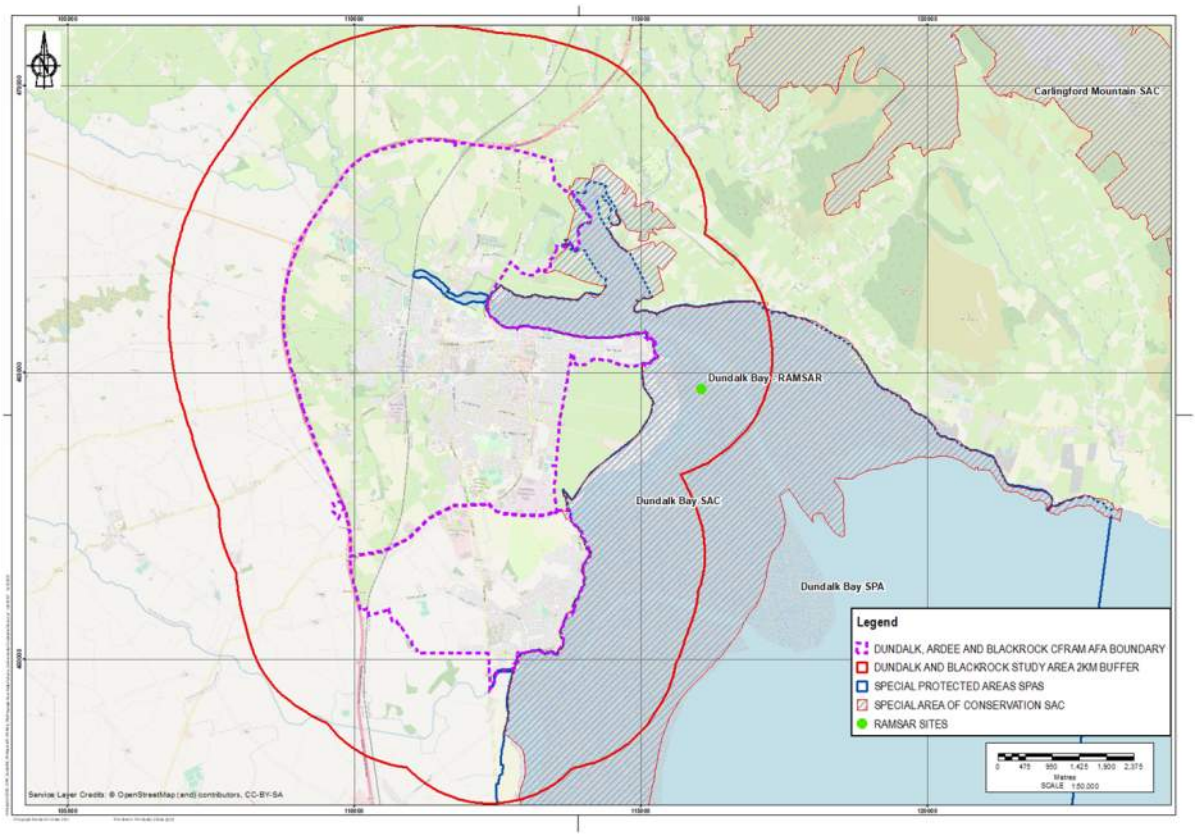


Figure 2.2 – Natura 2000 sites within 2km of the Dundalk and Black Rock Flood Relief Scheme.

Table 2.1 provides a list of all the Natura 2000 sites within 15 km of the proposed flood relief scheme. The project area is partly located within and largely adjacent to the Dundalk Bay SPA and Dundalk Bay SAC. As indicated in Table 2.1, there are potential for direct impacts to QI species and habitats within the SPA and SAC. Any displacement effects on wintering waterbirds utilising the Dundalk Bay SPA as a result of the proposed project has the potential to impact on populations in other SPAs. For instance, brent geese and greylag geese displaced from the Dundalk Bay SPA could re-locate to the Carlingford Lough SPA and the Stabannan-Braganstown SPA respectively. Additional birds within these SPAs may compete for resources.

No other source-receptor pathways between Natura 2000 designated sites and the project area were identified.

Table 2.1 - Potential connectivity and nature of potential impacts on all Natura 2000 sites within 15 km of the proposed development

Site name	Qualifying Interests (QIs)	Distance from site	Source-receptor linkage	Potential for significant effects and nature of potential impacts
Dundalk Bay SPA [004026]	• Great Crested Grebe (*Podiceps cristatus*) [A005] • Greylag Goose (*Anser anser*) [A043] • Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] • Shelduck (*Tadorna tadorna*) [A048] • Teal (*Anas crecca*) [A052] • Mallard (*Anas platyrhynchos*) [A053] • Pintail (*Anas acuta*) [A054] • Common Scoter (*Melanitta nigra*) [A065] • Red-breasted Merganser (*Mergus serrator*) [A069] • Oystercatcher (*Haematopus ostralegus*) [A130] • Ringed Plover (*Charadrius hiaticula*) [A137] • Golden Plover (*Pluvialis apricaria*) [A140] • Grey Plover (*Pluvialis squatarola*) [A141] • Lapwing (*Vanellus vanellus*) [A142] • Knot (*Calidris canutus*) [A143] • Dunlin (*Calidris alpina*) [A149] • Black-tailed Godwit (*Limosa limosa*) [A156] • Bar-tailed Godwit (*Limosa lapponica*) [A157] • Curlew (*Numenius arquata*) [A160] • Redshank (*Tringa totanus*) [A162] • Black-headed Gull (*Chroicocephalus ridibundus*) [A179] • Common Gull (*Larus canus*) [A182] • Herring Gull (*Larus argentatus*) [A184] • Wetland and Waterbirds [A999]	0km Proposed development site is partly within the SPA	Yes	<u>*Construction phase*</u> • Potential for disturbance to wintering waterbirds due to construction related activities occurring adjacent to the SPA. • Water pollution (hydrocarbons and sedimentation) due construction works has the potential to impact water quality which could affect the food availability for winter waterbirds. <u>*Operational phase*</u> • Disturbance to wintering birds due people utilising proposed greenway • Potential for alteration of coastal habitats utilised by wintering waterbirds as a result of changes in water levels and flooding regimes. Depending on the resultant wetting regimes and habitats potentially created there could be positive impacts on some waterbird species and negative for others.

Site name	Qualifying Interests (QIs)	Distance from site	Source-receptor linkage	Potential for significant effects and nature of potential impacts
Dundalk Bay SAC [000455]	• Estuaries [1130] • Mudflats and sandflats not covered by seawater at low tide [1140] • Perennial vegetation of stony banks [1220] • Salicornia and other annuals colonising mud & sand [1310] • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae)* [1330] • Mediterranean salt meadows (*Juncetalia maritimi*) [1410]	0km Proposed development site is partly within the SAC	Yes	*Construction phase* • Potential for direct loss of protected coastal habitats • Water pollution (hydrocarbon and sediment) has the potential to impact QI habitats occurring downstream or adjacent to project area *Operational phase* • Potential for changes in water levels and flooding regimes that could impact on QI habitats, notably the effect of coastal squeeze on salt marsh habitats 'trapped' between hard coastal defences and rising sea levels. • Depending on the resultant wetting regimes and habitats potentially created there could be positive impacts on some habitats, e.g. tidal inundation may allow for the creation of more salt marsh.
Carlingford Lough SPA [004078]	• Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] • Wetland and Waterbirds [A999]	*c.* 11.1km	No	There may be interchange of wintering brent geese between Carlingford Lough SPA and the project area (Dundalk Bay SPA). Birds potentially displaced from the Project Area by construction and operational activities could re-locate to the Carlingford Lough SPA, which could place extra pressure on foraging resources
Stabannan-Braganstown SPA [004091]	• Greylag Goose (*Anser anser*) [A043]	*c.* 7.2km	Yes	There may be interchange of wintering greylag geese between Stabannan-Braganstown SPA and the project area (Dundalk Bay SPA). Birds potentially displaced from the Project Area by construction and operational activities could re-locate to the Stabannan-Braganstown SPA, which could place extra pressure on foraging resources

Site name	Qualifying Interests (QIs)	Distance from site	Source-receptor linkage	Potential for significant effects and nature of potential impacts
Carlingford Mountain SAC [000453]	• Northern Atlantic wet heaths with *Erica tetralix* [4010] • European dry heaths [4030] • Alpine and Boreal heaths [4060] • Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230] • Blanket bogs (* if active bog) [7130] • Transition mires and quaking bogs [7140] • Alkaline fens [7230] • Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) [8110] • Calcareous rocky slopes with chasmophytic vegetation [8210] • Siliceous rocky slopes with chasmophytic vegetation [8220]	*c.* 2.9km	No	NONE The Carlingford Mountain SAC is linked hydrologically with the Project Area as the tributaries of the Ballymacscanlan River (Flurry R.) flow off the hills and into Ballymacscanlan estuary, north of Dundalk. However, given that the SAC is upstream of the Project Area, there is no potential for the proposed project to impact on any of the QI habitats for the Carlingford Mountain SAC.
Carlingford Shore SAC [002306]	• Annual vegetation of drift lines [1210] • Perennial vegetation of stony banks [1220]	*c.* 13.8km	No	NONE
Natura 2000 sites in Northern Ireland				
Carlingford Lough SPA [UK9020161]	• Light-bellied Brent Geese (*Branta bemicla hrota*) [A046] • Wetland and Waterbirds [A999]	*c.* 14.1km	Yes	There maybe interchange of wintering brent geese between Carlingford Lough SPA and the project area (Dundalk Bay SPA). Birds potentially displaced from the Project Area by construction and operational activities could re-locate to the Carlingford Lough SPA, which could place extra pressure on foraging resources

Site name	Qualifying Interests (QIs)	Distance from site	Source-receptor linkage	Potential for significant effects and nature of potential impacts
Slieve Gullion SAC [UK0030277]	• European dry heaths [4030]	*c.* 8.5km	No	NONE
Rostrevor Wood SAC [UK0030277]	• Old sessile oak woods with Ilex and Blechnum in the British Isles	*c.* 13.5km	No	NONE
Derryleckagh SAC [UK0016620]	• Transition mires and quaking bogs • Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	*c.* 14.0km	No	NONE

In addition to the statutory designated Natura 2000 sites there are 630 proposed NHAs (pNHAs) in Ireland. Under the Wildlife Amendment Act (2000), NHAs are legally protected from damage from the date they are formally proposed for designation. The pNHAs were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. These sites are of significance for wildlife and habitats. The pNHAs cover approximately 65,000ha and designation will proceed on a phased basis over the coming years. Under the Wildlife Amendment Act (2000), NHAs are legally protected from damage from the date they are formally proposed for designation. Prior to statutory designation, pNHAs are subject to limited protection, including 'Recognition of the ecological value of pNHAs by Planning and Licencing'[7].

In terms of nationally important sites designated for nature conservation, there were no Natural Heritage Areas (NHAs) within 15km of the proposed project. As listed is Table 2.2 and Figure 2.3, there are 10 proposed Natural Heritage Area (pNHAs) within 15km of the project area, with potential source-receptor pathways already identified under the corresponding SAC and SPA for the Dundalk Bay pHNA, Carlingford Lough pNHA and Stabannan-Braganstown pNHA. Potential source-receptor pathways were also identified for the Dunany Point pNHA. In Northern Ireland there are 14 ASSIs and one Nature Reserve within 15km of the project area. As shown in Table 2.2, a source-receptor linkage was identified for Carlingford Lough ASSI. As previously mentioned, displacement of wintering waterbirds from Dundalk Bay to other designated sites such as Carlingford Lough ASSI could result in increased competition for resources and adverse effects on populations. No source-receptor pathways were identified for the remaining ASSIs or the Nature Reserve.

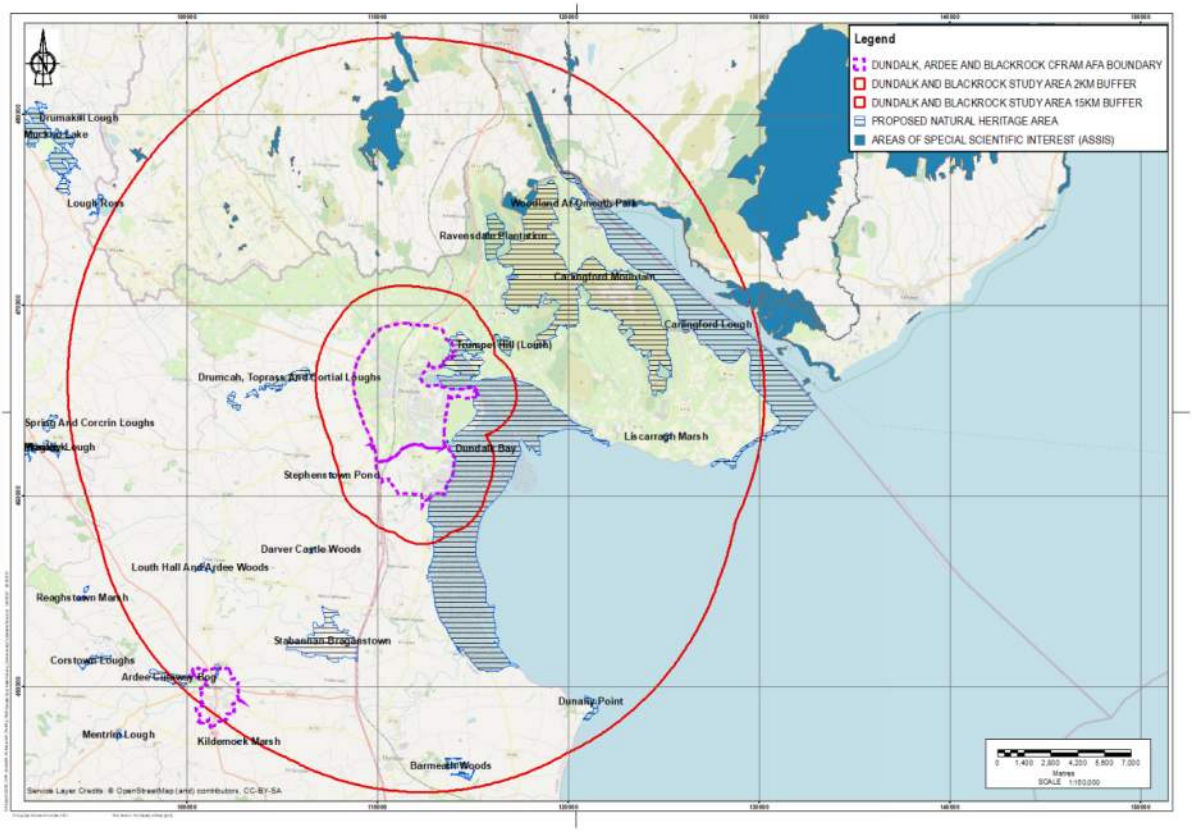


Figure 2.3 – Proposed Natural Heritage Sites and Areas of Special Scientific Interest (Northern Ireland) within 15km of the Dundalk and Black Rock Flood Relief Scheme.

[7] National Parks & Wildlife Service, https://www.npws.ie/protected-sites/nha, accessed April 2021.

Table 2.2 - Nationally Protected Sites in RoI (NHAs, pNHAs) and NI (NR) within 15km of the proposed development

Site name	Features of Conservation Interest	Distance from site	Source-receptor linkage	Potential for significant effects and nature of potential impacts
Dundalk Bay pNHA [000455]	• See info for Dundalk Bay SAC (Table 2.1)	Within	Yes	See details for Dundalk Bay SAC
Stabannan-Braganstown pNHA [000456]	• See info for Stabannan-Braganstown SPA (Table 2.1)	*c.* 7.2km	Yes	See details for Stabannan-Braganstown SPA
Carlingford Mountain pNHA [000453]	• See info for Carlingford Mountain SAC (Table 2.1)	*c.* 3.4km	No	NONE
Trumpet Hill (Louth) pNHA [001468]	• Semi-natural mixed deciduous woodland • Rocky outcrops	*c.* 2.4km	No	NONE
Woodland at Omeath Park pNHA [001465]	• Wet, semi-natural deciduous woodland	*c.* 9.4km	No	NONE
Drumcah, Toprass and Cortial Loughs pNHA [001462]	• Freshwater lakes with marshland	*c.* 1.7km	No	NONE
Darver Castle Woods pNHA [001461]	• Mixed wet deciduous woodland • Diverse orchid understory	*c.* 6.4km	No	NONE
Stephenstown Pond pNHA [001803]	• Open water body (artificial)	*c.* 4.9km	No	NONE
Ravensdale Plantation pNHA [001805]	• Conifer woodland and broadleaved woodland	*c.* 4.3km	No	NONE
Liscarragh Marsh pNHA [001451]	• Freshwater lake and marsh	*c.* 11km	No	NONE
Carlingford Lough pNHA 000452	• See info for Carlingford Lough SPA (Table 2.1) (RoI) – wintering waterbirds	*c.* 12.3km	Yes	As for SPA – displaced waterbirds potentially adding to pressure on resources
Dunany Point pNHA 001856	• Geological interest, with examples of coastal habitats, with the occurrence of light-belied brent geese noted.	*c.* 12.6km	Yes	Partly in Dundalk Bay SPA & disturbance due to project related activities could impact brent geese distribution in the area.
Louth Hall And Ardee Woods pNHA 001616	• Two woodland sites	*c.* 13.8km	No	NONE
Northern Ireland: Nature Reserves & ASSI - Areas of Special Scientific Interest				
Rostrevor Forest [NR5]	• Oak woodland	*c.* 13.5km	No	NONE

Site name	Features of Conservation Interest	Distance from site	Source-receptor linkage	Potential for significant effects and nature of potential impacts
Rostrevor Forest ASSI[ASSI178]	• Oak woodland	*c.* 13.5km	No	NONE
Carrickastickan ASSI [ASSI215]	• Semi-natural grassland and lowland meadow	*c.* 4.5km	No	NONE
Slieve Gullion ASSI [ASSI198	• Dry heath and fen complex	*c.* 8.9km	No	NONE
Cloghinny ASSI [ASSI293]	• Geological interest	*c.* 7.8km	No	NONE
Glendesha ASSI [ASSI292]	• Geological interest	*c.* 9.1km	No	NONE
Clermont & Anglesey Mountain [ASSI409]	• Heathland	*c.* 7.1km	No	NONE
Mullaghbane ASSI [ASSI291]	• Geological interest	*c.* 9.3km	No	NONE
Loughaveely ASSI [ASSI206]	• Wetland complex of standing water, swamp, fen, cutover bog, neutral grassland and scrub	*c.* 8.0km	No	NONE
Lurgan Lough ASSI [ASSI204]	• Fens • Eutrophic standing waters	*c.* 9.0km	No	NONE
Carlingford Lough ASSI [ASSI103]	• See info for Carlingford Lough SPA (NI) -wintering waterbirds & breeding terns	*c.* 10.0km	Yes	As for SPA – displaced waterbirds potentially adding to pressure on resources
Cashel Loughs ASSI [ASSI189]	• Fens (invertebrate community)	*c.* 10.9km	No	NONE
Levallymore ASSI [ASSI214]	• Lowland meadow	*c.* 13.0km	No	NONE
Cam Lough [ASSI231]	• Mesotrophic lake	*c.* 13.0km	No – upstream hydological connection via Flurry River	NONE

Dundalk Bay SAC

Special Areas of Conservation (SACs) have been selected by the NPWS as they contain specific habitats or species that are listed in the EU Habitats Directive and require protection. As part of the Irish State's legal requirements to protect these habitats or species, the NPWS has drawn up lists of habitats and species for each Natura Site in the State. These are known as the Qualifying Interests (QIs) of SACs some of which, because of their sensitivity/rareness, are designated as "Priority" habitats and require a greater level of protection than non-priority QIs.

The proposed interventions are located within or close to the Dundalk Bay SAC. The Qualifying Interests (QIs) for the Dundalk Bay SAC[8], their presence or not within the Study Area and their sensitivity to the potential options are shown in Table 2.3.

Table 2.3 - Qualifying Interests (QIs) for the Dundalk Bay SAC and likely sensitivity to the Proposed Scheme

Habitat / species	Presence within the Focused Study Area	Likely Sensitivity to the Proposed Scheme
Estuaries.	Yes	Sensitive - Elements of the proposed scheme are located within or close to this Qualifying Habitat. These areas include the south and north banks of the Castletown River to the east of the east of the N52 Road, the option of upgrading the existing flood defences on the west bank of the Flurry Estuary, proposed interventions at Blackrock and the River Fane Estuary.
Mudflats and sandflats not covered by seawater at low tide.	Yes	Sensitive - Elements of the proposed scheme are located within or close to this Qualifying Habitat. These areas include the north bank (and small sections of the south bank) of the Castletown River to the east of the east of the N52 Road, the option of upgrading the existing flood defences on the west bank of the Flurry Estuary, proposed interventions at Blackrock and the River Fane Estuary.
Perennial vegetation of stony banks.	Yes	The exact current extent of this habitat is unknown, but it is thought to be widespread.
Salicornia and other annuals colonising mud and sand.	Yes	Sensitive – The distribution is space within the focused study area. A small section of interventions on the south side of the Castletown River Estuary at Soldiers Point and near The Loakers are close to this qualifying habitat.
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	Yes	Sensitive - Elements of the proposed scheme would be located within or close to this Qualifying Habitat. These areas include the north Castletown River to the east of the east of the N52 Road, interventions at Bellurgan Point, proposed interventions at the northern area of Blackrock and small areas of the River Fane Estuary. A small area of potential salt marsh habitat has been identified close to the option of upgrading the existing flood defences on the west bank of the Flurry Estuary.

[8] NPWS, Conservation Objectives, Dundalk Bay SAC000455 Dundalk Bay SPA 004026, July 2011

Habitat / species	Presence within the Focused Study Area	Likely Sensitivity to the Proposed Scheme
Mediterranean salt meadows (*Juncetalia maritimi*)	Yes	Sensitive - A very small area of this qualifying habitat has been identified on the north bank of the Castletown River to the east of the N52. The defences in this area will potentially be upgraded fall close (<20m) to this habitat.

Estuaries

Estuaries are habitat complexes which comprise an interdependent mosaic of subtidal and intertidal habitats, which are closely associated with surrounding terrestrial habitats. As can be seen in Figure 2.4, this habitat type covers the mouth of the Castletown River to the N52 Road Bridge, the Flurry River Estuary and all to the subtidal and intertidal area along the coastline in the focused study area south of the River Fane.

The Conservation Objective for this QI habitat for the Dundalk Bay SAC is to maintain the favourable conservation condition of Estuaries in Dundalk Bay SAC, which is defined by the following list of attributes and targets:

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

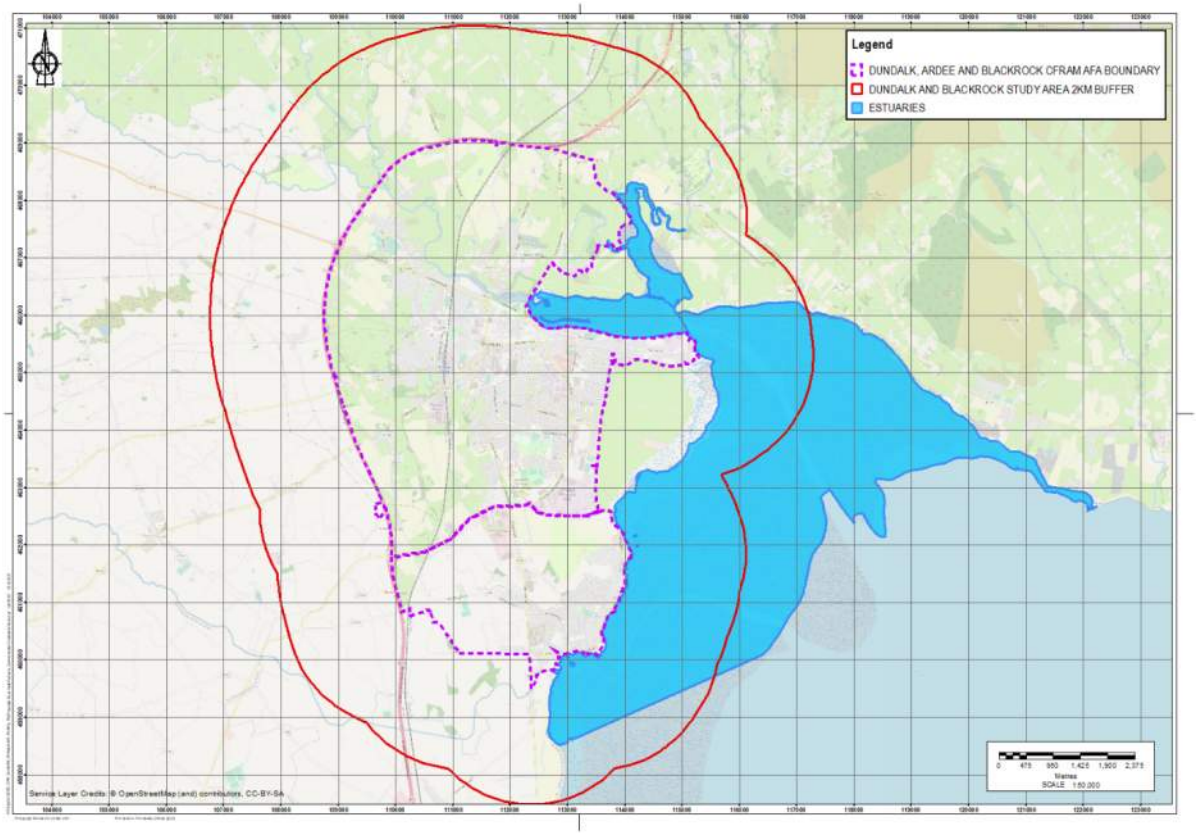


Figure 2.4 – Map showing the extent of [1130] Estuaries habitat in relation to the Study Area

Mudflats / Sandflats

Intertidal mudflats and sandflats are submerged at high tide and exposed at low tide. They form a major component of [1130] Estuaries and [1160] Large shallow inlets and bays in Ireland but also occur extensively along the open coast and in lagoonal inlets. The physical structure of the intertidal flats ranges from mobile, coarse-sand beaches on wave-exposed coasts to stable, fine-sediment mudflats in estuaries and other marine inlets. This habitat type can be divided into three broad categories (clean sands, muddy sands and muds), although in practice there is a continuous gradation between them. As can be seen in the map shown in Figure 2.5, this habitat type is present within Dundalk Bay and estuaries.

The Conservation Objective for this QI habitat is to 'maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide at Dundalk Bay SAC, which is defined by the following list of attributes and targets':

- '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'.

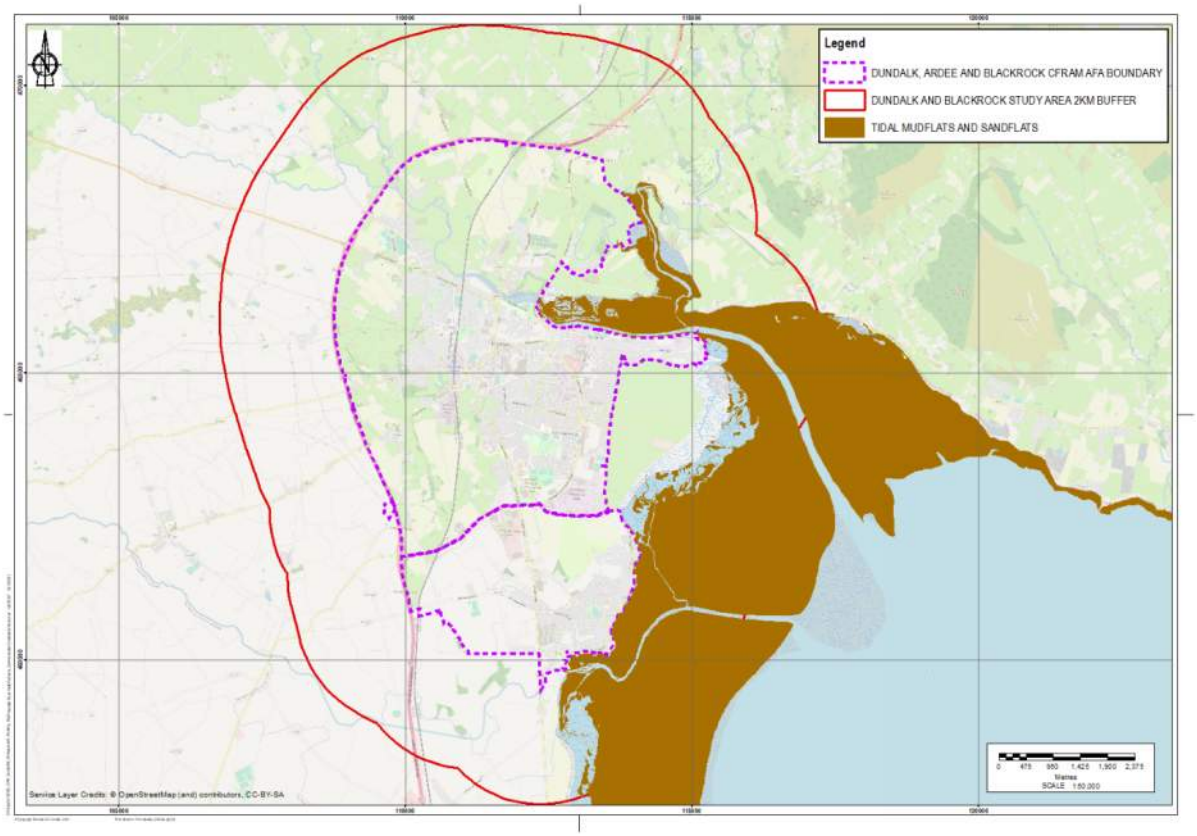


Figure 2.5– Map showing the extent of [1140] Mudflats and Sandflats not covered by seawater at low tide habitat in relation to the Study Area

Perennial vegetation of stony banks

Perennial vegetation of stony banks is vegetation that is found above the high tide mark on beaches comprised of shingle (cobbles and pebbles). It is dominated by perennial species (i.e. plants that continue to grow from year to year). Vegetated shingle occurs on deposits of shingle

lying at or above mean high-water spring tides. The first species to colonise are annuals or short-lived perennials that are tolerant of periodic displacement or overtopping by high tides and storms. Level, or gently-sloping, high-level mobile beaches, with limited human disturbance, support the best examples of this vegetation. More permanent ridges are formed by storm waves. Several of these storm beaches may be piled against each other to form extensive structures[9]. The exact current extent of this habitat is unknown, but it is thought to be widespread. The shingle is mostly stable, occurring on post-glacial raised beaches. It often occurs in close association with the intertidal area, saltmarsh habitats and coastal grassland.

The exact current extent of this habitat is unknown, but it is thought to be widespread. The shingle is mostly stable, occurring on post-glacial raised beaches. It often occurs in close association with the intertidal area, saltmarsh habitats and coastal grassland. It is difficult to measure the area of this habitat, but assuming an average width of 10m and a total length of approximately 12km then the estimated area that the shingle covers is 12ha, although not all of this would be vegetated.

The Conservation Objective for this QI habitat is to: To maintain the favourable conservation condition of Perennial vegetation of stony banks in Dundalk Bay SAC, which is defined by the following list of attributes and targets:

- '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

This pioneer saltmarsh vegetation colonises intertidal mud and sandflats in areas protected from strong wave action and is an important precursor to the development of more stable saltmarsh vegetation. It develops at the lower reaches of saltmarshes where the vegetation is frequently flooded by the tide, and can also colonise open creek sides, depressions or pans within saltmarshes, as well as disturbed areas of upper saltmarshes[10]. As can be seen in Figure 2.6 this habitat is present within the study area in a relatively small area on the seaward side of the Atlantic Salt Meadow to the south of the Castletown River Estuary.

Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

Atlantic salt meadows develop when halophytic vegetation colonises soft intertidal sediments of mud and sand in areas protected from strong wave action. This vegetation forms the middle

[9] NPWS, Dundalk Bay SAC (site code 455) Conservation objectives supporting document -coastal habitats

[10] JNCC, Website accessed January 2021, https://sac.jncc.gov.uk/habitat/H1310/

and upper reaches of saltmarshes, where tidal inundation still occurs but with decreasing frequency and duration. A wide range of community types is represented and the saltmarshes can cover large areas, especially where there has been little or no enclosure on the landward side. The vegetation varies with climate and the frequency and duration of tidal inundation (Ref: https://sac.jncc.gov.uk/habitat/H1330/). As can be seen in Figure 2.6 this habitat is present within the study area within the Castletown River and along the coastline to the south of the Castletown River Estuary. Potential Atlantic salt meadows are noted in the Flurry Estuary.

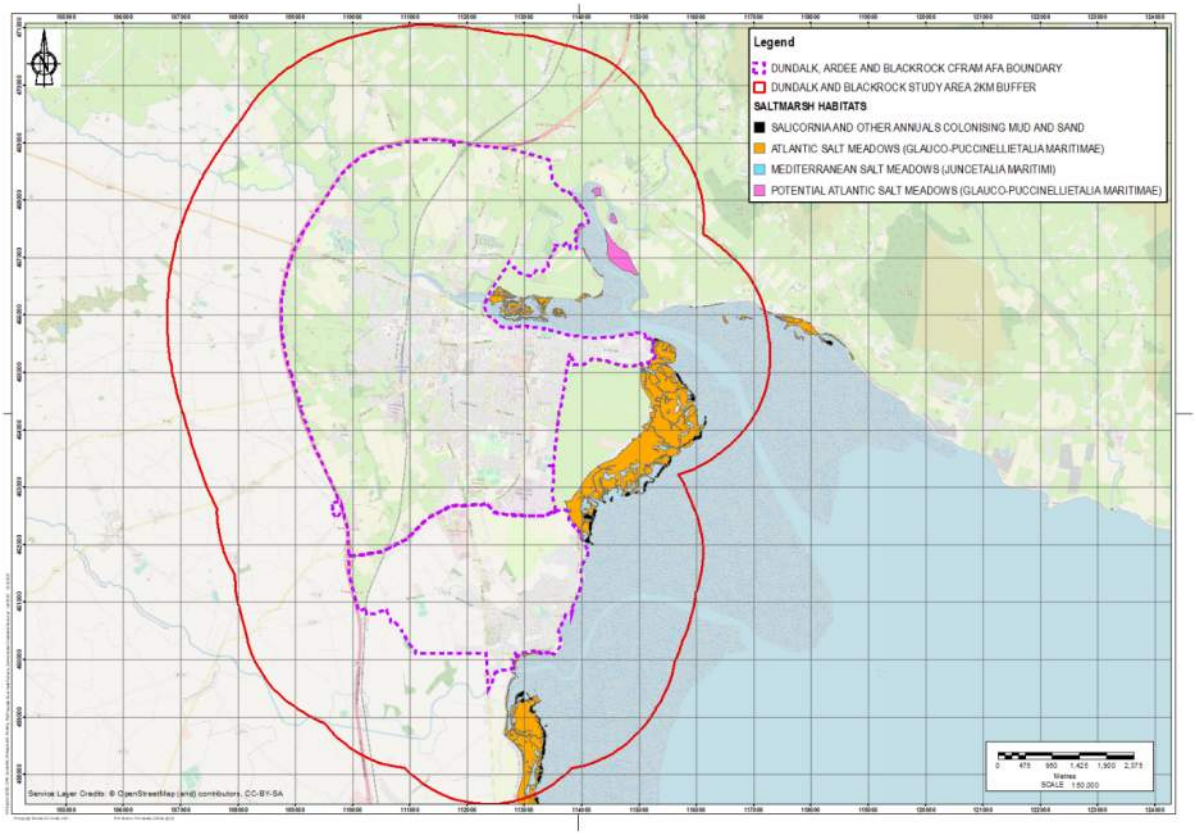


Figure 2.6– Map showing the extent of saltmarsh habitats

Mediterranean salt meadows (*Juncetalia maritimi*)

This habitat includes saltmarshes in the Mediterranean basin dominated by Juncus (rushes) especially Juncus maritimus (sea rush) tolerant of saline soils.

A very small area of Mediterranean salt meadow habitat has been identified within the study area along the north bank of the Castletown River to the east of the N52 road

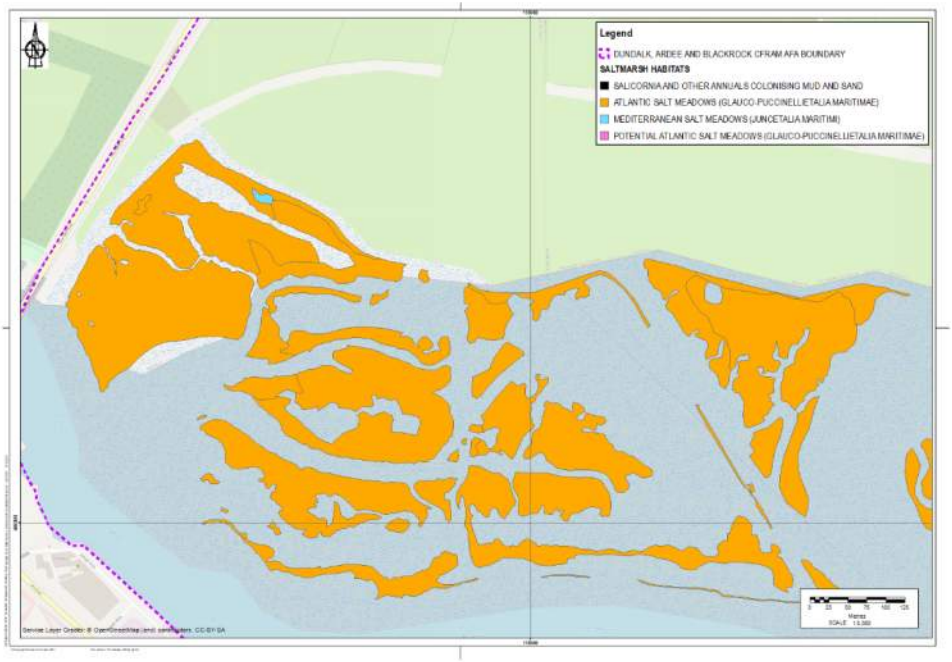


Figure 2.7 – Detail map of extent Mediterranean Salt Meadow

The Conservation objectives all the saltmarsh habitats are to maintain the favourable conservation condition (of Atlantic salt meadows, Salicornia and Other Annuals Colonizing Mud and Sand, Mediterranean salt meadows) in Dundalk Bay SAC, which is defined by the following list of attributes and targets:

- Area stable or increasing, subject to natural processes, including erosion and succession.
- 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 subcommunities with characteristic species listed in Saltmarsh Monitoring Project.
- 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.

Dundalk Bay Special Protection Area (SPA)

As shown in Figure 2.2, the Project Area is partially located within the Dundalk Bay Special Protection Area (SPA). The area covers the mouth of the Castletown River to the N52 Road Bridge, the Flurry River Estuary and all to the subtidal and intertidal area along the coastline in the focused study area to south of the River Fane.

The qualifying interests are for "wetlands and waterbirds" and for wintering populations of the Annex I bird species Great Crested Grebe *Podiceps cristatus*, Greylag Goose *Anser anser*, Light-bellied Brent Goose *Branta bernicla hrota*, Shelduck *Tadorna tadorna*, Teal *Anas crecca*, Mallard *Anas platyrhynchos*, Pintail *Anas acuta*, Common Scoter *Melanitta nigra*, 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*, and Herring Gull *Larus argentatus.*

The SPA conservation objectives for all of the above bird species are to maintain the favourable conservation condition in Dundalk Bay SPA, which is defined by the following list of attributes and targets:

- Long term population trend 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; and
- To maintain the favourable conservation condition of the wetland habitat in Dundalk Bay SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

As shown in Figure 2.8 the Project Area is partially located within the tidal zones and wetlands used by waterbirds. The area covers the mouth of the Castletown River to the N52 Road Bridge, the Flurry River Estuary and all to the subtidal and intertidal area along the coastline in the focused study area to south of the River Fane.

The conservation objective for Wetlands and Waterbirds is to maintain the favourable conservation condition of the wetland habitat in Dundalk Bay SPA for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

- 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.

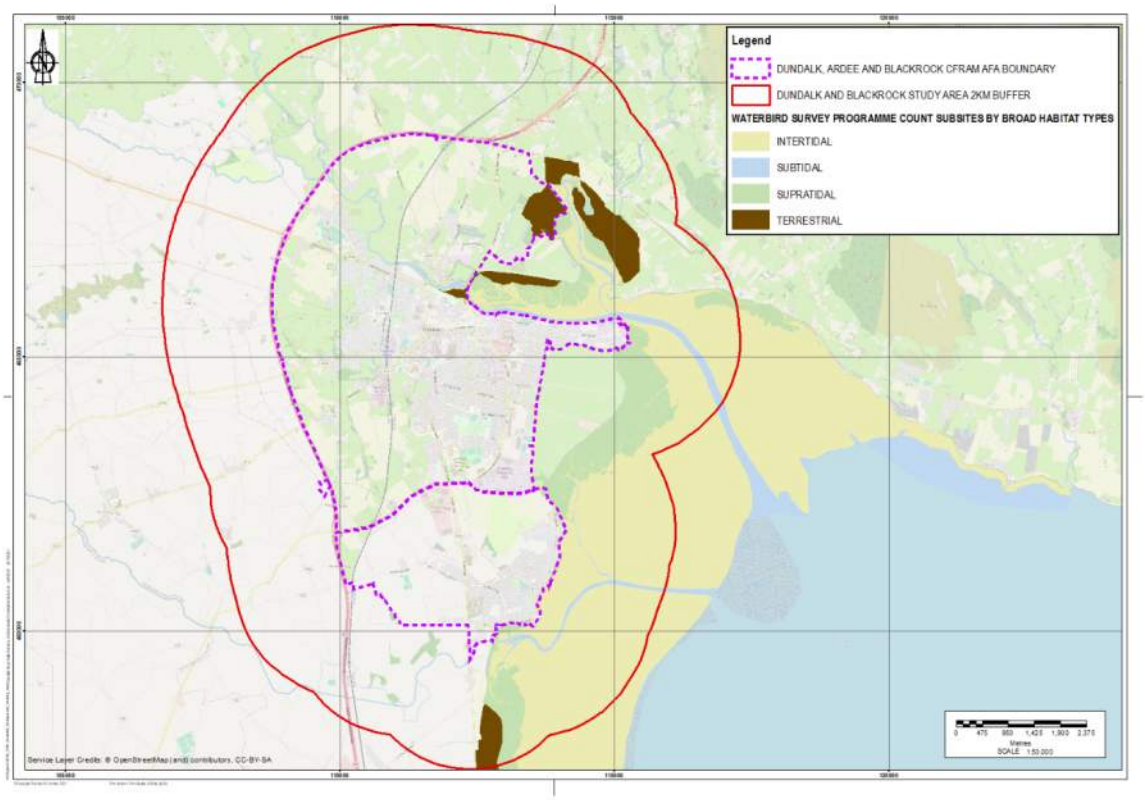


Figure 2.8 – Map showing the extent of Dundalk Bay SPA and Bird Use Zones.

Dundalk Bay Ramsar Site

The Convention on Wetlands (Ramsar convention) entered into force in Ireland in March 1985. Signatories to the Convention are required to identify and designate wetlands of international importance in their territories and to take the steps necessary to ensure that the ecological character of those sites is maintained. Dundalk Bay is designated as a Ramsar Site, which occupies a similar footprint to the Dundalk Bay SAC. The designation covers an area of 4767.62ha. Dundalk bay is described as being '*internationally important for waterbirds regularly holding over 20,000 birds and supporting over 1% of the Northwest European/East Atlantic Flyway populations of numerous species of waterbirds. The saltmarshes are partially fenced and grazed by sheep and are used as high-tide roosts. Ramsar site no. 834.*'[11]The sand banks and mudflats throughout the site host a rich fauna of bivalve molluscs, marine worms and crustaceans which provide the main food source to the waterbirds which feed in the Dundalk Bay intertidal areas. The saltmarshes contain grasses such as Townsend's Cord-grass (*partina townsendi*)) and other vegetation which is used as a food source by grazing birds[11].

(b) Habitats

For each of the project features, the results of surveys carried out in February and March 2021 are detailed in Table 2.4, which provides information on the occurrence of habitat types (Fossitt, 2000), shown in Appendix 3.

[11] Ramsar Information Service website accessed April 2021 https://rsis.ramsar.org/ris/834

Table 2.4 - Habitat types in the project area

Project feature code(s) **FD** = flood defence **GW** = greenway ( ) = Project Code *Preliminary ecological scoping report, D.01/ 19.04.2021*	**Survey effort**	**Natura 2000 sites**	**Habitat types Fossitt (2000) codes**	**Potential EU Annex I habitats**	**Non-native species**	**Habitat constraints, issues & comments**
North Area - Ballymascanlan estuary						
1d (FD1)	Full habitat survey - partly covered for mammal	Hydrologically linked to Dundalk Bay SAC & SPA	BC1, FW1, FW2, WL2	Nil	Beech	Adjacent watercourse with connectivity to SAC
1b (FD2)	Partly covered	Hydrologically linked to Dundalk Bay SAC & SPA, with section in SAC	BL2(embankment), BL3, FS1, FW1, FW2, GA1, CS3, WD4, WL1,	Nil	Conifer plantation (mostly larch)	Adjacent watercourse with connectivity to SAC
Northern habitat creation area	Partly covered	Within Dundalk Bay SAC & SPA	BL2(embankment), CM1/2, CW2, FS1, FW1, FW2, GA1, CS3, WD4, WL1, WL2, WS1	Atlantic salt meadows	None recorded	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
1a/2 (FD3) - existing embankment/ GW1 - alternative, along coast	Full habitat survey - partly covered for mammal	Within Dundalk Bay SAC & SPA	BL2(embankment), CM1/2, CW2, FS1, FW1, FW2, GA1, GS3, LS4, WL1, WS1	Atlantic salt meadows Mudflats & sandflats	None recorded	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
GW2 - along dismantled railway	Full habitat survey - partly covered for mammal	Partly within Dundalk Bay SAC & SPA	BL2(embankment), CM1/2, CW2, ED3, FW1, FW2, GA1, CS3, WL1, WS1	Atlantic salt meadows	Winter heliotrope	Majority of trail upgrade would be removed from potentially sensitive habitats along coast
West of Castletown Bridge, along Castletown River						
3a (FD13)	Full habitat survey - partly covered for mammal	Hydrologically linked to Dundalk Bay SAC & SPA	GA1, GS4, WL1	Nil	None recorded	Hydrologically linked to Dundalk Bay SPA and SAC
3b (FD14)	Full habitat survey - partly covered for mammal	Hydrologically linked to Dundalk Bay SAC & SPA	CW2, FW4, GS2, GS4, WL1, WL2, WS1	Nil	None recorded	Adjacent to Dundalk Bay SPA, hydrologically linked to Dundalk Bay SAC

Project feature code(s) **FD** = flood defence **GW** = greenway ( ) = Project Code *Preliminary ecological scoping report, D.01/ 19.04.2021*	**Survey effort**	**Natura 2000 sites**	**Habitat types Fossitt (2000) codes**	**Potential EU Annex I habitats**	**Non-native species**	**Habitat constraints, issues & comments**
4a (FD15)	Full habitat survey - partly covered for mammal	Hydrologically linked to Dundalk Bay SAC & SPA	FS1, GA1, GA2, WL1, WS1	Nil	None recorded	Hydrologically linked to Dundalk Bay SPA and SAC
4b/4c (FD16)	Full habitat survey - partly covered for mammal	Directly adjacent to Dundalk Bay SPA and hydrologically linked to Dundalk Bay SAC	BL1, CM2, CW2, FS1, GA2, GS2, WD5, WL1, WL2, WS1,	Atlantic salt meadows	Buddleia	Adjacent to Dundalk Bay SPA, hydrologically linked to Dundalk Bay SAC
Western - Passive flow control area						
12 - Passive flow control area	Full habitat survey - partly covered for mammal	Hydrologically linked to Dundalk Bay SAC & SPA	FS1, FW2, FW4, GA1, GS4, WL2, WS1	Nil	None recorded	Watercourse with connectivity to SAC
Dundalk - South harbour/estuary						
5 (FD4) - Sean O'Mahonys GAA Club - Eastern By-pass Bridge	Partly walked and viewed from adjacent road/track	Within or directly adjacent to Dundalk Bay SPA and SAC	CM, GA2, GS2, MW4, WD1, WL1, WL2, WS1	Estuaries	Spartina	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
5 (FD5) - Sewage Work's - Sean O'Mahonys GAA Club	Full walkover survey	Within or directly adjacent to Dundalk Bay SPA and SAC	CC1, GA2, GS2, MW4, WS1	Nil	None recorded	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
6 (FD6) - Soldier Point	Full walkover survey	Within or directly adjacent to Dundalk Bay SPA and SAC	CC1, CM1, GA2	Atlantic salt meadows	Spartina	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
GW3: Sean O'Mahonys GAA Club - Eastern By-pass Bridge - via road	Walked/driven	Hydrologically linked to Dundalk Bay SAC & SPA	GA2, WS1	Nil	None recorded	Avoids direct impacts to SAC/SPA

Project feature code(s) **FD** = flood defence **GW** = greenway ( ) = Project Code *Preliminary ecological scoping report, D.01/ 19.04.2021*	**Survey effort**	**Natura 2000 sites**	**Habitat types Fossitt (2000) codes**	**Potential EU Annex I habitats**	**Non-native species**	**Habitat constraints, issues & comments**
GW4: Sean O'Mahonys GAA Club - Eastern By-pass Bridge	Partly walked and viewed from adjacent road/track	Within or directly adjacent to Dundalk Bay SPA and SAC	CM, CW2 GA1, GA2, GS2, MW4, WD1, WL1, WL2, WS1	Estuaries	Spartina	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
GW5: Wastewater Treatment Works - Sean O'Mahonys GAA Club	Full walkover survey	Within or directly adjacent to Dundalk Bay SPA and SAC	CC1, GA2, GS2, MW4, WS1	Estuaries	None recorded	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
GW6: Soldier's Point-Blackwater River - via road	Driven/walked	Hydrologically linked to Dundalk Bay SAC & SPA	CW2, GA2	Nil	Rosa rugosa	Avoids direct impacts to SAC/SPA
GW7: Soldier Point-Blackwater River - via coast	Full walkover survey	Within or directly adjacent to Dundalk Bay SPA and SAC	CM1, CW2, GA2	Atlantic salt meadows (	Spartina, Buddleia	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
Dundalk east coast						
7a (FD7)	Full walkover survey	Boundary of Dundalk Bay SPA and SAC	BC1, BL2, CW2, CM1/2, FW4, GA1, WL1, WL2, WS1	Atlantic salt meadows	Spartina	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
8 (FD8)	Full walkover survey	Boundary of Dundalk Bay SPA and SAC	BC1, BL2, CM2, GA1, GS2, WL2	Atlantic salt meadows	None recorded	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats - will for barrier for salt marsh
GW8	Full walkover - landward side of embankment less comprehensively covered	Boundary of Dundalk Bay SPA and SAC	BC1, BL2, CW2, CM1/2, FW4, GA1, WL1, WL2, WS1	Atlantic salt meadows	Spartina	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats

Project feature code(s) **FD** = flood defence **GW** = greenway ( ) = Project Code *Preliminary ecological scoping report, D.01/ 19.04.2021*	**Survey effort**	**Natura 2000 sites**	**Habitat types Fossitt (2000) codes**	**Potential EU Annex I habitats**	**Non-native species**	**Habitat constraints, issues & comments**
GW9	Full walkover survey	Boundary of Dundalk Bay SPA and SAC	BC1, BL2, CM2, GA1, GS2, WL2	Atlantic salt meadows	Cherry laurel	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
Southern habitat creation area	Partly walked and viewed from adjacent road/track	Within or directly adjacent to Dundalk Bay SPA and SAC	BC1, BL2, CM2, GA1, GS2, WL2	Atlantic salt meadows	None recorded	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
Blackrock						
9c to 9D (FD9)	Full walkover survey	Within Dundalk Bay SAC and SPA	BL1, CB1, CC1, CM2, GA2, GS2, LR2, LS2, SR2, WS1	Atlantic salt meadows Mudflats and Sandflats	Winter heliotrope, Petasites hybridus	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
10c (FD10)	Full walkover survey	Within Dundalk Bay SAC and SPA	CM, FS1, GA2, GS2	Atlantic salt meadows Mudflats and Sandflats	Winter heliotrope, Spartina, Crocosmia	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
10a (FD11)	Full walkover survey	Hydrologically linked to Dundalk Bay SAC & SPA	ED3, FS1, FW2, GA1, GA2, WS1	Nil	Cherry laurel	Hydrologically linked to Dundalk Bay SPA and SAC
10d (FD12)	Full walkover survey	Within Dundalk Bay SAC and SPA	CM2, CW2, GA2, WS1	Atlantic salt meadows	None recorded	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
GW10 - short section along road to coast	Full walkover survey	Hydrologically linked to Dundalk Bay SAC & SPA	CM2, GA1, GS2, WL1	Atlantic salt meadows	None recorded	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
GW11 - on road R172	Full walkover/windscreen survey	Within or directly adjacent to Dundalk Bay SPA and SAC	BL1, CB1, CC1, CM1/2, FS1, FW2, GA1, GA2, GS2, LR2, LS2, LS4, SR2, WL1, WL2, WS1	Atlantic salt meadows Mudflats and Sandflats	Winter heliotrope, Petasites hybridus, Spartina, Crocosmia	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats

Project feature code(s) **FD** = flood defence **GW** = greenway ( ) = Project Code *Preliminary ecological scoping report, D.01/ 19.04.2021*	**Survey effort**	**Natura 2000 sites**	**Habitat types Fossitt (2000) codes**	**Potential EU Annex I habitats**	**Non-native species**	**Habitat constraints, issues & comments**
GW12 - alternative along coast	Full walkover survey	Within or directly adjacent to Dundalk Bay SPA and SAC	CM2, CW2, FS1, GA1, GA2, GS2, LS4, WL1, WS1	Atlantic salt meadows	Winter heliotrope, Spartina, Crocosmia	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
Dundalk north-west						
11j (FD17)	Full walkover survey	Hydrologically linked to Dundalk Bay SAC & SPA - via underground drain	BC3, GA1, GA2, WL1, WS1	Nil	None recorded	Watercourse with connectivity to Natura 2000 sites
11i (FD18)	Full walkover survey	Hydrologically linked to Dundalk Bay SAC & SPA - via underground drain	FW4, GA1, WL2	Nil	None recorded	Watercourse with connectivity to Natura 2000 sites
Dundalk - centre						
11f (FD19)	Full walkover survey	Hydrologically linked to Dundalk Bay SAC & SPA - via Blackwater River	BL2, FS1, FW2, GA1, WL1, WS1	Nil	Buddleia, Cotoneaster, Crocosmia	Watercourse with connectivity to Natura 2000 sites
11h (FD20)	Full walkover survey	Hydrologically linked to Dundalk Bay SAC & SPA - via Rampart river	BC4, FW2, GA2	Nil	None recorded - out of season	Watercourse with connectivity to Natura 2000 sites
11g (FD21)	Full walkover survey	Hydrologically linked to Dundalk Bay SAC & SPA - via Blackwater River	ED3, FW2, GA2, WL2	Nil	None recorded - out of season	Watercourse with connectivity to Natura 2000 sites

Project feature code(s) **FD** = flood defence **GW** = greenway ( ) = Project Code *Preliminary ecological scoping report, D.01/ 19.04.2021*	**Survey effort**	**Natura 2000 sites**	**Habitat types Fossitt (2000) codes**	**Potential EU Annex I habitats**	**Non-native species**	**Habitat constraints, issues & comments**
Dundalk south-west						
11d 11e (FD22)	Full walkover	Hydrologically linked to Dundalk Bay SAC & SPA - via Blackwater River	GA2, GS4, FW4, WL1, WL2	Nil	Leylandii	Watercourse with connectivity to Natura 2000 sites
11c (FD23)	Not all areas accessible	Hydrologically linked to Dundalk Bay SAC & SPA - via Blackwater River	BL3, FW4, GA1, GS4, WS1, WL2	Nil	Leylandii	Watercourse with connectivity to Natura 2000 sites

(c) Fauna

For each of the project features, the survey results for fauna are detailed in Table 2.5, which provides the faunal species occurring in the proposed project area, shown in Figure 2.9.

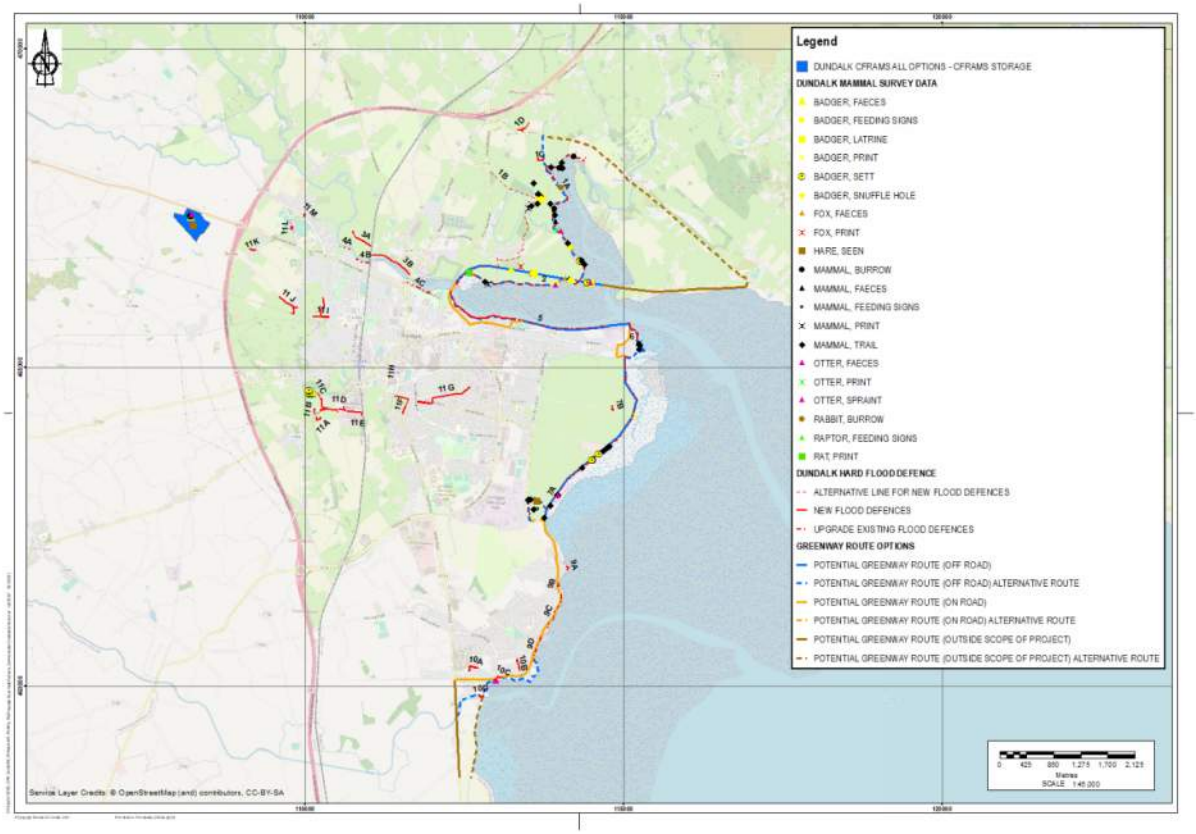


Figure 2.9 Fauna within the vicinity of the scheme (Confidential)

Table 2.5 - Fauna on the site on the proposed scheme

Project feature code(s) **FD = flood defence** **GW = greenway** ( ) = Project Code *Preliminary ecological scoping report, D.01/ 19.04.2021*	**Survey effort**	**Evidence of mammals**	**Bat habitat assessment**	**Bird interest**	**Amphibian habitat assessment**	**Fisheries assessment**	**Invertebrate assessment**
North Area - Ballymascanlan estuary							
1d (FD1)	Full habitat survey - partly covered for mammal	None observed	Strong foraging features for bats, with connectivity to the wider landscape. Tree with Moderate & Low PRFs	Potential foraging habitat for wintering waterbirds in cereal	Limited - flowing water	Not assessed	N/A
1b (FD2)	Partly covered	Badgers sign, including latrine	Strong foraging features for bats, with connectivity to the wider landscape. Small number of Moderate PRFs identified in treeline/hedgerows	Wintering waterbirds	Potential in ponds & pools	Ballymascanlan estuary has small salmon & sea trout run associated with Flurry River, which also supports a wild brown trout population. Fish populations of other rivers flowing into Ballymascanlan estuary are unknown	Potential for devil's-bit scabious
Northern habitat creation area	Partly covered	Badger setts, unidentified mammal burrows, evidence of otters	Strong foraging features for bats, with connectivity to the wider landscape. High PRF in farm buildings, adjacent to area. Moderate PRFs identified in treeline.	Wintering waterbirds	Potential in ponds & pools		Potential for devil's-bit scabious
1a/2 (FD3) - existing embankment/ GW1 - alternative, along coast	Full habitat survey - partly covered for mammal	Badger setts, unidentified mammal burrows, evidence of otters	Strong foraging features for bats, with connectivity to the wider landscape. High PRF in farm buildings, adjacent to trail.	Wintering waterbirds	Limited - saline conditions		N/A

Project feature code(s) **FD = flood defence** **GW = greenway** ( ) = Project Code *Preliminary ecological scoping report, D.01/ 19.04.2021*	**Survey effort**	**Evidence of mammals**	**Bat habitat assessment**	**Bird interest**	**Amphibian habitat assessment**	**Fisheries assessment**	**Invertebrate assessment**
GW2 - along dismantled railway	Full habitat survey - partly covered for mammal	Badger setts and latrines	Strong foraging features for bats, with connectivity to the wider landscape. - no PRFs	Wintering waterbirds	Potential in ponds & pools		Potential for devil's-bit scabious
West of Castletown Bridge, along Castletown River							
3a (FD13)	Full habitat survey - partly covered for mammal	None observed	Strong foraging features for bats, with connectivity to the wider landscape. - no PRFs	Wintering waterbirds	Limited - no ponds/pools	Castletown River - supports salmon, brown trout, sea trout, eels, lamprey species	N/A
3b (FD14)	Full habitat survey - partly covered for mammal	None observed	Strong foraging features for bats, with connectivity to the wider landscape. - no PRFs	Wintering waterbirds	Limited - no ponds/pools		Potential for devil's-bit scabious
4a (FD15)	Full habitat survey - partly covered for mammal	None observed	Strong foraging features for bats, with connectivity to the wider landscape. - no PRFs	Wintering waterbirds	Limited - no ponds/pools		Potential for devil's-bit scabious
4b/4c (FD16)	Full habitat survey - partly covered for mammal	None observed	Strong foraging features for bats, with connectivity to the wider landscape. - no PRFs	Wintering waterbirds	Limited - no ponds/pools		Potential for devil's-bit scabious
Western - Passive flow control area							
12 - Passive flow control area	Full habitat survey - partly covered for mammal	Badger and otter signs, hare seen	Moderate foraging features for bats, with connectivity to the wider landscape. - no PRFs	Scrub cover for breeding birds, with some wet areas with potential for breeding snipe	Potential in ponds & pools	Tributary of Castletown River, which is a salmon fishery	N/A

Project feature code(s) **FD = flood defence** **GW = greenway** ( ) = Project Code *Preliminary ecological scoping report, D.01/ 19.04.2021*	**Survey effort**	**Evidence of mammals**	**Bat habitat assessment**	**Bird interest**	**Amphibian habitat assessment**	**Fisheries assessment**	**Invertebrate assessment**
South estuary							
5 (FD4) - Sean O'Mahonys GAA Club - Eastern By-pass Bridge	Partly walked and viewed from adjacent road/track	None observed	Moderate foraging features for bats in woodland near bridge, with some connectivity to the wider landscape - No PRFs otherwise relatively exposed - No PRFs noted	Wintering waterbirds	Limited - mostly built environment	N/A	N/A
5 (FD5) - Sewage Work's - Sean O'Mahonys GAA Club	Full walkover survey	None observed	Relatively exposed, limited strong habitat features - No PRFs	Wintering waterbirds	Limited - built environment	N/A	N/A
6 (FD6) - Soldier Point	Full walkover survey	Unidentified prints and trails on salt marsh	Relatively exposed, limited strong habitat features - No PRFs	Wintering waterbirds	Limited - saline conditions	N/A	N/A
GW3: Sean O'Mahonys GAA Club - Eastern By-pass Bridge - via road	Walked/driven	None observed	Urban setting limited natural features for bats and lighting impacts for sensitive species - Moderate PRFs identified in several abandoned buildings along Quay Street	Limited - urban setting	Limited - built environment	N/A	N/A
GW4: Sean O'Mahonys GAA Club - Eastern By-pass Bridge	Partly walked and viewed from adjacent road/track	None observed	Moderate foraging features for bats in woodland near bridge, with some connectivity to the wider landscape - No PRFs	Wintering waterbirds	Limited - mostly urban	N/A	N/A

Project feature code(s) **FD = flood defence** **GW = greenway** ( ) = Project Code *Preliminary ecological scoping report, D.01/ 19.04.2021*	**Survey effort**	**Evidence of mammals**	**Bat habitat assessment**	**Bird interest**	**Amphibian habitat assessment**	**Fisheries assessment**	**Invertebrate assessment**
			otherwise relatively exposed - No PRFs noted				
GW5: Sewage Work's - Sean O'Mahonys GAA Club	Full walkover survey	None observed	Relatively exposed, limited strong habitat features - No PRFs	Wintering waterbirds	Limited - saline conditions	N/A	N/A
GW6: Soldier Point-Blackwater River - via road	Driven/walked	Unidentified prints	Moderate foraging features for bats, with some connectivity to the wider landscape - No PRFs	Limited cover for breeding birds	No suitable waterbodies noted	N/A	N/A
GW7: Soldier Point-Blackwater River - via coast	Full walkover survey	Unidentified prints and trails on salt marsh	Relatively exposed, limited strong habitat features - No PRFs	Wintering waterbirds	Limited - saline conditions	N/A	N/A
Dundalk east coast							
7a (FD7)	Full walkover survey	Badger setts, unidentified mammal burrows	Strong foraging features for bats, with connectivity to the wider landscape. - Low PRFs	Wintering waterbirds	Limited - saline conditions	N/A	N/A
8 (FD8)	Full walkover survey	Mammal trials, Hare seen	Moderate foraging features for bats, with connectivity to the wider landscape. - no PRFs	Wintering waterbirds	Limited - saline conditions	N/A	N/A
GW8	Full walkover - landward side of embankment less	Badger setts, unidentified	Strong foraging features for bats, with connectivity to the wider landscape. - Low PRFs	Wintering waterbirds	Limited - saline conditions	N/A	N/A

Project feature code(s) **FD = flood defence** **GW = greenway** ( ) = Project Code *Preliminary ecological scoping report, D.01/ 19.04.2021*	**Survey effort**	**Evidence of mammals**	**Bat habitat assessment**	**Bird interest**	**Amphibian habitat assessment**	**Fisheries assessment**	**Invertebrate assessment**
	comprehensively covered	mammal burrows					
GW9	Full walkover survey	Mammal trials, Hare seen	Moderate foraging features for bats, with connectivity to the wider landscape. - no PRFs	Wintering waterbirds	Limited - saline conditions	N/A	N/A
Southern habitat creation area	Partly walked and viewed from adjacent road/track	Mammal trials, Hare seen	Moderate foraging features for bats, with connectivity to the wider landscape. - no PRFs	Wintering waterbirds	Limited - saline conditions	N/A	N/A
Blackrock							
9c to 9D (FD9)	Full walkover survey	None observed	Relatively exposed, limited strong habitat features, urban setting with lighting - No PRFs	Wintering waterbirds	Limited - urban setting	N/A	N/A
10c (FD10)	Full walkover survey	Otter signs	Relatively exposed, limited strong habitat features - No PRFs	Wintering waterbirds	Limited - saline conditions	N/A	N/A
10a (FD11)	Full walkover survey	None observed	Moderate foraging features for bats, with some connectivity to the wider landscape - No PRFs	Cover for breeding birds	Potential in reed beds	Salmonid suitability limited	N/A
10d (FD12)	Full walkover survey	None observed	Relatively exposed, limited strong habitat features - No PRFs	Wintering waterbirds	Limited - saline conditions	N/A	N/A
GW10 - short section along road to coast	Full walkover survey	None observed	Moderate foraging features for bats, with some connectivity to the wider landscape - No PRFs	Wintering waterbirds	No suitable habitats noted	N/A	N/A

Project feature code(s) **FD = flood defence** **GW = greenway** ( ) = Project Code *Preliminary ecological scoping report, D.01/ 19.04.2021*	**Survey effort**	**Evidence of mammals**	**Bat habitat assessment**	**Bird interest**	**Amphibian habitat assessment**	**Fisheries assessment**	**Invertebrate assessment**
GW11 - on road R172	Full walkover/windscreen survey	Otter signs	Moderate foraging features for bats, with some connectivity to the wider landscape - suburban gardens, only a few trees noted with moderate and low PRFs	Wintering waterbirds	No suitable habitats noted	N/A	N/A
GW12 - alternative along coast	Full walkover survey	Otter signs	Relatively exposed, limited strong habitat features, although old lifeboat house provides moderate/high PRF	Wintering waterbirds	Limited - saline conditions	N/A	N/A
Dundalk north-west							
11j (FD17)	Full walkover survey	None observed	Strong foraging features for bats, with connectivity to the wider landscape. - Low PRFs	Farmland birds	Potential in pools adjacent to stream	Salmonid suitability limited	N/A
11i (FD18)	Full walkover survey	None observed	Strong foraging features for bats, with connectivity to the wider landscape. - Low PRFs	Farmland birds	Potential in pools adjacent to stream		Potential for devil's-bit scabious
Dundalk centre							
11f (FD19)	Full walkover survey	None observed	Moderate foraging features for bats, with some connectivity to the wider landscape - Moderate PRF in old shed - urban lighting	Wetland habitats with potential for snipe	Urban area - no suitable habitat	Salmonid suitability limited	N/A
11h (FD20)	Full walkover survey	None observed	Foraging options limited to trees in gardens and along channelised	Limited cover for breeding birds	Potential in standing water in		N/A

Project feature code(s) **FD = flood defence** **GW = greenway** ( ) = Project Code *Preliminary ecological scoping report, D.01/ 19.04.2021*	**Survey effort**	**Evidence of mammals**	**Bat habitat assessment**	**Bird interest**	**Amphibian habitat assessment**	**Fisheries assessment**	**Invertebrate assessment**
			stream - Low PRFs in ivy clad tree - urban lighting		drain, also swamp in area		
11g (FD21)	Full walkover survey	None observed	Moderate foraging features for bats, with some connectivity to the wider landscape. - Low PRFs in trees - urban lighting	Some cover for breeding birds	Potential in standing water in drain		N/A
Dundalk south-west							
11d 11e (FD22)	Full walkover	Badger setts to north	Strong foraging features for bats, with connectivity to the wider landscape. - Low PRFs	Cover for breeding birds - including snipe, meadow pipit and skylark	Potential in wet grassland	Salmonid suitability limited	Wet grassland with potential for devil's-bit scabious
11c (FD23)	Not all areas were accessible	None observed	Strong foraging features for bats, with connectivity to the wider landscape. - Low PRFs		Potential in wet grassland		

(d) Aquatic Species

Several protected aquatic species known to occur in the project area have the potential to be impacted by the project, including lamprey species, salmon and otter. The rivers flowing through the project area are also known to support brown trout, sea trout and eels. The WFD catchment encompassing the project area is not reported as supporting freshwater pearl mussel and there are only a small number of white-clawed crayfish records from the upper catchment, beyond the focused study area.

In terms of water quality and disturbance, the main risks are considered to be during the construction phase of the project. It is anticipated that appropriate mitigation measures can be implemented as part of a construction management plan to avoid adverse impacts and that there will be no significant effects on either downstream water quality or habitat disturbance for these species.

In terms of habitat modification, the main risk is considered to be during the operational phase of the project as water flow and riparian habitats may be modified due to changes in water levels and/or flow. However, it is considered that with appropriate pre-construction surveys and mitigation measures, any residual effects on these species will be negligible.

(e) Invertebrates

Existing records for protected invertebrates within the project area suggest that occurrence is limited in the focused study area. As mentioned in the section covering aquatic species freshwater pearl mussel and white-clawed crayfish are not known to occur in the catchment area. Likewise, other invertebrate species likely to result in significant constraints for proposed developments include species of Vertigo snails, the marsh fritillary butterfly and the kerry slug. None of these species are known to occur within the focused study area.

Of these species it is possible that marsh fritillary butterfly could occur in the project area. These butterflies are the only insect species occurring in Ireland listed on Annex II of the Habitats Directive, which requires EU member states to designate SACs to protect this species and monitor the status of the national population. There are no designated sites near the project area with marsh fritillary is listed as a QI. The occurrence of this species is largely restricted to locations where the larval foodplant devil's-bit scabious (*Succisa pratensis*) occurs. Areas of wet grassland in the project area have the potential to support devil's-bit scabious, however it was considered unlikely that the plant occurs at densities sufficient to support a marsh fritillary colony.

(f) Amphibians and reptile

Common frogs are protected throughout their European range under the Habitats Directive and are protected under the Irish Wildlife Act 1976 (as amended). The Project Area would be considered likely to support a relatively healthy population, especially within the pools and drains within the area. In the absence of mitigation direct impacts on common frog are likely to occur during construction phase, including direct mortality during vegetation clearance and excavation works, and dewatering of waterbodies (including temporary waterbodies) holding frog spawn. To minimise any significant impacts upon the local frog population, it is recommended that this species is included within the proposed mitigation measure for the

Scheme, including pre-construction visits during the spawning season to isolate any breeding sites from construction activities.

While there were no records for smooth newts generated by the desk-based study within the project area, they can be under recorded. It is considered likely there is potential for this species occur if the right conditions were available, which is typically ponds that are fish free and support some vegetation for laying eggs on. Potentially suitable ponds or pools were considered limited within the project area. In addition, smooth newts cannot tolerate the saline environments offered by tidal pools even within upper salt marsh where rainwater has a dilution effect.

For common lizards there no current records of the species occurring within the project area and the closest records are from the Carlingford Mountains. The habitat suitability assessment did not find any significant expanses of habitats or areas capable of supporting lizards and this species was considered unlikely to occur in the focused study area.

(g) Birds

A desk-top study has identified the occurrence of waterbirds in the surrounding project area. The project area occurs within and adjacent to the Dundalk Bay SPA which is designated for a wide and internationally important range of waterbird species.

In terms of breeding waders, salt marshes can offer nesting opportunities for lapwing, redshank, curlew,snipe and Twite. However, grazing across the salt marsh was noted as being relatively tight which will limit cover for ground nesting birds. Curlew may have historically nested in this area; however, any historic sites are likely to have become abandoned in recent years, as the Irish curlew population has undergone catastrophic declines. Likewise, any redshank breeding records are likely to be historic. If the areas adjacent to the coast and along the flood plain remain wet in the summer it is possible that breeding snipe may occur. Areas with woodland and scrub often support breeding woodcock and it is likely that this species breeds and winters in the area.

In terms of general breeding bird assemblages at the hard defences, the treelines, hedgerows and scrub would be likely to support more common and widespread woodland and scrub nesting species like robin, blackbird, wren, tit species and willow warbler. Certain types of hedging are known to favoured by certain species, for instance goldcrest often utilise leylandii. Construction works during the breeding season could potentially result in direct impact on birds nesting in scrub and trees. Some areas where grassland management is less intensive, e.g. upper saltmarsh may support ground nesting passerines including meadow pipits and skylarks. Yellowhammer are species listed as occurring within 2km of the project area; however, dominance of grassland habitat means this species may not occur in high densities as breeding yellowhammer are typically associated with cereal production.

In terms of habitat availability for riparian species, rivers, streams and ditches were assessed as offering limited nesting habitat for kingfishers or sand martin, which typically require vertical sandy banks for excavation of nesting holes. Man-made structures offer ample nesting opportunities for dippers and grey wagtails and these species tend to prefer areas with rapids and exposed rock, which at least during the survey period were not widely available. Likewise, habitat availability for common sandpipers was limited and this species requires gravel banks and islands for breeding. Sedge warblers, little grebes, coots, moorhens and water rails are species typically associated with nesting habitat in emergent vegetation along rivers and drains.

The relatively narrow extent of this type of cover is likely to limit the breeding densities for these species.

Inappropriately timed construction works have the potential to directly impact both breeding and wintering birds and in sensitive locations works should be timed to avoid sensitive periods, i.e. the breeding and wintering seasons (1st March to 31st August, and 1st October to 28th/29th February respectively). Further surveys, consideration of the proposed scheme design and ecological assessment, and application of mitigation measures (e.g. appropriate timing of vegetation clearance, avoiding or limiting works at certain periods of the tidal cycle when birds are using high tide roosts) will determine the exact areas and times during which construction works should be limited.

This project may involve re-wetting of areas, which is likely to attract waterbirds into the area. Therefore, baseline surveys to demonstrate the potential positive impact will be important.

(h) Mammals

Given the range of habitats available in the project area, it is considered that hedgehog, Irish mountain hare, stoat, badger, otters, foxes, red squirrel and possibly pine marten have the potential to occur. There is a requirement for proposed developments to identify the resting places of badgers (setts) and otters (holts) to ensure that appropriate mitigation measure are implemented to avoid disturbance to these species. During the site visits several badger setts were identified and some unassigned burrows could have been otter holts. Burrowing activity was concentrated on embankments. Both badger scats and otter spraints recorded

No red squirrel or pine marten signs were detected during scooping surveys. This is probably due to the limited availability of woodland with the project area.

Lundy et al (2017)[12] provide a habitat suitability index for Irish bats at the landscape scale. There are five categories ranging from low to high suitability. Based on this classification system the project area is classed as:

- Moderate-low for Nathusius' pipistrelle
- Moderate for Daubenton's bat, whiskered bat
- Moderate-high for brown long-eared bat
- High for soprano pipistrelle, common pipistrelle, Leisler's bat, natterer's bat.

The onsite preliminary assessment of habitat suitability for bats considered that the project area is a lowland site in an urban to sub-urban setting. Connectivity to the wider landscape is provided by a network of hedgerows and the stream/drains are potential foraging features, especially for Myotis species. The urban environment, in particular light pollution, can have a negative impact on bats, with some light sensitive species being displaced and others being attracted to the increased insect activity around lights. Buildings and other man-made structures can provide roost features for bats, and for example within the project area the several old houses were assessed as providing roof spaces and crevices roosting bats. The predominately, open nature of the landscape, i.e. limited occurrence of woodland is likely to favour pipistrelles and Leisler's bats over species like brown long-eared bats that typically favour

[12] Lundy et.al, Landscape Conservation for Irish Bats, 2011

more cluttered environments. The BCI data request returned a single record of a known natterer's bats roost adjacent to the project area.

Preliminary assessment of habitat suitability for bats identified a number of potential roost features (PRFs) see Figure 2.10, mostly potential tree roosts with PRFs ranging from low to moderate suitability. An assessment of foraging foraging/commuting features available for bats ranged in suitability from moderate to high. Lighting and breaks in connectivity were noted as negative features.

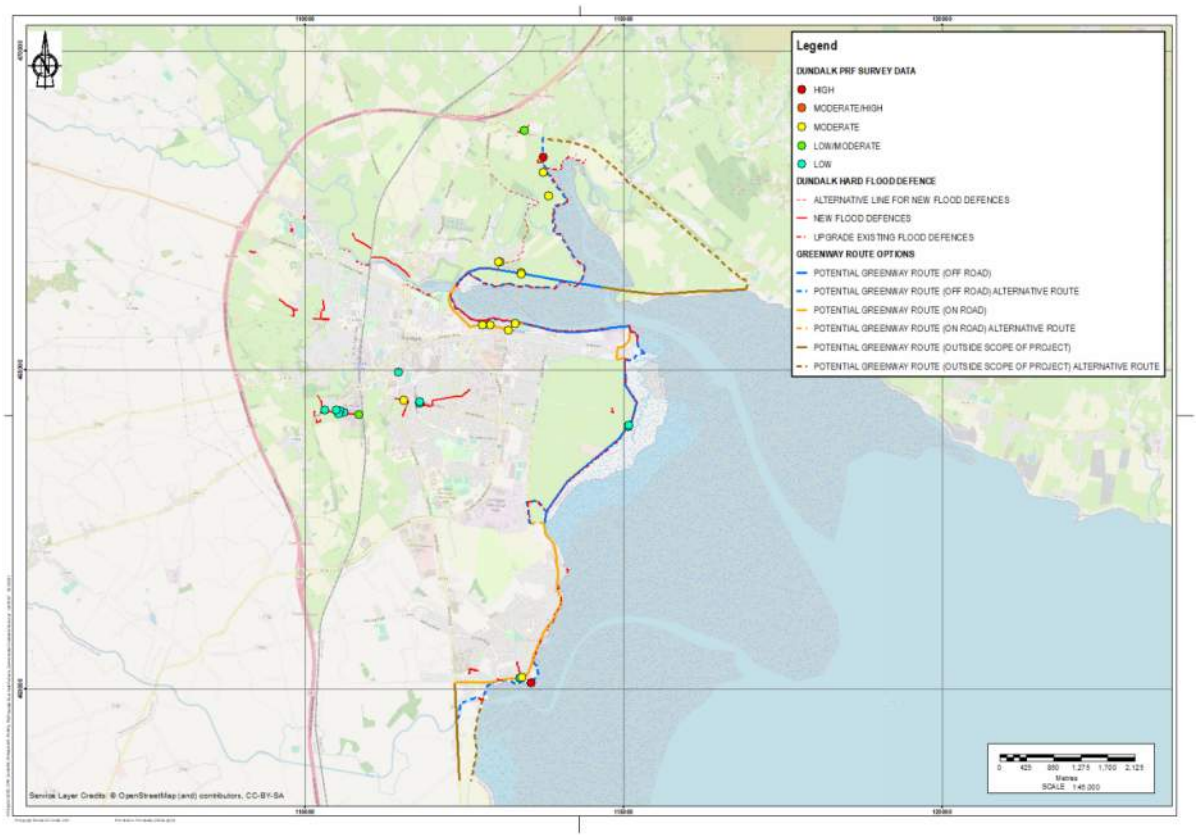


Figure 2.10 Potential Bat Roost Features

(i) Invasive Species

The control of invasive species falls under the Wildlife (Amendment) Act 2000. The act made it an offence to cause an exotic species of flora to grow in the wild anywhere in the Ireland, it is stated in the Act that:

"*Any person who plants or otherwise causes to grow in a wild state in any place in the State any (exotic) species of flora, or the flowers, roots, seeds or spores of flora, otherwise than under and in accordance with a licence granted in that behalf by the Minister shall be guilty of an offence.*"

The Birds and Natural Habitats Regulations 2011 (SI 477 of 2011), Section 49(2) prohibit the introduction and dispersal of species listed in the Third Schedule (including Japanese knotweed) where:

"*any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in any place specified in relation to such plant in the third column of Part 1 of the Third*

Schedule, any plant which is included in Part 1 of the Third Schedule, shall be guilty of an offence."

The urban setting of this project combined with river corridors means there is a heightened risk of unintentional spreading of any non-native species occurring in the area. During the site visit there was no evidence of any Third Schedule invasive species. However, surveys conducted out of the growing season have the potential to miss certain annual or biannual species that have foliage that dies off during the winter, e.g. Japanese knotweed *Fallopia japonica* or Himalayan balsam *Impatiens glandulifera*)

The desk-based study did not pick up any records of Third Schedule species within 2km of the project area, however several species occur in the vicinity. During the scoping surveys several non-native tree species with lower risk impacts were recorded including sycamore (medium risk) and beech (naturalised – non-native). Of most concern during construction works is the occurrence of winter heliotrope, buddleia and crocosmia (montbretia) within the project area. These species spread rapidly on bare ground created during construction and could have a negative impact on habitat, particularly Annex I coastal habitats. Cord grass (Spartina) in a non-native that occurs widely within the saltmarsh and care should be taken not to move infected sward to other parts of the site during construction to avoid spread this species. Japanese knotweed rhizomes can be spread through excavating and moving (including exporting and importing) material.

In addition, because the scheme is located partly within a Special Area of Conservation (SAC)/Special Protection Area (SPA) then the control of invasive species needs to be assessed under the EU Habitats Directive, transposed into Irish law by the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), as amended.

Figure 2.11 below shows currently known invasive alien species and plant survey data located close to the proposed scheme. The presence of alien species will need to be checked carefully in pre-construction surveys, and plans put in place to manage risks during construction.

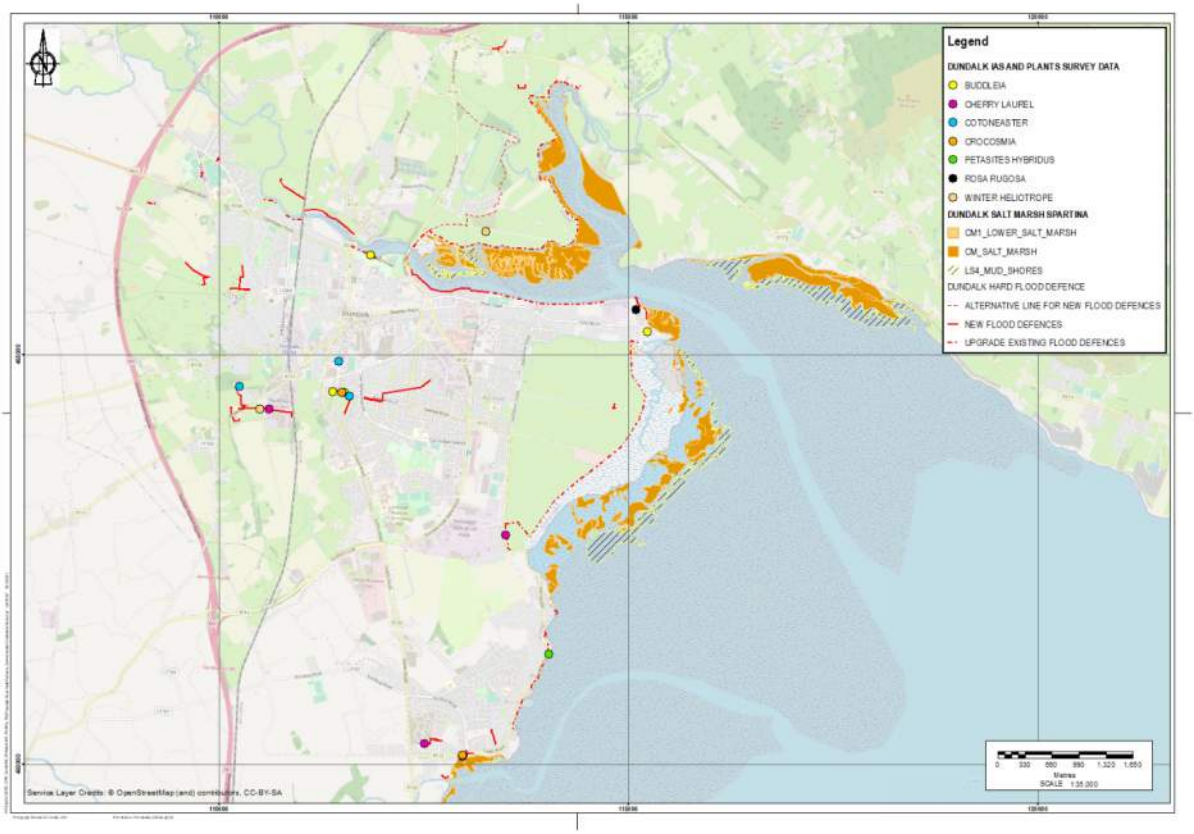


Figure 2.11 Invasive Alien Species and Plant Survey Data and areas containing Spartina in the vicinity of the proposed scheme.

(j) Fisheries

In Castletown River and River Fane, records of Red List Native Fish Species, e.g. brown trout/sea trout, Atlantic salmon, sea lamprey and river lamprey exist. Upstream of Dundalk, in Northern Ireland, the Creggan Lower, Cully Water, Forkill/Kilcurry River and the Kilnasaggart River are all designated salmonid rivers. The Ramparts River flows through Dundalk and contains modest stocks of Brown Trout. In the Castletown River Estuary at Dundalk there is some fishing for mullet and flounder, with occasional sea trout and bass. The main sea angling in the bay is from Gyles Quay. Charter angling also takes place in the bay.

The Fane River is well known for salmon and sea trout fishing. Upstream of Inniskeen in Northern Ireland the River Fane is designated as a Salmonid River. In Iniskeen itself the River Fane contains valuable salmonid nursery and adult habitat as well as supporting good numbers of salmon and trout[13].

There is potential of disturbance to fish stocks associated with in-channel works, or permanent modification of channel banks. These could have an adverse impact on aquatic populations and water quality.

2.3 Water and Geomorphology

[13] Fishing Ireland Website Access January 2021, https://fishinginireland.info/salmon/east/fane/

The project area is characterised by a large transitional waterbody where the Castletown River flows into the Castletown Estuary and converges with the Ballymascanlan Estuary, before flowing into the Inner Dundalk Bay. The Castletown River flows through the northern reaches of Dundalk, entering the town from the north west, then flows into the Castletown Estuary. The Ballymascanlan Estuary is situated to the north of the Castletown Estuary these waterbodies converge then flow into the Inner Dundalk Bay area. The Ballymascanlan Estuary is the estuary of the Flurry River. The River Fane estuary is located to the south of Blackrock, the river flows from the west and converges with the Inner Dundalk Bay area to the south of Blackrock.

(a) The Water Framework Directive

The Water Framework Directive (WFD) (2000/60/EC) requires all water bodies to meet Good Ecological Status (GES) and all artificial and heavily modified water bodies (A/HMWB) to meet Good Ecological Potential (GEP) in set timescales. The requirements are set out in Article 4 of the Directive and in the relevant River Basin Management Plan (RBMP). There is an obligation under the WFD to consider the effect of works on the water environment that could affect the biological, hydromorphological and physico-chemical condition of water bodies (and the interactions between these). Works must not cause deterioration in overall water body status or prevent water bodies from achieving their WFD objectives.

WFD is executed in six year 'cycles', with the first cycle lasting between from 2009-2015. The second cycle is currently active and running from 2016-2021. A RBMP covering 2018 – 2021 has been produced by Department of Housing, Planning and Local Government[14] and covers the whole of Ireland. The RBMP outlines the new approach that Ireland will take as it works to protect its rivers, lakes, estuaries and coastal waters over the next four years.

Surface Waterbodies

The WFD surface water statuses and supporting conditions within the focused study area are set out in Table 2.6[15] and shown in Figure 2.12.

[14] Department of Housing, Planning and Local Government, River Basin Management Plan for Ireland, 2018 – 2021
[15] EPA Maps Website, https://gis.epa.ie/EPAMaps/Water, accessed February 2021

Table 2.6 - WFD surface waterbody status and supporting conditions 2013-2018

Waterbody Name	Castletown Estuary Transitional (040_0200)	Ballymascanlan Estuary Transitional (040_0300)	Inner Dundalk Bay Transitional (040_0100)	Fane Estuary Transitional (040_0400)	Outer Dundalk Bay Coastal (040_0000)	Castletown River (030)	Flurry River (030)	Fane River (060)
Ecological Status	Poor	N/a	Moderate	N/a	Good	Moderate	Poor	N/a
Biological status	Poor	N/a	Moderate	N/a	Good	Moderate	Poor	N/a
Phytoplankton status or potential	Poor	N/a	Moderate	N/a	High	N/a	N/A	N/a
Invertebrate status or potential	N/a	N/a	Good	N/a	Good	Moderate	Poor	N/a
Supporting Chemistry conditions	Moderate	N/a	Good	N/a	Good	N/a	Pass	N/a
General Conditions	Moderate	N/a	Good	N/a	Good	N/a	Pass	N/a
Oxygenation conditions	Good	N/a	Good	N/a	Good	N/a	Pass	N/a
Dissolved oxygen (% sat)	Good	N/a	Good	N/a	Good	N/a	Pass	N/a
Other determinand for oxygen conditions	Good	N/a	High	N/a	High	N/a	High	N/a
Acidification Conditions	N/a	N/a	N/a	N/a	N/a	N/a	Pass	N/a
pH	N/a	N/a	N/a	N/a	N/a	N/a	Pass	N/a
Nutrient conditions	Moderate	N/a	Good	N/a	High	N/a	Pass	N/a
Nitrogen Conditions	N/a	N/a	N/a	N/a	N/a	N/a	Good	N/a
Nitrate	N/a	N/a	N/a	N/a	N/a	N/a	Good	N/a
Ammonium	N/a	N/a	N/a	N/a	N/a	N/a	High	N/a
Other determinand for nutrient conditions	Moderate	N/a	Good	N/a	High	N/a	N/a	N/a
Phosphorus conditions	Moderate	N/a	High	N/a	High	N/a	High	N/a
Orthophosphate	Moderate	N/a	High	N/a	High	N/a	High	N/a
Heavily Modified	No	No	No	No	N/a	No	Unknown	Unknown
Artificial	No	No	No	No	N/a	No	Unknown	Unknown

Waterbody Name	Castletown (020)	Kilcurry (010)	Ballymascanlan River (010)	Ramparts River (010)	Haggardstown (010)	Rockmarshall (010)	Raskeagh River (010)
Ecological Status	Good	Good	Poor	N/a	N/a	N/a	N/a
Biological status	Good	Good	Poor	N/a	N/a	N/a	N/a
Phytoplankton status or potential	N/A	N/A	N/a	N/a	N/a	N/a	N/a
Invertebrate status or potential	Good	Good	Poor	N/a	N/a	N/a	N/a
Supporting Chemistry conditions	Good	N/A	Moderate	N/a	N/a	N/a	N/a
General Conditions	Good	N/A	Moderate	N/a	N/a	N/a	N/a
Oxygenation conditions	Good	N/A	Pass	N/a	N/a	N/a	N/a
Dissolved oxygen (% sat)	Good	N/A	Pass	N/a	N/a	N/a	N/a
Other determinand for oxygen conditions	High	N/A	High	N/a	N/a	N/a	N/a
Acidification Conditions	Pass	N/A	Pass	N/a	N/a	N/a	N/a
pH	Pass	N/A	Pass	N/a	N/a	N/a	N/a
Nutrient conditions	Pass	N/A	Fail	N/a	N/a	N/a	N/a
Nitrogen Conditions	Good	N/A	Moderate	N/a	N/a	N/a	N/a
Nitrate	Good	N/A	Good	N/a	N/a	N/a	N/a
Ammonium	High	N/A	Moderate	N/a	N/a	N/a	N/a
Other determinand for nutrient conditions	N/A	N/A	N/a	N/a	N/a	N/a	N/a
Phosphorus conditions	Moderate	N/A	Moderate	N/a	N/a	N/a	N/a
Orthophosphate	Moderate	N/A	Moderate	N/a	N/a	N/a	N/a
Heavily Modified	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Artificial	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown

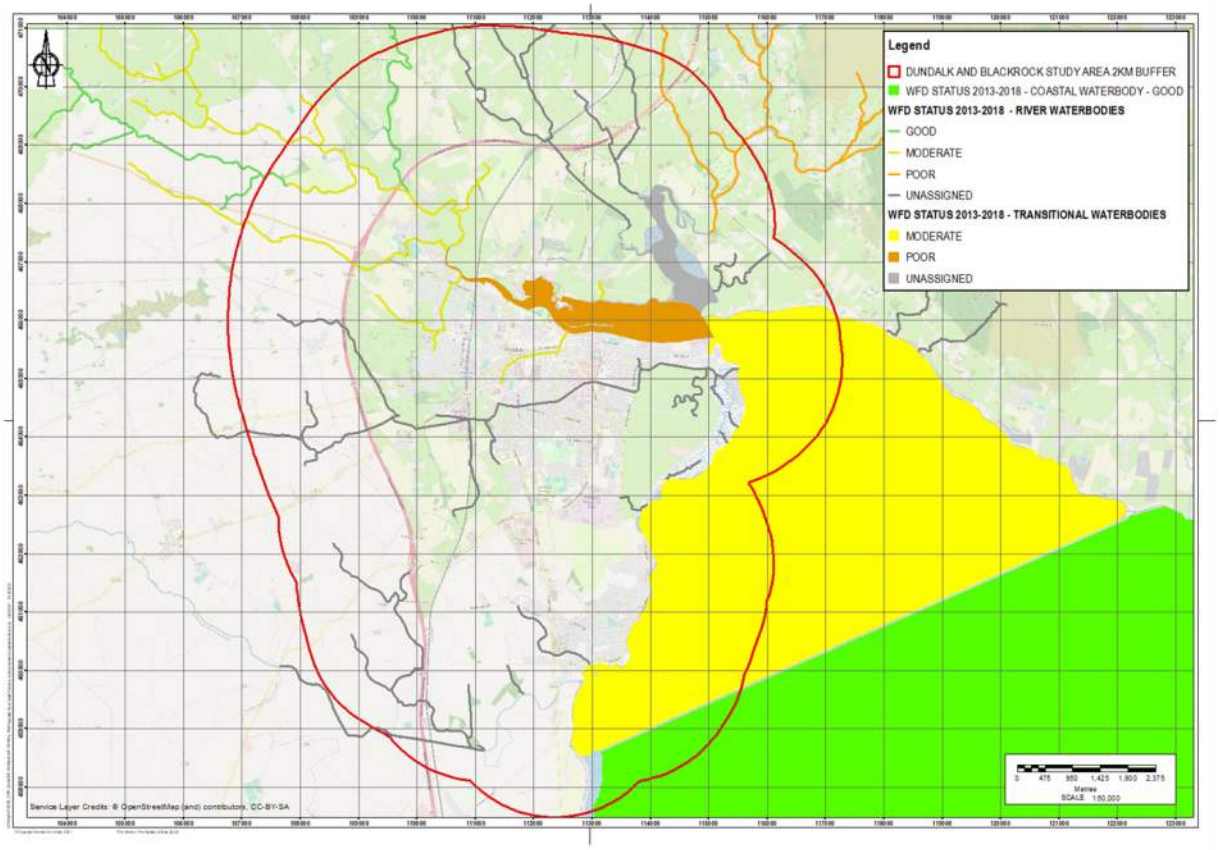


Figure 2.12 – WFD Surface Water Bodies

Groundwater bodies

Most groundwater bodies throughout Ireland are rated at a satisfactory quality, and areas of poor-quality ground water are few and far between (Environmental Protection Agency, 2018)[16]. The WFD groundwater bodies in the focused study area are shown in Figure 2.13 and the WFD quality ratings in Table 2.7. A large proportion of the study area falls with the Louth – poorly productive bedrock (IEGBNI_NB_G_019) WFD groundwater body with an overall groundwater status of good. An area from the east of Dundalk town centre to the coast and areas to the east of the Flurry Estuary are comprised of the Dundalk Gravels (IE_NB_G_031) WFD groundwater body with an overall groundwater status of good. The area surrounding the Flurry Estuary is underlain by the Dundalk (IE_NB_G_015) groundwater body described as Productive fissured bedrock and with an overall groundwater status of Good.

[16] Environmental Protection Agency Website. www.epa.ie Access February 2021

Table 2.7 - Breakdown of WFD 2013-2018 water quality rating for ground water within the study area.

Quality Element	Groundwater Status			
	Louth (019)	**Dundalk Gravels (031)**	**Dundalk (015)**	**Dundalk (024)**
Water Quality (WFD 2013-2018)	Good	Good	Good	Good
Quantitative Groundwater Status	Good	Good	Good	Good
Saline (or Other) Intrusions Test	Good	Good	Good	Good
Impact of Groundwater on Surface Water Ecological/Quantitative Status Test	Good	Good	Good	Good
Groundwater Dependent Ecosystems (GWDTE) - Quantitative Assessment Test	Good	Good	Good	Good
Water Balance Test	Good	Good	Good	Good
Chemical Groundwater Status	Good	Good	Good	Good
Saline (or Other) Intrusions Test	Good	Good	Good	Good
Impact of Groundwater on Surface Water Ecological/Chemical Status Test	Good	Good	Good	Good
Groundwater Dependent Ecosystems (GWDTE) - Chemical Assessment Test	Good	Good	Good	Good
Drinking Water Protected Area Test	Good	Good	Good	Good
General Chemical Assessment Test	Good	Good	Good	Good

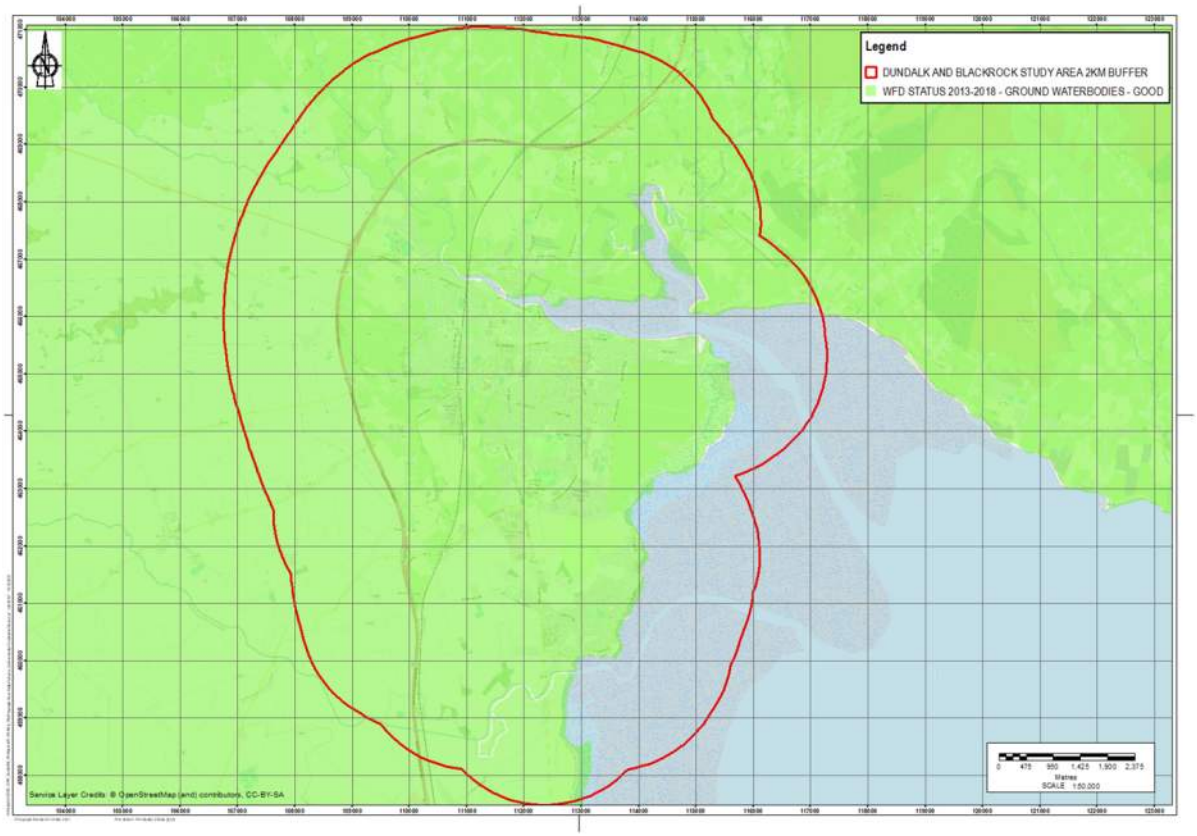


Figure 2.13 – WFD 2013-2018 rating of ground water within the focused study area.

(b) Geomorphology

The proposed in-channel works could impact on the characteristics of the river channels including flow, channel dimensions, sediment transport, channel features (bars, bank slopes). Changes to these characteristics can have an effect on the aquatic environment, the ecology it supports and the WFD status. The UoM06 (Neagh Bann) catchment unit is a relatively low slope, low energy system with a predominance of inland low slope lowland meandering channels, flanked by steeper pool riffle channels to the west and north east where lands of higher altitude progress towards low lying flatter lands both to the north in County Armagh and at the Louth coast. Historical drainage schemes are known to have previously been undertaken within Dundalk.

The channel types in UoM06 are typical of Irish catchments and sediment deposition is expected where the channel meanders and loses energy. This can become an issue if too much sediment is transported from the upper reaches and deposited downstream, causing channel capacity issues or localised damage to flood defence structures from scour. Taking a closer look at morphological pressures within the catchment provides an indication if natural processes are exacerbated, such that there is risk of these impacts. The steep flashy and erosive nature of upstream watercourses can create a sediment load such that deposition, where the channels near the coast, could affect coastal areas. Sediment deposition, in flooding terms, only becomes an issue if too much sediment is transported from the upper reaches and deposited causing channel capacity issues or localised damage to flood defence structures from scour[17].

[17] OPW/RPS, National CFRAM Programme, Draft Flood Risk Management Plan, Strategic Environmental Assessment. June 2016.

The watercourses proposed for flood defences comprise of coastal defences, rivers, estuaries, minor streams and ditches. There are existing flood defences on the coastline between Dundalk and Blackrock, and the Castletown River/Creggan River have been modified in the past and have existing flood defences. The minor streams and ditches where flood interventions are proposed, particularly in the more urban areas of Dundalk and Blackrock, have been heavily modified including being channelised and culverted in the past.

(c) Flood Risk

Assessing the flood risk within the Dundalk and Blackrock region is complex due to the number of interlocking fluvial and coastal processes active within the area. Figures 2.14 and 2.15[18] below shows the areas at risk from fluvial flooding during 1% (Fluvial) and 0.5% (Coastal) Annual Exceedance Probability (AEP) flood events within the Dundalk and Blackrock area[19].

Across the study area, a total of approximately 1335 residential properties and 166 non-residential properties are at risk from flooding events. The proposed scheme involves a mixture of hard defences, relocation of properties, storage and improvement of channel conveyance throughout the CFRAM AFA study area to offer adequate protection to the properties at risk from flooding.[20] The proposed options have been developed in the context of the specific fluvial and coastal processes affecting the various areas throughout the study area.

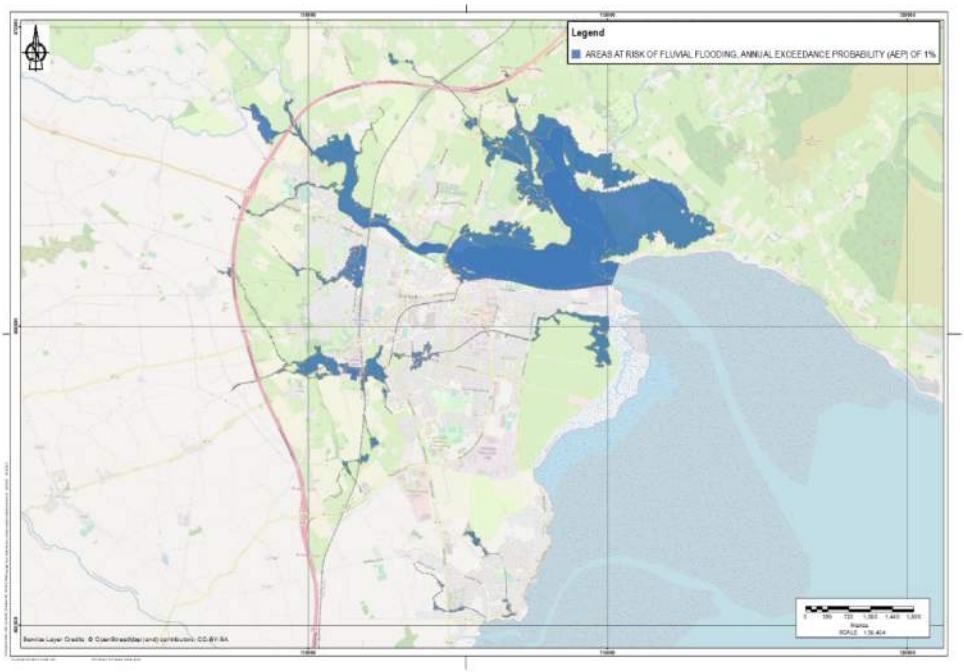


Figure 2.14 – Areas at risk of fluvial flooding in Dundalk & Blackrock.

[18] OPW, Flood Info Map, https://www.floodinfo.ie/map/floodmaps/, Accessed March 2021
[19] RPS, North Western Neagh Bann CFRAM Study: UoM6 Hydraulics Report (2017)
[20] RPS, North Western Neagh Bann CFRAM Study: UoM6 Preliminary Options Report (2016)

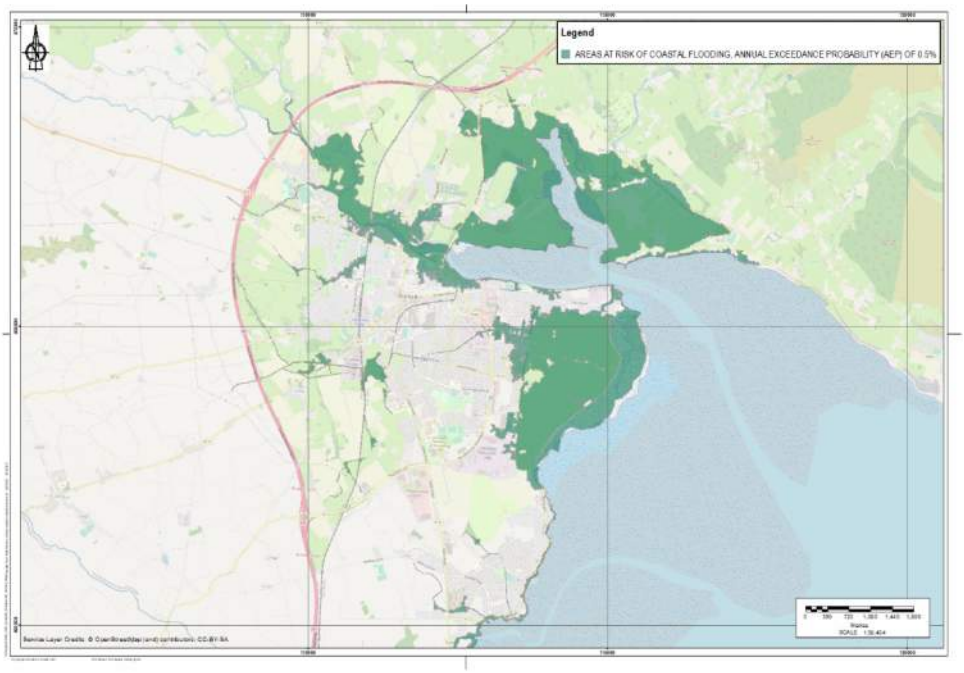


Figure 2.15– Areas at risk of Coastal flooding in Dundalk & Blackrock.

2.4 Population

The town of Dundalk is located along the south bank of the Castletown River estuary and consists primarily of a mix of residential, industrial and commercial areas of significant cultural and economic importance. According to the 2016 Census, Dundalk and its immediate surroundings has a population of 39,004[21]. The area to the north of the Castletown River estuary is predominantly rural with isolated settlements and properties. There are several small residential estates and the Dundalk Stadium, used for hosting horse and greyhound racing. Dundalk Port, operated by the Dundalk Port Co, is an active cargo port with the capacity to accommodate ships up to 3,500 deadweight (dwt) and 106m in length and has cargo handling and customs facilities22.

Bellurgan Point, a small scale settlement comprised of residential and commercial buildings, is situated north east of Dundalk on the opposite side of the estuary at the confluence between the Castletown River and Flurry River.

East of Dundalk town is an area of low lying agricultural land with isolated residential buildings. Part of this low lying agricultural land is used intermittently as a live firing range by the military.

Blackrock village is located on the coast of Dundalk Bay and is approximately 3.5km to south of Dundalk. The village consists predominantly of residential and commercial areas. It features several beaches, the largest of which, Blackrock Beach, lies to the south of the village. Several smaller beaches also adjoin the northern areas of the village. The village is a tourist destination,

[21] Brinkhoff, T. *(2018) City Population.* Available online: http://www.citypopulation.de/en/ireland/towns/louth/0388__dundalk/

[22] https://afloat.ie/resources/irish-ports/dundalk-port-company

with several hotels, guest houses, cafés and restaurants. A golf course belonging to Dundalk Golf Club is located 1km to the west of the village.

As set out in Section 2.3 across the study area, a total of approximately 1335 residential properties and 166 non-residential properties are currently at risk from flooding.

Much of the land within the Wider Study Area is rural in character comprising predominantly agricultural fields, isolated residential property and small villages. The larger settlements in the Wider Study Area include Newry (NI) 15mm to the north, Warrenpoint (NI) 11.5km north east, Carlingford 13km east, Dunleer 14km south, Adree 14.5km south west, Tallanstown 10km south west and Crossmaglen (NI) 13.5km north west.

Under 6% of Louth's population is engaged in agriculture[23], and the average farm size in 2010 was 36 ha. Of the 81,120ha of land within Louth County, in 2010 approximately 61,000ha was reported as in agricultural use, with livestock taking up 43,000ha and tillage and horticulture taking up some 20,800ha[24]

The Green, Low-Carbon Agri-Environment Scheme (GLAS) is part of the Rural Development Programme 2014-2020 (a new pilot scheme is being planned for 2021, for farmers not currently enrolled within the GLAS scheme). It provides funding to farmers in return for delivering environmental management on their land. Farmers which sign up to the scheme must commit to it for a minimum of five years. Its principal aims are to protect agricultural land, its habitats and biodiversity; to promote environmentally sustainable methods of farming; to address issues of climate change mitigation, water quality and the preservation of habitats and species, and; to maintain features such as traditional drystone walls and hedgerows.

There is potential for land within the study area to be covered by GLAS and consultation should be undertaken with the Department of Agriculture, Food and the Marine (DAFM) to determine the potential for any implications of the project upon the GLAS scheme.

Dundalk and the surrounding area is a popular site for bird watching given the importance of the Dundalk Bay Area for water birds, and sightings of rare birds are often reported. There are 6 'Birding sites' within the area: two in Blackrock, one within Dundalk, one in the Bellurgan area to the North East, one at the eastern point of Dundalk, known as Soldier's Point which is a Bird watching observatory, and one in the Ballymascanlon Bay area to the north west[25].

Rivers in the study area are popular for angling. The Castletown River has a known run of salmon and sea trout with fishing controlled by the Dundalk Brown Trout Angling Association and other riparian owners. A notable area for salmon and sea trout fishing is found downstream of Toberona Bridge just outside (north-east) of Dundalk Town[26].

The Ballymascanlan River is known to contain stocks of brown trout and gets a run of salmon and sea trout during the summer. Salmon and sea trout fishing is found downstream of Ballynascanlan Bridge just outside Dundalk. Riparian owners and the local angling association the Dundalk Brown Trout Anglers control fishing on the Ballymascanlan River.

[23] Louth County Council, Louth County Landscape Character Assessment, December 2002
[24] Central Statistics Office, 2010 https://www.cso.ie Accessed 2021
[25] Refs. Dundalk Birdwatching - https://www.visitlouth.ie/explore-and-do/do/enjoy-our-coast/bird-watching.html
[26] Fishing Ireland Website Access January 2021, https://fishinginireland.info/salmon/east/fane/

The Fane River and its tributaries hold good stocks of wild brown trout and is understood to get a small run of salmon and sea trout.

Dundalk Bay is used for sea fishing and boat fishing takes place for spurdog, ray and flatfish. Quay fishing takes place from the quay on Castletown River south bank for mullet in summer, and elsewhere around the bay quay fishing takes place from Gyles Quay at high water for flatfish and dogfish, and at the Glyde River and Dee River junction spinning from the southern breakwater takes place for bass, mackerel and sea trout.

There are very few Public Rights of Way (PRoW) in Ireland that are not maintained public roads; access to the countryside is usually obtained through permissive paths (i.e. with landowners' permission). A number of existing formal and informal footpaths are located close to the proposed interventions. These include the footpath on the south bank of the Castletown River Estuary and the path running north south along the route of the existing defences on the coastline to the east of Dundalk. The Táin Way is a long distance footpath starting and ending in Carlingford. Its closest point to the Project Area is approximately 3.3km to the north east of the scheme.

Other attractions include Castle Roche north west of Dundalk, dating from 1236[27], and the Hill of Faughart is a ten minutes (drive) north of Dundalk providing large views over the surrounding area[28].

2.5 Traffic and Transport

The local road network is characterised by several main roads serving as thoroughfares throughout Dundalk and the main transportation routes to elsewhere in country Louth. In addition, there are many secondary and minor roads throughout the area, connecting the various urban components of Dundalk, as well as the surrounding minor settlements and landscape.

The M1 motorway road is situated to the west of Dundalk and the Project Area, running north to south connecting the east coast of Ireland and Northern Ireland between Dublin and Belfast. The N52 serves as a partial ring-road to Dundalk, coming in from the south and connecting the town to the northern side of the Castletown River via the eastern bypass.

The R132 and R177 run south and north respectively of the town centre, with the R132 providing access to the south of Blackrock, and the R177 connecting Dundalk to the northern side of the Castletown River via Dundalk Bridge. The R172 runs along the coastal front at Blackrock before cutting inland and north to connect with Dundalk.

Dundalk Train Station is located within the heart of the town, with a train line running north to Belfast and south to Drogheda and Dublin. It is the only train line within the Project Area.

[27] Visit Louth. Castle Roche. Website accessed September 2021. https://www.visitlouth.ie/explore-and-do/explore-louth/castles-and-conquests-louth/castle-roche.html

[28] Visit Louth. Hill of Faughart Website. Accessed September 2021. https://www.visitlouth.ie/explore-and-do/explore-louth/sacred-sites-louth/hill-of-faughart.html

2.6 Archaeology and Cultural Heritage

A cultural heritage constraint study has been undertaken in order to identify all recorded archaeological and cultural heritage (including built heritage) sites and to highlight areas of archaeological or architectural potential within the 2km focused study area.

(a) Recorded Monuments

Within the focused study area, there are 420 recorded monuments (Figure 2.16). All of these sites are subject to statutory protection under the National Monuments Act and should be considered as key cultural heritage constraints during the design of the works. There are 3 records of National Monuments in State care or National Monuments subject to Preservation Orders within the focused study area. Prior written consent is required for any works at or in proximity to these monuments, listed below:

- Dun Dealgan (LH007-118007), - 500m to the south of Flood Defence 11d. This is a National Monument, in state guardianship: No. 388. Castle, motte and bailey. '*A large circular steep-sided mound (max. H 8.5-10m, diam. c. 43m) with external bank (Wth 3.5-5m, H c. 1.5m above surrounding ground level). A small D-shaped bailey (8m by 9m), defined by an earthen bank (Wth 5m, H 1m), adjoins the fosse of the motte at the NW. A much larger bailey existed at the E which according to Wright (1758, bk I, pl. IX) was sub-rectangular in plan, but this has now been almost totally destroyed by a modern waterworks*.'
- Donaghmore (LH006-060001 and LH006-060002), 1.8km to the west of flood defence 11j. This is a National Monument, in state guardianship: No 526. (LH006-060001) '*Discovered during building construction. The souterrain consists of a passage (L 17.2m, Wth 1m, H 0.9m-1.5m) running N-S, with the original entrance at the N end. At the S end of the first passage is a second passage (L 14.6m, Wth 1.1m, H 1.2m) running SW. A third passage (L 6.7m, Wth 0.9m, H 1.2m) runs SE from the SW end of the second passage*'. (LH006-060002) '*Souterrain situated adjacent to souterrain LH006-060001-. Its full extent is unrecorded as the site was delintelled and backfilled in antiquity. One of the passages of the souterrain passes close to the modern entrance of the previous site (LH006-060001-)*.'
- Proleek (LH004-074 and LH004-075), 1.2km to the north west of flood defence 1a. This is a National Monument, in state guardianship: No 476. (LH004-074) '*This portal-tomb is situated some 80m WNW of wedge-tomb (LH004-075). It consists of a chamber, facing NW, represented by a massive roof stone resting on two portal stones and a side stone'*. (LH004-075) '*This wedge-tomb is situated some 80m ESE of wedge-tomb (LH004-074----). It consists of a wedge-shaped gallery 6m long, orientated WSW-ENE, and narrowing from 1.5m at the W to 1.1m at the E*.'

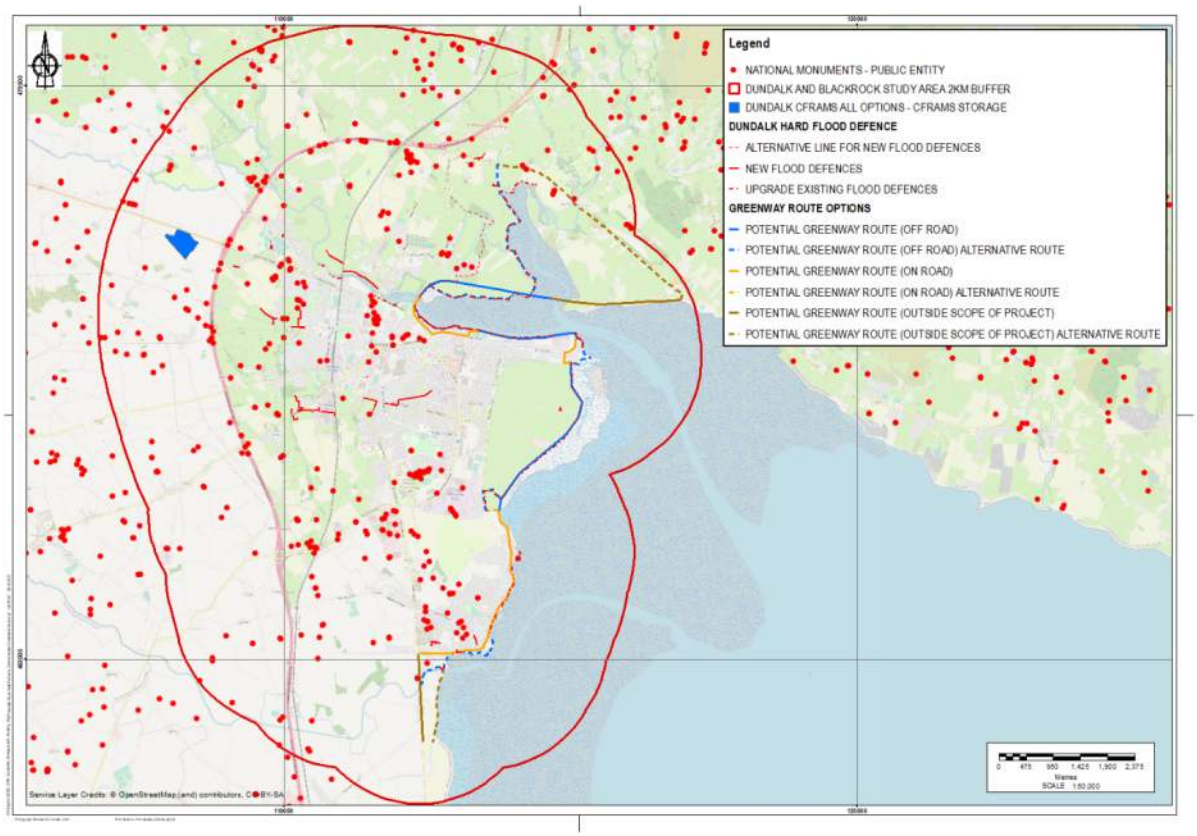


Figure 2.16 - Recorded monuments within the focused study area.

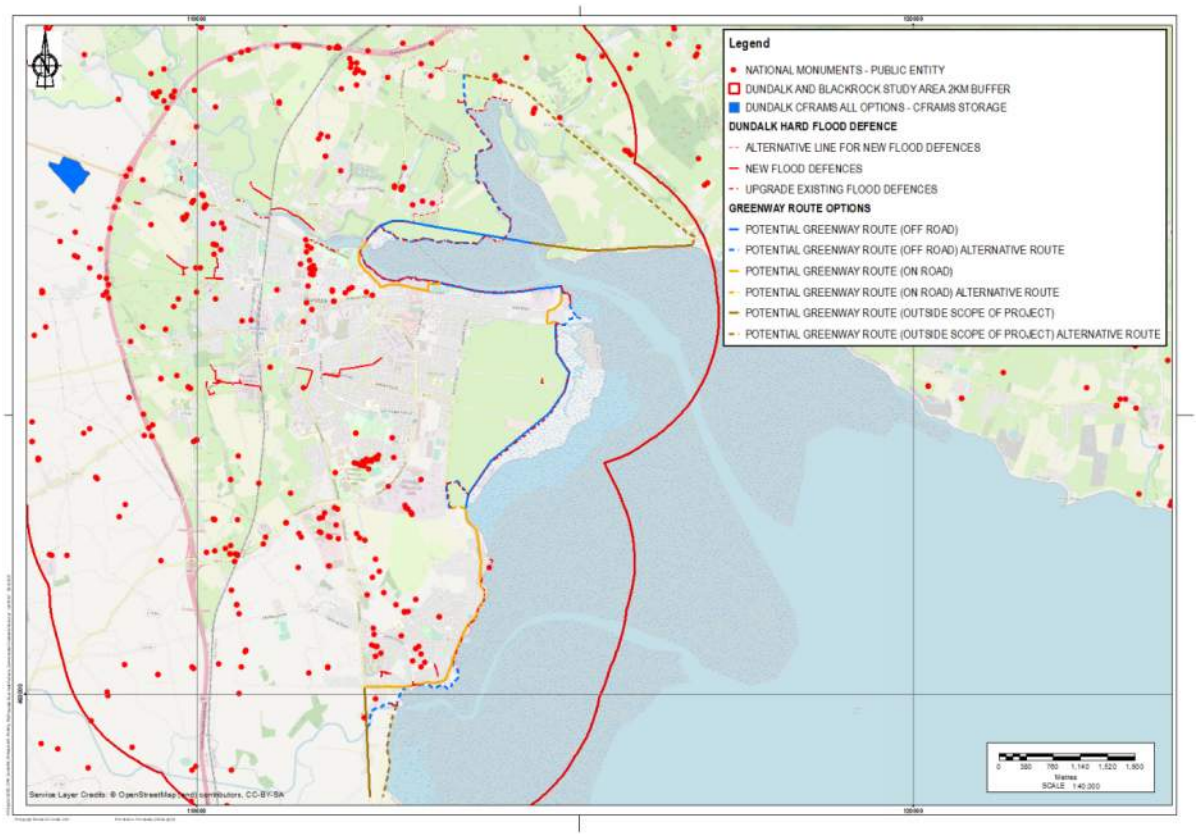


Figure 2.17- Recorded monuments within the vicinity of the proposed scheme.

The closest recorded monuments to the proposed Project Area (within 250m of the closest scheme element) are:

Flood defence 1a

- LH004-127001, 225m to the north. Ringfort '*Part of a curving ditch (Wth 2.5 - 3m; max. D 1.85m) containing animal bones and mussel shells was uncovered. Proposed development was moved to avoid further impact on the site. The available evidence has led to the suggestion 'that this was the ditch of an enclosure of the Early Christian period*'.

Flood defence 1b

- LH007-184, LH007-185 and LH007-186, 75m to the west, '*five concentrations of archaeological activity. 'Area 5' consisted of a large oval-shaped deposit of oyster shells (L 16.4m; Wth 10m), with a number of associated pits. Finds included a flint flake and a possible sherd of souterrain ware. 'Area's 1 2 and 3' contained a series of prehistoric pits*'.

Flood defence 1d

- LH004-072, 120m to the south, Souterrain, '*Lintels of a souterrain displaced during ploughing. No further details*'.
- LH004-131, 180m to the west, '*Excavations uncovered evidence for Early Bronze Age activity which appeared to be habitational rather than ritual. Bronze Age "Food Vessel" pottery and worked flint were found*'.

Flood defence 1d

- LH007-119027, 55m to the west, Town defences '*The town wall of Dundalk enclosed an irregularly shaped elongated area of roughly 19 hectares (48 acres)*.'
- LH007-119038, 90m to the south, '*believed to be a medieval rubbish pit. Only half of this pit was excavated, the rest was preserved in-situ*'.
- LH007-119004, 95m to the south, meeting house, No details available.
- LH007-119032, 170m to the south, '*Only a small portion of the kiln survived intact as later activity had cut through a substantial part of it. Evidence was produced for a firing chamber or oven and two opposing flues. 386 pottery sherds together with kiln waste and fired clay were recovered. On the basis of the fabric and decoration of the pottery sherds, a date between 1250AD and 1350AD has been suggested for the use of the kiln'.*

Flood defence 9a

- LH012-013, 80m to the south, Souterrain, no further details available.

Flood defence 10a

- LH012-113, 230m to the north, '*truncated remains of a probable prehistoric burnt mound containing a flint blade and two possible hammerstones'.*
- LH012-114, 250m to the north, '*A stone-lined pit that may have served as a trough or as a hearth and of a small number of post-holes may indicate a structure'.*

Flood defence 10b

- LH012-071, 130m to the west, '*keyhole shaped kiln with an overall L of 4.6m*.'
- LH012-027, 190m to the west, Souterrain, no further details available.

Flood defence 10d

- LH012-115, 230m to the west, '*This souterrain was discovered in September 1999 in the course of landscaping the garden of a newly-constructed house. The ground collapsed at the SE end of the W of four linked passages (see attached plan) of an extensive souterrain*.'

Flood defence 11b

- LH007-064001, 225m to the west, '*Situated in low-lying area with stream running by N and E sides. Irregular, roughly crescentic mound (max. dims. 16.5m by 11m, H 0.9m) of burnt stones and earth*.'
- LH007-064002, 250m to the west, '*Possibly fulachta fia'.*
- LH007-064003, 250m to the west, '*Situated in flat marshy land. Possible fulacht fia'.*

Flood defence 11f

- LH007-114, 30m to the south, '*Marked on the 1835 'OS 6-inch' map as 'Lady's Well' and on the 1938/9 edition as 'Lady's Well (Disused)'. Patron was held here on 9th September each year. It is covered by a small rectangular structure with a gabled roof. Above the doorway is an alcove containing a statue of the Madonna and surmounting*

this at the point of the gable is a stone cross. Steps lead down to the well and it is situated within a railed rectangular enclosure with stations of the cross on three sides.'

Flood defence 11i

- LH007-034, 50m to the north, '*Drystone-built section of passage and a chamber (overall L 3.5m, Wth 1.3-2.2m, H 1.3m) aligned N-S. Air-vent (L 0.9m, Wth 0.2m, H 0.2m) in N wall of chamber. Passage blocked by collapse at S end*.
- LH007-136, 130m to the north, '*An oval shaped pit (2.76m x 1.8m; D 0.46m) covered with a thin layer of burnt mound material. It was filled with material very similar to that of the fulacht fia (LH007-135----) found in the same field'*.
- LH007-135, 160m to the north, Fulacht fia '*Excavation revealed a spread of burnt stones and charcoal, underneath which were two troughs and a hearth. One trough was sub-rectangular in shape while the other was rectangular and had a stakehole in each corner'*.
- LH007-134, 190m to the north, Redundant record.

Flood defence 11j

- LH007-121, 100m to the east, '*Consisted of a trough (L 3.3m; Wth 1.8m; D 0.85m) and a small spread of burnt stones and charcoal rich clay, the latter did not fully seal the trough or extend beyond it'*.
- LH007-125, 170m to the east, '*Consisted of a trough (L 3.6m; Wth 1.2m; D 0.8m) and a small hearth which were partially sealed by a spread of burnt stones and clay'*.

Flood defence 11k

- LH007-183, 220m to the west, Fulacht fia '*A patchy spread (L 7m; Wth 7m; max. D 0.4m) of burnt stone set in a burnt silty sand under which lay a sub-oval trough (L 1.5m; Wth 1m) and a possible post-hole or pit*'.

(b) Zones of Archaeological Potential

These comprise historic towns which have been identified by the Department of Environment, Heritage and Local Government for general protection. The areas within the historic boundaries are known as Zones of Archaeological Potential and are areas where intense archaeology is present and should be considered as key cultural heritage constraints during the design of the works. The historical core of Dundalk is classified as a Zone of Archaeological Potential as shown in Figure 2.18 below. Flood defence 4c falls within this area.

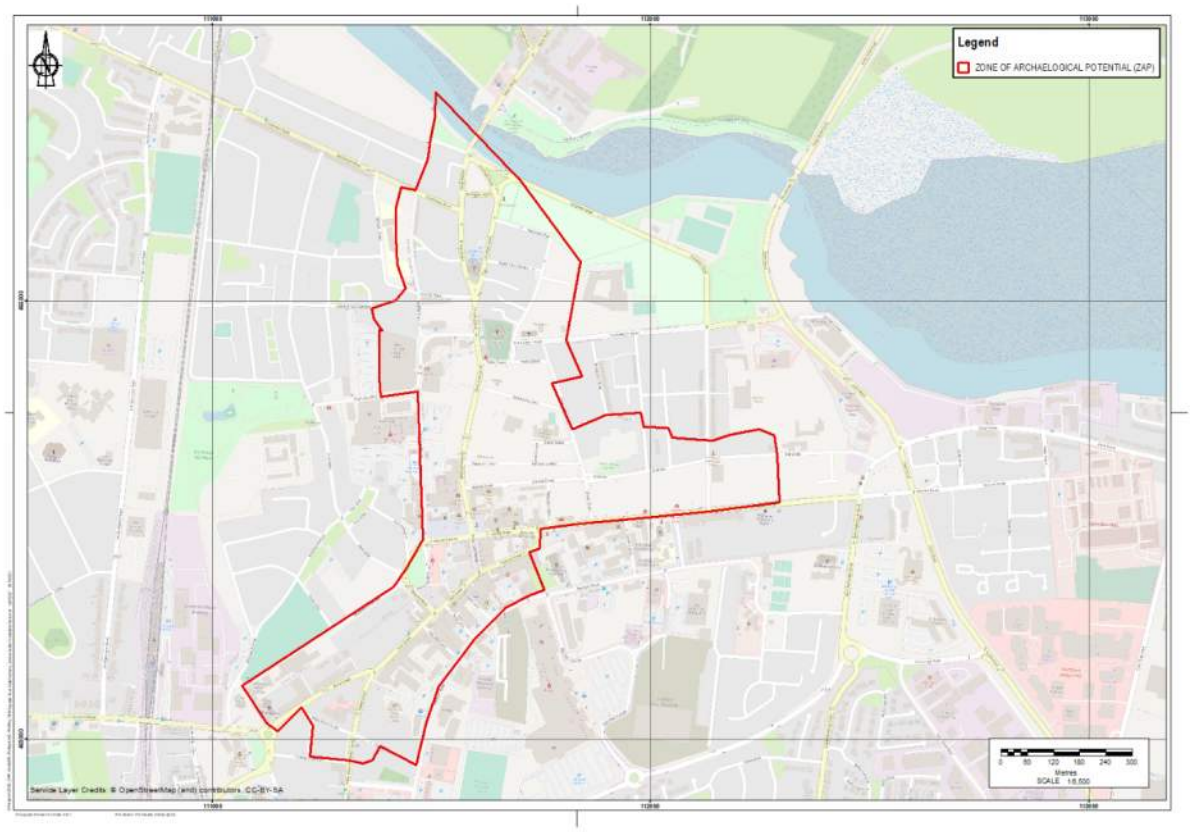


Figure 2.18- Dundalk Zone of Archaeological Potential

(c) Protected Structures

A Protected Structure is a structure that a local authority considers to be of special interest from an architectural, historical, archaeological, artistic, cultural, scientific, social or technical point of view. The protection given to a structure applies to all parts of the structure, including the interior, the land lying within the curtilage of the structure, any other structures lying within that curtilage and their interiors and all fixtures and features. All protected structures are subject to Statutory Protection and should therefore be considered to be a key constraint. There are a total of 480 Protected Structures in the focused study area, with the majority clustered within Dundalk town centre. Figure 2.19 shows all Protected Structures within the focused study area. Figure 2.20 shows a detailed view of recorded monuments close to the area of proposed works.

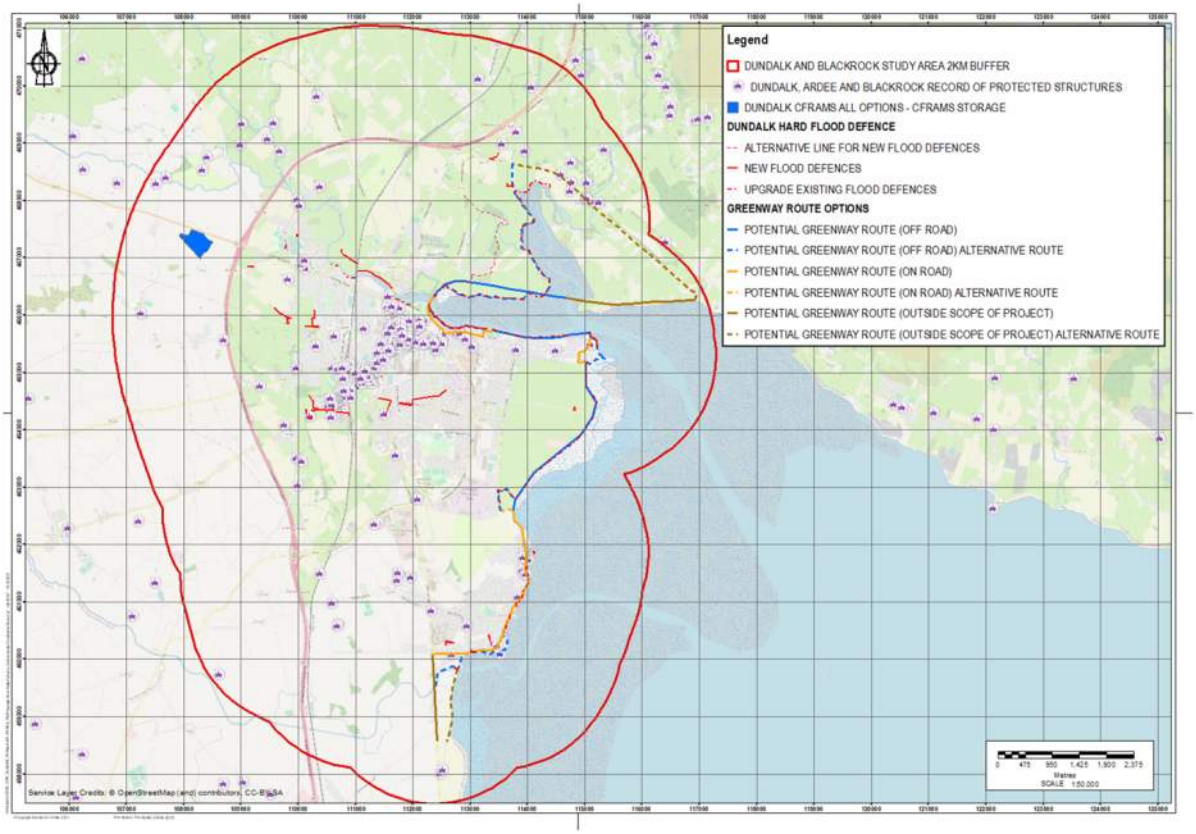


Figure 2.19 – Protected structures within the focused study area.

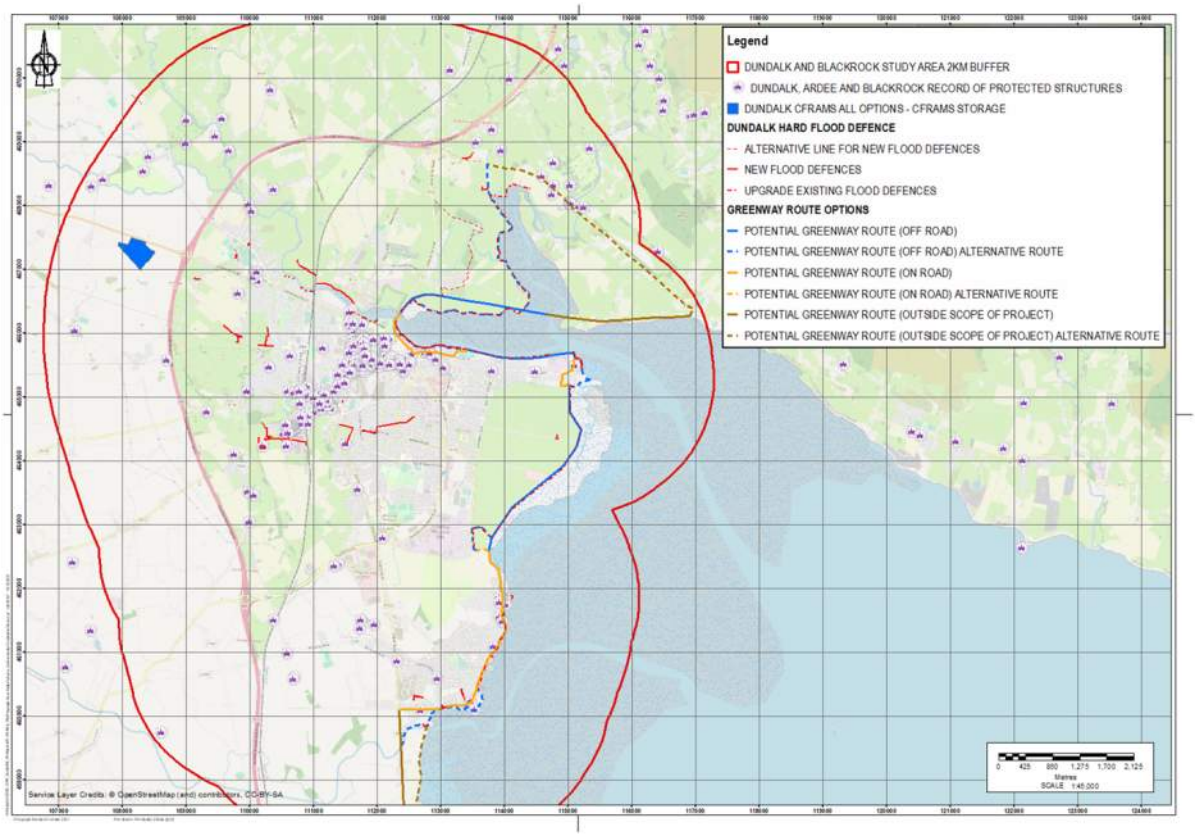


Figure 2.20 – Protected structures close to the proposed scheme.

The following are the Protected Structures are located close (within 250m) to the proposed scheme:

Flood defence 4c

- D027, 0m on the Site of the proposed scheme. Dundalk Bridge (listed on NIAH). '*This robustly detailed bridge with its elegant arches and battered walling exhibits some good quality stonework. It has survived almost unaltered as a secondary approach to the north end of the town*'.
- D028, 30m to the south west, No 36 Bridge Street, Dixon's Public House (listed on NIAH). '*This house is prominently located at the north approach to Dundalk town. The delicate rendered detailing is of particular interest, especially the two shopfronts and pediments. Decorative tiled panels to the stall risers are also worthy of note*'.
- D029, 145m to the south, No 62 Bridge Street, M. Deane, '*terraced single-bay two - storey retail building c.1880*'.
- D200, D201, D202, D203, D204, 100m to the south No 6 to No 10 Fairgreen Row. 1900 terraced three-bay two-storey houses.
- D432, 100m to the south, Fairgreen House (listed on NIAH) '*This well-proportioned house exhibits simple well executed decorative detailing to its windows and this simple decoration contrasts with the striking doorcase which forms an eye-catching feature on this corner sited building*'.
- D444, 150m to the south, No 25 Linenhall Street (listed on NIAH), '*this house contains a fine example of a nineteenth-century shopfront. It is an integral feature within the streetscape and a positive addition to the architecture of the town.*'
- D031, 230m to the south, St. Nicholas R.C. Ch (listed on NIAH), '*Free-standing double-height Roman Catholic church built c.1860*'.

Flood defence 5

- D259, 135m to the south, Gibson Enterprises, Quay Street (listed on NIAH). '*An important feature in the architectural landscape. The classical influenced stone façade is well-executed providing an elegant entrance to the building. Further significance is added by the fine chimneystacks and sash windows'*.
- D261, 145m to the south, Custom House Quay Street (listed on NIAH). '*Dated 1803, attached single storey three bay custom house, with side to street. Set along northern edge of yard with single-storey buildings to west and south*'.
- D258, 80m to the south, No 40 Quay Street (listed on NIAH). '*This fine building is a memento of the building boom that accompanied the growth of the modern Port of Dundalk. The stained glass lights to the ground floor are striking, unexpected features which complete an aesthetically pleasing structure*.'
- D262, 80m to the south, No 56 Quay Street (listed on NIAH). '*c.1850, Georgian style. End of terrace two-bay two-storey over basement with coach house to rear*'.
- D264, 110m to the south, No 60 Quay Street, (listed on NIAH). '*c.1820, Georgian style. End of terrace three-bay two-storey over basement. Extension to South, attached to East*'.
- D263, 80m to the south, No 58 Quay Street. '*c.1820, Georgian style. Terraced two-bay two storey over basement house*'.

- D260, 100m to the south, House at "B & I " Quay Street. 'c.1870 detatched three-bay two-storey building'.
- D130, 190m to the west, St. Helena House (listed on NIAH), 'Pair of Semi-detached two-bay two-storey former custom house, built c. 1750'.
- D446, 200m to the south, Dundalk Military Bar, (listed on NIAH), '*Miltary buildings incl. mess hall, stables, warehouses, offices, stores, factory, infirmary, house, workshops and gates, walls and railings*'.
- D278, 250m to the south, Red Barns House (listed on NIAH), '*Detached three-bay two-storey house, built c. 1880*'.
- D256, 200m to the south, Thatched cottage (listed on NIAH),' *Detached four-bay single-storey thatched house, built c.1820'.*

Flood defence 6

- D257, 130m to the west St. Helena House (listed on NIAH). '*Pair of Semi-detached two-bay two-storey former custom house, built c. 1750*'.

Flood defence 9a

- Lhs012-004a - e, 130m to the west, four Protected Structures (listed on NIAH), The Square, northside (listed on NIAH), '*end of terrace two-bay two-storey house, built c. 1910. Gable-fronted porch to south'....Terraced two-bay two-storey house, built c. 1910.. Attached five-bay two-storey house, built c. 1880.....Projecting shopfront to south-east c. 1900; lean-to return and flat roof extension to north....two-storey house with small flat roofed porch. windows replaced'.*
- Lhs012-005, 190m to the west, Georgian House (listed on NIAH). '*Detached three-bay two-storey house, built c. 1860.... This attractive house, set back off the main road through Blackrock, has fine proportion and form, and the overall symmetry of the structure is possibly its most striking feature*.'
- Lhs012-006, 200m to the south west, Bunker Lodge (listed on NIAH). '*Detached three-bay two-storey house, built c. 1850..... Bunker Lodge is an attractive house situated on an elevated position within Blackrock.'*
- Lhs012-003, 130m to the south west, Sandymount House (listed on NIAH). '*Detached L-plan two-storey over basement house, built c. 1830.....Sandymount House is an attractive house situated on an elevated site with spectacular views of Dundalk Bay*'.

Flood defence 9b

- Lhs012-008, 60m to the west, Field House (listed on NIAH). '*Detached five-bay two-storey house, built c. 1850,... Field House is an attractive house set within it own grounds and occupies a site within Blackrock with breath taking views*'.

Flood defence 9c

- Lhs012-025e, Lhs012-025f, 40m to the west, 5 and 6 The Cresent, (listed on NIAH). 2x '*c.1880 terraced, two-bay two-storey with converted attic. velux rooflight and replacement windows at first floor*'.
- Lhs012-010, 75m to the west, St Oliver Plunkett's Church (listed on NIAH). '*1923 Roman Catholic church by Ralph Byrne, Hiberno-Romanesque, of rubble limestone withgranite dressings*'.

Flood defence 10a

- Lhs012-018, 220m to the south, A.O.H. Hall, '*Single storey hall with Venetian window on gable, and additions*'.

Flood defence 10b

- Lhs012-012, 90m to the east, Red Brick House (listed on NIAH), '*Detached three-bay two-storey red brick house. former RIC barracks, built c. 1890, burned down 1922, rebuilt c. 1930, now in private domestic use*'.
- Lhs012-011c, 90m to the south east, Stella Maris Bay Vie House (listed on NIAH), '*Semi-detached three-bay two-storey with attic house, built c. 1860. Half-dormer to north, flat-roofed extension to south*'.
- Lhs012-011b, 90m to the south east, (listed on NIAH), '*terraced three-bay two storey house with hexagonal bay windows*'.
- Lhs012-014, 220m to the south east, Boathouse (listed on NIAH), *'1900, Detached rectangular-plan gable-fronted three bay single-storey with buttressed gables and attic former boathouse, now in use as store'.*

Flood Defence 11a

- D360, <5m to the north, Brookfield House (listed on NIAH), '*Detached three-bay two-storey house, built c.1780….. This country house has been extensively restored and its attendant ground finely manicured. The many fine details such as the canted bay windows and portico add to the architectural interest. The impressive gate piers and railings enhances the setting'*.

Flood Defence 11d

- D012a D012b, D012c, 50m to the south, Macardle Moore Brewery (listed on NIAH), '*Detached four-bay two-storey with attic building, built 1863….. Attached four-bay multiple-storey former granary, built c. 1865….. Octagonal-plan chimney, built c. 1865…*' These buildings comprise '*a group which was an important industrial centre in Dundalk in the nineteenth century*'.
- D014. 90m to the north St. Margarets (house) (listed on NIAH), '*Detached single-storey red brick house, built c. 1880…. set within its own grounds, this building forms part of an interesting group of brick built structures with the former railway worker's house*'.
- D382 to D401, 50m to the north, Brook Street Terrace comprising 20 protected structures (listed on NIAH), former two storey railway worker's houses, built c. 1880. '*This terrace is a fine example of late Victorian housing built for railway workers. The polychromatic brickwork adds interest and enriches the design'*.
- D362 to D381, 100m to the north, Ardee Terrace comprising 20 Protected Structures, (listed on NIAH), former two storey railway worker's houses, built c. 1880. '*This terrace is a fine example of late Victorian domestic housing built for railway workers. Completed at the same time as the Great Northern Railway works. The polychromatic brickwork of the façade adds interest and enriches the design*'.
- D008, 175m to the north east, Brook St, " Brooklyn (house), (listed on NIAH) '*Semi-detached four-bay two-storey red brick former railway manager's house, built c. 1880*'.
- D008a, 180m to the north east, Brook St, " Brookville (house) (listed on NIAH), '*Semi-detached four-bay two-storey red brick former railway manager's house, built c. 1880*'.

- D010, 180m to the north east, G.N.R. Railway building (listed on NIAH), '*Group of three interconnecting brick former railway building, built c. 1880*'.
- D414, 180m to the north, Dundalk Freight Depot, '*Detached multiple-bay single-storey aluminium office building, built c. 1995*'.

Flood Defence 11f

- D184, <20m to the west, Ladywell Shrine, No further detail provided.

Flood Defence 11h

- D189, 165m to the west, public house Nos 36-37, Windsor Bar '*dated 1886 Late Victorian public house*'.
- D335 to D344, 175m to the west, houses on Stapleton Place, 11 Protected Structures, terraced house build 1834 to 1890 (listed on NIAH), which '*displays an interesting symmetrical design, which is highlighted by the gabled bay. The simple decoration is effective. The shared porch with its Tudor influenced openings is noteworthy, while the intricate ironmongery adds artistic significance*'.

(d) National Inventory of Architectural Heritage (NIAH)

There is a total of 444 buildings within the focused study area listed in the NIAH (Figure 2.21, Figure 2.22). These buildings consist of shops, private homes, club houses, and buildings used for religious worship. Whilst NIAH structures are not subject to statutory protection, the results of the survey do inform what structures the Local Authority include within the Recorded Protected Structures and many of these structures have been designated as Protected Structures. As such they should be considered to be a key constraint. The following NIAHs are located close of to the proposed scheme elements:

Flood defence 4c

- 13701005, 0m - on the site of the proposed scheme. Dundalk Bridge (see Protected Structures section for details, D027).
- 13701006, 30m to the south west, No 36 Bridge Street, Dixon's Public House (see Protected Structures section for details, D028).
- 13702027, 100m to the south, Fairgreen House (see Protected Structures section for details, D432).
- 13702028, 150m to the south, No 25 Linenhall Street (see Protected Structures section for details, D444).
- 13701004, 230m to the south, St. Nicholas R.C. Ch (see Protected Structures section for details, D031)

Flood defence 5

- 13706001, 135m to the south, Gibson Enterprises, Quay Street (see Protected Structures section for details, D259).
- 13706002, 145m to the south, Custom House Quay Street (see Protected Structures section for details, D261).

- 13703004, 80m to the south, No 40 Quay Street (see Protected Structures section for details, D258).
- 13703003, 80m to the south, No 56 Quay Street (see Protected Structures section for details, D262).
- 13703002, 80m to the south, No 58 Quay Street.
- 13703001, 110m to the south, No 60 Quay Street, (see Protected Structures section for details, D264).
- 13900701, 50m to the south, The Towers (House).
- 13702001/2, 190m to the west, custom house. (see Protected Structures section for details, D130).
- 13706020, 13706022 - 13706032, 200m to the south, Dundalk Military Bar, (see Protected Structures section for details, D446).
- 13706027, 13706028, 13706029, 13706030, 13706031, 160 to 230m to the south, Dundalk Military Barracks.
- 13900703, 250m to the south, Red Barns House (see Protected Structures section for details, D278).
- 13900702, 200m to the south, Thatched cottage (see Protected Structures section for details, D256).

Flood defence 9a

- 13824001, 13824002, 13824003, 130m to the west, The Square, Terraced Houses (see Protected Structures section for details, Lhs012-004a -e).
- 13824004, 160m to the west, detached three-bay two-storey house, built c. 1860 (see Protected Structures section for details, Lhs012-005).
- 13824005, 200m to the south west, Bunker Lodge (see Protected Structures section for details, Lhs012-006).
- 13824006, 130m to the south west, Sandymount House (see Protected Structures section for details, Lhs012-003).

Flood defence 9b

- 13824007, 60m to the west, Field House (see Protected Structures section for details, Lhs012-008).

Flood defence 9c

- 13824008, 13824009, 40m to the west, 5 and 6 The Crescent, (see Protected Structures section for details, Lhs012-025e, Lhs012-025f).
- 13824010, 75m to the west, St Oliver Plunkett's Church (see Protected Structures section for details, Lhs012-010).

Flood Defence 10b

- 13901223, 90m to the east, Red Brick House (see Protected Structures section for details, Lhs012-012).

- 13901227, 90m to the south east, Stella Maris Bay Vie House (see Protected Structures section for details, Lhs012-011c).
- 13901226, 90m to the south east (see Protected Structures section for details, Lhs012-011b).
- 13901224, 220m to the south east, Boathouse (see Protected Structures section for details, Lhs012-014).
- 13901222, 200m to the west, Fairy Mount, '*Detached three-bay single-storey former dower house, built c. 1760*'.

Flood Defence 11a

- 13,900,732, <5m to the north, Brookfield House (see Protected Structures section for details, D360).

Flood Defence 11d

- 13900725, 13900726 and 13900727 50m to the south, Macardle Moore Brewery (see Protected Structures section for details, D012a D012b, D012c).
- 13900724, 90m to the north St. Margarets (house) (see Protected Structures section for details, D014).
- 13900728, 50m to the north, Brook Street Terrace (see Protected Structures section for details, D382 to D401).
- 13900716, 100m to the north, Ardee Terrace comprising 20 Protected Structures, (see Protected Structures section for details, D362 to D381).
- 13900714, 175m to the north west, Brook St, rooklyn (house) (see Protected Structures section for details, D008).
- D008a, 180m to the north east, Brook St, Brookville (house) (see Protected Structures section for details, D008a).
- 13900715, 180m to the north east, G.N.R. Railway building) (see Protected Structures section for details, D010).
- 13900743, The Manse (house) 100m to the south west. *'Detached three-bay two-storey former manse, built c. 1860, now in use as private house*'.

Flood Defence 11h

- 13707001 to 13707011, 175m to the west, houses on Stapleton Place, 11 Protected Structures, terraced house build 1834 to 1890 (see Protected Structures section for details, D335 to D344).

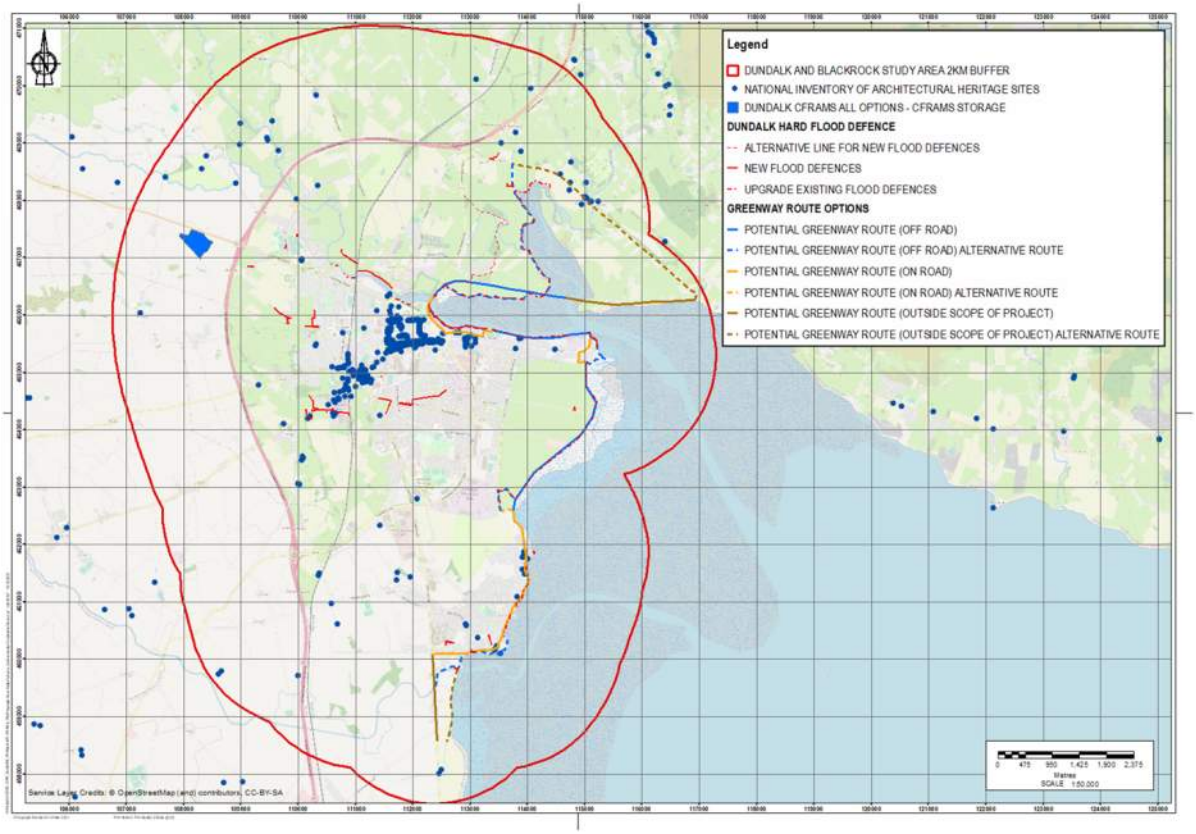


Figure 2.21- National Inventory of Architectural Heritage within the focused study area

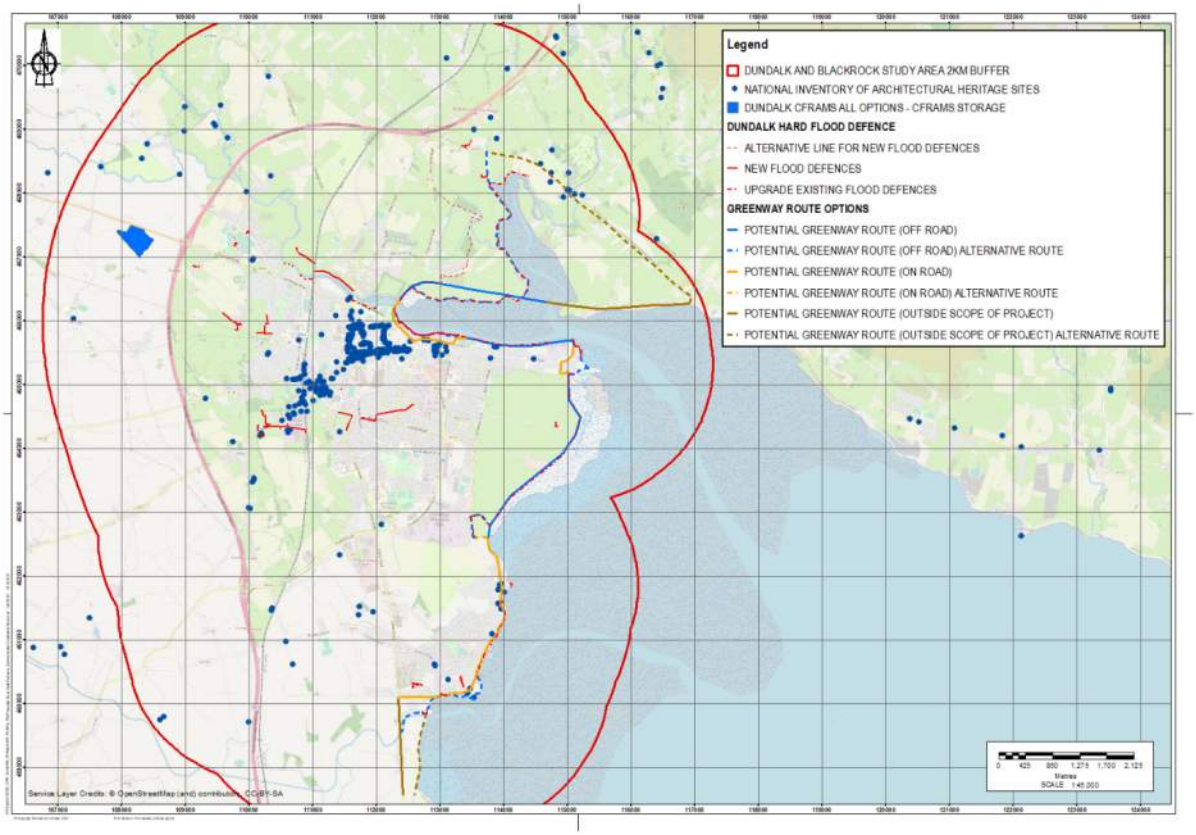


Figure 2.22- National Inventory of Architectural Heritage close to the proposed scheme

(e) Architectural Conservation Areas (ACAs)

An Architectural Conservation Area is defined as "A place, area, group of structures or townscape, taking account of building lines and heights, that is of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest or that contributes to the appreciation of a protected structure, and whose character it is an objective of a development plan to preserve"[29]. Chapter II of Part IV of the Planning and Development Act 2000 states that all development plans must now include objectives for preserving the character of ACAs. As such ACAs are considered to be a key constraint.

There are 8 ACAs within the focused study area as follows:

- St Mary's Road (ACA19): 225m to the west of flood defence 5, *'The area is a well laid out and ordered example of Victorian/ Edwardian urban housing, close to the main commercial centre of the town. It has a distinctive character of red brick terraces bounded by the wide and leafy St Mary's Road on the north and the commercial areas on the west and south*'.
- Roden Place (ACA20): 650m to the south of flood defence 4c, '*The area comprises the municipal centre of the town and contains buildings of National importance – the Court House, and St Patrick's Pro-Cathedral, and a high number of buildings of regional importance all of which are in the RPS'*.
- The Crescent (ACA21): 125m to the west of flood defence 11h, '*The primary purpose in the designation of this ACA is to protect and enhance the character of the urban housing area*'.
- Clanbrassil Street (ACA22): 200m south of flood defence 4c, '*The area comprises the principal commercial streets of the town and contains a large number of protected structures. It commences on Church Street at St Nicholas Catholic church, includes the medieval church of St Nicholas and continues into Clanbrassil St., a long wide street of bold and ornate facades, principally of Victorian character. The south end of the street opens into Market Square, laid out by William Elgee in the 1740's, which faces the Court House*'.
- Jocelyn Street/Seatown Place (ACA23): 180m to the south of flood defence 5, '*Jocelyn Street and Seatown Place are wide streets, laid out in the 1740's, with rows of C 18 and C 19, two and three-storey Georgian and Victorian Houses, some with basements, many of which are now used for commercial purposes. The street contains a significant number of buildings of regional importance and contained in the RPS, including a number of public buildings - the Methodist and Presbyterian Churches, the Convent of Mercy, the County Museum and Library'.*
- Soldiers Point (ACA24): 0m, on the site of flood defence 6, '*The area comprises of a row of nine houses, which were originally built in 1805 for the revenue commissioners. They later became the coastguard cottages in 1822. All cottages are two-storey, three-bay terraced houses, with slated roofs, and rendered exteriors. An assortment of front porches and sunrooms have been added and the original joinery is mostly replaced by hardwood, aluminium and uPVC. Many of the original renders have been replaced by dry-dash*'. The intention of the designation is to:

[29] Local Government (Planning and Development) Act, 1999

- *'1 To protect and enhance the character and appearance of the area by giving consideration to the suitability of scale, style, construction materials, colour and decoration to be used in any proposals for new development, including alterations and extensions, taking place within this area.*
- *2. To encourage the preservation and re-instatement of traditional details and materials appropriate to the style and period of the buildings.*
- *3. To protect and enhance the relationship between buildings and open space.'*

– Magnet Road & The Demesne (ACA25): 190m to the north of flood defence 11h, '*The area comprises of buildings and open space which surround the section of Magnet Road between its junctions with Park Street and The Long Walk; and includes the red brick semi-detached dwellings at Nos. 1 & 2 Park Villas, the large grassed and wooded open space opposite the Demesne shopping arcade, the plastered semi-detached dwellings at Nos. 1 & 2 The Demesne and the former Revenue Commissioners Offices and Cinema building*'.

– The Crescent Blackrock (ACA26): >20m from flood defence 9c, *'Blackrock is a coastal town in North Louth. The Crescent ACA is located on the northern approach to the village and faces north east across Dundalk Bay. It consists of a terrace of 6 houses, four of these being in a straight row, and the larger two on the southern end, are angled to enclose a space around a communal green to the front. The ACA includes the gardens and boundaries to the rear of the houses*'. The intention of the ACA is to:

- *1. To preserve the special character of the terrace and its setting.*
- *2. To protect the setting of the terrace and the views towards the sea.*
- *3. To require the preservation and re-instatement of traditional details and materials on existing buildings and in the streetscape, where improvements or maintenance works are being carried out.'*

Unrecorded Archaeological Sites

There is potential for the presence of unrecorded archaeological sites and artefacts within the focused study area.

2.7 Landscape Character and Visual Amenity

This section considers the potential effects upon landscape character and visual amenity arising from the construction and operation of the proposed project. The extent of the study area for landscape character effects would be based upon existing landscape character assessments combined with the development and consideration of the local landscape character specifically for the project. This would be developed around an appropriate offset from the proposals defining a Zone of Theoretical Visibility (ZTV) from which it might be theoretically possible to view a part of the project during construction or operation. It is generally considered that receptors beyond the study area as defined by the ZTV would not be significantly affected.

A landscape and visual impact assessment would be used to assess potential effects on both landscape character and visual amenity as a result of the proposed scheme. The consideration of landscape character and its sensitivity and the nature and sensitivity of views and visual amenity potentially affected, combined with an assessment of the magnitude of the change

brought about by the proposed scheme will inform judgments on the likely significance of effects.

(a) Landscape Character

At present, there is not a national landscape character assessment for Ireland. The '*National Landscape Strategy for Ireland (2015 – 2025)*' sets out recommendations for the landscape of Ireland to be identified, characterised and mapped to provide the data and qualitative information required to evaluate and underpin effective spatial planning, landscape-centred decision making and to appropriately evaluate it.

The most detailed and extensive Landscape Character Assessment for the broader area is the Louth County Landscape Character Assessment that defines landscape character as: "a distinct and recognisable pattern of elements that occur consistently in a particular type of landscape and how these are perceived by people. It creates the particular sense of place of different areas of the landscape."

County Louth has previously been broken down into nine distinct, separate landscape character areas (LCAs) which are divided by geographical characteristics, each with its own set of objectives that relate to conservation, enhancement, restoration and creation.

The proposed scheme spreads from the north of Dundalk, along the southern bank of Dundalk Harbour and further south towards Blackrock. The proposals include the development of a further section of Greenway – a long distance cycle path from Belfast to Dublin.

The landscape character of the eastern and northern areas of the proposed project area are predominantly flat and open with extensive views over the marsh land and estuarine environment. Away from the coastline the landscape becomes generally fragmented by patchworks of hedge and treelined fields. The built environment is more limited in the northern and western areas, comprising of linear isolated and mainly residential buildings following the limited road network. The southern (Blackrock) and western (Dundalk) areas are predominantly lower rise and urban in character.

The project area extends across three Landscape Character Areas as described within the Louth County Landscape Character Assessment.

The area to the north of Dundalk Harbour is located within the Lower Faughart, Castletown & Flurry River Basins LCA. The majority of the project area is within the Dundalk Bay LCA, with some elements extending west into the Muirhevena Plain LCA.

Lower Faughart, Castletown & Flurry River Basins LCA

Key Characteristics:

- *"Variety of landscape types within the area, dictated by the landform and drainage areas*
- *Some fine examples of mature broadleaf roadside trees at Bellurgan and Aghnaskeagh.*
- *Prominence of Trumpet Hill in the landscape and its importance in terms of biodiversity giving reason for its proposed N.H.A. status.*
- *The flat marshes along the Flurry estuary (Designated S.P.A.).*

- *Early Christian associations with St. Bridget, along with many other archaeological features.*
- *Scenic roads around the wooded Ravensdale area and from the R174 at Ballymakellet and Jenkinstown."*

Key values of the landscape within this area are:

- *"Enjoying the scenic quality of the surrounding landscape of the Carlingford Mountains in the east to Slieve Gullion and beyond.*
- *The significance of Dundalk Bay as an SPA around the Flurry estuary.*
- *The Geological feature of Trumpet Hill.*
- *Plentiful open air recreational opportunities.*
- *Fine broadleaf tree cover in the Ravensdale, Ballymascanlan and Deep Park Road.*
- *The eminence of Roche Castle."*

The area borders on Co. Armagh which has an adjacent designated Landscape Area called the Crossmaglen Drumlins and Loughs. This area, along with the Slieve Gullion Complex and part of the Carlingford mountain areas drain into Lower Faughart by means of the Castletown and Flurry rivers via the southern ground slopes. Trumpet Hill, of igneous origin, and over 200 m O.D. is a striking landmark but its dominance is lost against the backdrop of the mountains behind. When viewed from the Jenkinstown Ravensdale route (R174) its prominence becomes very pronounced. The area at Marshes North, Aghaboys and Bellurgan is very flat and subject to flooding. Fields tend to be small and are divided by traditional hedgerows, which are often poorly kept.

Dundalk Bay LCA

Key characteristics:

- *"Land is relatively flat and not higher than 20m O.D.*
- *Seashore is mainly of marsh at the northern end, which gives way to sandy beaches in the south. Coastal erosion is evident.*
- *Well-defined hedge rows with larger fields. Some examples of old Country house estates with broadleaf planting.*
- *Main settlements are Blackrock, Dromiskin, Castlebellingham/Kilsaran and Annagassan.*
- *Motorway to the west has reduced the traffic along the old N1*
- *The area is rich in archaeological features.*
- *Dundalk Bay is a designated Special Protection Area (SPA).*
- *Isolated housing is very evident".*

The area extends from the marshes in Dundalk to Dunany Point and varies from ½ km to 2 ½ kms in width, inland from the coastline. The landscape is quite flat and seldom rises above the 20m O.D. contour.

Predominant land uses are non-irrigated arable land and pastures. Due to the shallowness of Dundalk Bay the intertidal area presents an expansive landscape at low tide of salt marshes and sand and has the potential for increased recreational use. The old N1 (Dublin – Belfast) has

been downgraded to regional route status following the opening of the new motorway to the west, and this adds to the landscape quality of the Castlebellingham/Kilsaran area.

Whilst existing farming practices are unlikely to change, further removal of hedgerows and stone walls, whilst extending the panoramic views available in the area, would alter the local landscape character.

Key values of the landscape within this area are:

- *"Dundalk Bay (S.P.A.) Saltmarsh and mudflats with full range of plant communities. Very important for wintering and migrating wading birds*
- *Some fine groups of broadleaf trees*
- *Impressive coastal routes of high scenic quality*
- *Dunany Point area where there is a sense of tranquillity due to the low levels of the of the built environment, traffic and noise*
- *Opportunities for recreational pursuits with particular emphasis on the river edges and coastline*
- *Existing hedgerows and stone walls".*

Muirhevena Plain LCA

This LCA extends to the west of Dundalk Bay LPA.

Key characteristics:

- *"Serves as a major traffic corridor between North and South*
- *Extensive plain located between the Carlingford/Slieve Gullion mountain complex and the uplands of Collon and Monasterboice*
- *Rich soils are conducive to extensive agricultural practices both in crop and animal production*
- *Robust hedgerows give a sense of enclosure*
- *The nature of the topography has had the effect that a number of small meandering rivers drain the flat landscape*
- *Contains a number of fine broadleaf wooded areas around country houses*
- *Area is rich in archaeological features*
- *Renowned for its mythological past leading to the definition of the Táin Trail*
- *Isolated housing is very evident especially in the eastern half."*

The Muirhevena Plain is by far the largest landscape area in the county, extending from the top of the Boyne Valley up to and including Dundalk. It is identified for its flat undulating features drained by the rivers of the Fane, Glyde, White and Dee rivers. It contains the most fertile agricultural land in the county, which gives an overall impression of good farming husbandry. In the western half the landscape, the horizon is limited due to the smaller field patterns with their mature hedgerows and trees. The soils and topography dictate that farming in this area is the most intensive in the county. In this open flat landscape, the removal of traditional hedgerows would have a significant impact on its character. Where hedgerows might require removal, it is recommended that their replacement should be a similar hedgerow and not a

post and wire fence, wooden fence, or brick wall. Many of the small broadleaf woodlands are at maturity stage and their regeneration and tree replacement should be encouraged.

Key values of the landscape within this area are:

- *"An extensive area of good quality agricultural land with fine traditional hedgerows*
- *Small but very fine broadleaf woodlands throughout the area and within the town of Ardee*
- *High density of archaeological features, particularly souterrains."*

Objectives around the key values of both Dundalk Bay and Muirhevena Plain LCA's are descried within the Landscape Character Assessment as being of regional importance.

A more detailed landscape character baseline study will be developed and focused on the area within the ZTV. This would include any landscape designations or areas of recognised importance and with consideration of landform, land use, land cover, scale, enclosure, human influence, settlement character and patterns and historic landscapes. This, along with known landscape receptors from published policy and assessment documentation, would form the basis of the Landscape Character Assessment for the Environmental Impact Assessment. It is likely that this landscape character assessment would also identify additional areas of estuarine, marsh and river corridor as landscape receptors of some sensitivity.

Local Landscape Designations.

Landscape Conservation Areas.

Set out in the emerging draft Louth Development Plan (2021 to 2027) is a recommendation for exploring the possibility of the Carlingford Mountain SAC to be designated as a Landscape Conservation Area by the Planning Authority for the purposes of preserving the landscape. This area is located approximately 7.5 km to the north west of the proposed project area.

Area of Outstanding Natural Beauty

The Louth Development Plan has identified the Carlingford and Feede Mountains as an Area of Outstanding Natural Beauty (AONB) with much of the area remaining in its natural state, covered in gorse, bracken and heather. This area is approximately 4km to the north east of the proposed scheme and is designated due to its unspoiled natural landscape, special character and spectacular scenic quality. It includes elevated areas with potential views over Dundalk Bay and the Flurry Estuary, towards the proposed project area.

Areas of High Scenic Quality

Feede Mountains and Cooley Area is identified as an Area of High Scenic Quality and extends to the eastern bank of the Flurry Estuary approximately 0.7km from the scheme. AHSQs are described as not quite possessing the exceptional natural beauty and landscape quality of the AONB, but nevertheless adding significantly to the stock of natural scenic landscapes within the County.

Relevant policy

The following policy objectives are extracted from the emerging Louth Development Plan:

- *Policy NBG 23 - "To ensure the preservation of the uniqueness of a landscape character type by having regard to its character, value and objectives in accordance with national policy and guidelines"*

- *Policy NBG 24 – "To ensure development reflects and, where possible, reinforces the distinctiveness and sense of place of the landscape character type"*
- *Policy NBG 25 – "Where appropriate, require that landscape and visual impact assessments prepared by suitably qualified professionals be submitted with development applications"*
- *Policy ENV 56 – "To strictly control the nature and pattern of development within coastal areas and ensure that it is designed and landscaped to the highest standards, and sited appropriately so as not to detract from the visual amenity of the area"*
- *Policy ENV 57 – "To prohibit development along the coast outside existing urban areas where such development is not adequately safeguarded over the lifetime of the development without the need to construct additional coastal defences."*
- *Policy NBG 36 – "To protect the unspoiled natural environment of the Areas of Outstanding Natural Beauty (AONB) from inappropriate development and reinforce their character, distinctiveness and sense of place, for the benefit and enjoyment of current and future generations"*
- *Policy NBG 37 - "To protect the unspoiled rural landscapes of the Areas of High Scenic Quality (AHSQ) from inappropriate development for the benefit and enjoyment of current and future generations"*
- *Policy RA 7 – "To protect the amenity value of the coast and improve public access to coastal amenities"*
- *Policy RA8 – "To protect areas at risk from coastal erosion and flooding, subject to available resources"*

(b) Visual Amenity

The extensive, linear characteristics of the proposed scheme sit within open areas of landscape with likely wide views, contrasting with more enclosed characteristics generally limited to the immediate built areas of Dundalk and Blackrock. Several pathways and roads run alongside the project area that provide views over the Castletown River Estuary and Dundalk Bay, including the mudflats, salt marshes, and agricultural land.

The open character of the landscape, much of which is flat, affords the potential for distant views including the surrounding elevated vantage points such as The Cooley Mountains approximately 4.5km to the north. ZTV analysis would assist in identifying those elevated areas within the viewshed of the scheme.

The extent of the visual impact of the flood defences is likely to be limited to some extent by the intrinsically low profile nature of their design , however the likely effects of the proposals on the visual receptors of the study area, verified through the ZTV analysis would be assessed. The following potential visual receptors have been identified as likely:

- **Users of footpaths/cycle routes -** It is anticipated that the proposed scheme would include elements that might be visible from the informal local footpath and cycle network. These include the footpath on the south bank of the Muirhevena Plain LCA River Estuary and the path running north south along the route of the existing defences on the coastline to the east of Dundalk. The Táin Way is a long-distance footpath starting and ending in Carlingford. Its closest point is approximately 3.3km to the north

east as it passes over high ground and where views over Dundalk Bay towards the proposed scheme are possible.

- **Residents/Residential Property** - these could include residential properties within Dundalk with views of either the north or south river banks of the Castletown River, costal properties in Black Rock, residential property close to the small interventions away from the coastline in both Dundalk and Black Rock and those with views across the Flurry Estuary. Property on elevated ground on the east side on Dundalk Bay area may experience distant views of the proposed scheme.
- **Views from roads** – The N52 road is the is the major connection for access from the north into Dundalk from the M1 Motorway. There is potential for road users to experience views of the proposed scheme from both the north and south bound carriageways on the north side of Dundalk Town Centre, the N52 Bridge over the Castletown River as well as the R172 Red Barns Road, Racecourse Road to the north of the estuary and the coastal road at Bellurgan Point.
- **Views of, or from within, valued landscapes** – in particular from the north and east.

A visual baseline study would be established to determine the sensitivity to change of each of these visual receptors with representative viewpoints being identified that would provide a context of the views, describe the change and inform the assessment of any impact of the proposals.

Potential effects of the proposals upon landscape character and visual receptors should not be seen purely as a constraint. Opportunities may exist to enhance landscape character and reduce impacts within sensitive viewpoints. Consideration of these impacts at the design stage, combined with other design measures and mitigation can assist in settling scheme components effectively into the landscape infrastructure.

2.8 Soils and Geology

The geology of County Louth is dominated by silurian greywackes and limestone, and it is rich in sands and gravel, however it is noted as being one of the more geologically diverse counties within Ireland. The area between Dundalk Bay and Carlingford Lough to the north east almost entirely consists of granite, gabbro and basalt based mountains, with areas of carboniferous limestone along the southern end of the peninsula and extending to the south of the county and into the midlands[30].

The soils throughout the urban areas of both Dundalk and Blackrock are classified as man made. The surrounding rural area within the focused study area is predominantly composed of lower Paleozoic sandstone and shale till, with smaller areas of undifferentiated alluvium dispersed throughout, especially along the banks of the upper course of the Castletown River within the study area and along the banks of the River Fane. The soil along Dundalk Bay, the north coast of the Castletown River estuary and surrounding the Ballymascanlan estuary is made up of marine deposits, including estuarine sediments (silts/clays), marine sands, and gravels. To the north east of the study area, the predominant soil type is composed of granite till. There are

[30] Louth County Council, *Solid Geology* (2021)

small areas of sandstone and shale till with matrix of Irish Sea Basin origin located to the south east of Dundalk and south west of Blackrock.[31]

The CORINE land cover dataset shows that the town centre of Dundalk is mostly composed of continuous urban fabric within the centre, and discontinuous urban fabric on the town's outer limits. Blackrock to the south east is composed of discontinuous urban fabric. There are regions of artificial surfaces comprising of industrial, commercial and transport units which align with a business park and industrial park located between Dundalk and Blackrock, as well as some industrial sites to the east and south west of Dundalk town centre. The estuarine environment of Castletown River estuary and Dundalk Bay is composed of a mix of coastal wetlands, comprised of salt marshes and intertidal flats. The rural landscape surrounding Dundalk is predominantly classified as agricultural pasture areas, with a stretch of heterogenous agricultural areas to the north of the town and to the south west. Some smaller areas of non-irrigated arable land are situated immediately west of Blackrock and south of Dundalk, and to the east of Dundalk between the town and the bay. Dundalk stadium consists of artificial non-agricultural vegetated surfaces.

There is potential for there to be contamination to the underlaying ground or ground water from both current or historical sources on or close to the proposed scheme notably associated with the port and associated uses in the centre of Dundalk. A high level review of the available online current and historical mapping (dating from 1829)[32] of the areas close to the proposed scheme has identified potential sources of contamination including quays, gravel pits (potential for infilled land with unknown materials), railways, mills, military land use, embankments, gas works and sewage works.

2.9 Air Quality and Noise

The Air Quality Index for Health (AQIH) rates air quality in Ireland as good, fair, poor or very poor based on regular measurements of five air pollutants with the potential to harm health; ozone gas, nitrogen dioxide, sulphur dioxide, PM2.5 particles and PM10 particles. The focused study area falls within the Air Quality Management Zone category of Large Towns, within Region 3, and is classified as 'good' throughout. The nearest monitoring station is located at the fire station on Rampart road (Station Code LH3) located within the east of the Dundalk town area. In both the study area and the surrounding landscape, air quality is classified as 'good' (Figure 2.23) The resident population of Dundalk and Blackrock, as well as the Dundalk Bay SAC, are considered susceptible receptors to air quality and noise change from construction activities.

[31] Environmental Protection Agency, EPA Unified GIS Application (2021)
[32] National Townland Historical Map Viewer https://geohive.maps.arcgis.com, Accessed April 2021

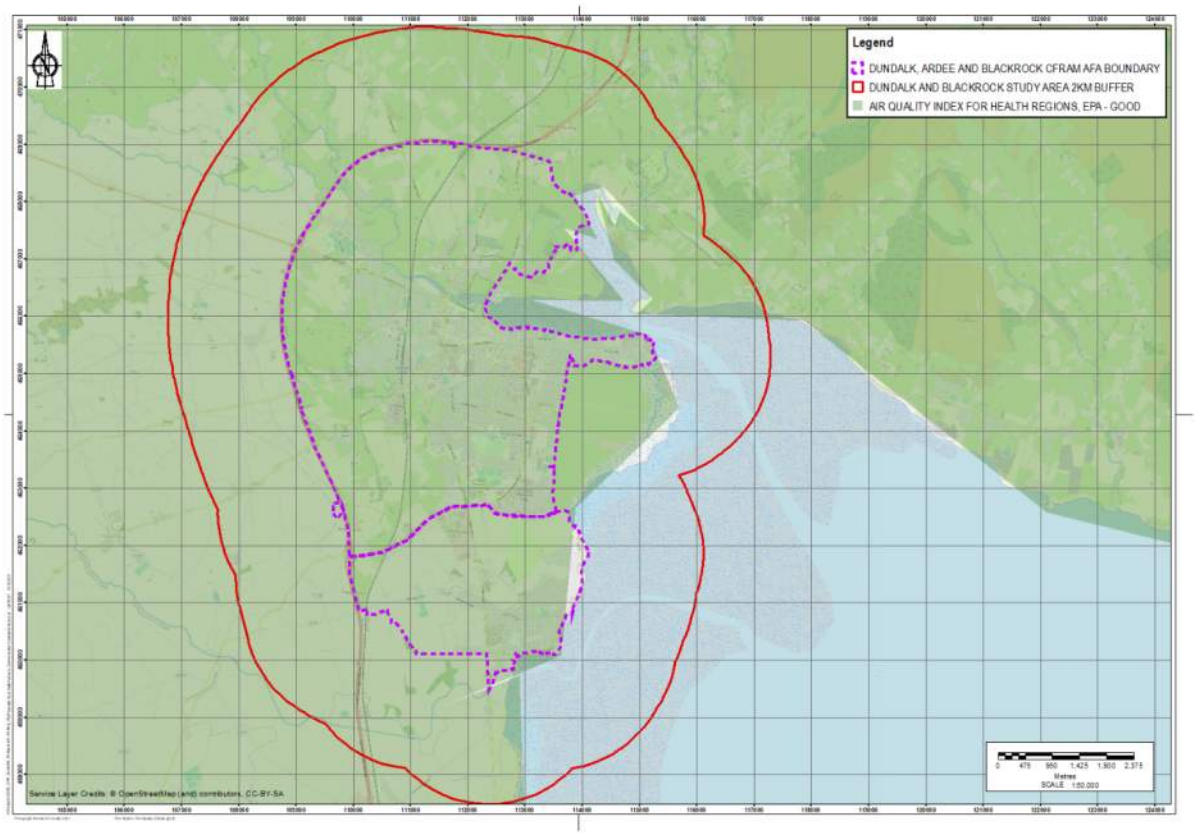


Figure 2.23 - Air Quality Index for Health Rating of the focused study area.

2.10 Other Projects and Inter-relationships

Planning permission is being sought for the development of the Oriel offshore windfarm, located off the coast of Dundalk Bay in the Irish Sea. The proposal includes plans for up to 25 turbines with a total capacity of 375MW, located 6km away from the shore at the closest point. It is expected to produce 1,500GWh/yr. A planning application is being prepared and is expected to be submitted to the planning authority within the coming months.[33]

The Navvy Bank runs for 3.2km along the south bank of the Castletown River and along the northern edge of Dundalk town, and serves as a scenic footpath and cycle way for visitors to the area. Funding is currently being sought to further develop the embankment and increase its potential as a local amenity.[34]

3. Potential Impacts, Further Work and Design Considerations

Table 3.2 provides a summary of the main potential environmental impacts likely to arise as a result of each of the proposed options and measures that are required to avoid or reduce (mitigate) the effects.

Each potential impact has been designated an initial impact rating as shown in Table 3.1.

[33] Oriel Windfarm Project Information. https://www.orielwindfarm.ie/project-information-1. Accessed May 2021.
[34] Carrol, F. *Funding window for Navvy Bank upgrade.* https://www.independent.ie/regionals/argus/news/funding-window-for-navvy-bank-upgrade-40035102.html Accessed May 2021

Table 3.1– The Potential Impact Rating

1	**Potential for adverse impacts resulting in environmental legislative challenges and requirement for extensive mitigation.**
2	**Potential adverse impacts but not expected to result in breach of environmental legislation. Further assessment is required.**
3	**No likely significant impacts / potential improvement to baseline conditions.**

Table 3.2– Summary of Environmental Constraints, Considerations and Further Works

Key Environmental Constraints	Potential Impact Rating (1-3)	Design Considerations and Further Works
Biodiversity		
Natura 2000 sites/Ramsar - Source-receptor linkage identified via hydrological link for QIs within Dundalk Bay SPA and SAC	1	A Construction Environmental Management Plan (CEMP) will be required before commencement of any construction works. Measures including adherence to construction best practice where works occur adjacent or within any streams/drains to prevent deterioration of water quality during construction, e.g. from sediment release or spills. Carry out a Preliminary Ecological Appraisal of the proposed scheme. Mitigation measures required to protect water quality during construction and limit disturbance to wintering waterbirds. Screening for Appropriate Assessment should inform the requirement for progression to Stage 2 Appropriate Assessment and the preparation of a Natura Impact Statement.
Nationally Important Sites - Potential for source-receptor linkage identified between proposed development and Dundalk Bay pNHA, Stabannan-Braganstown pNHA, Carlingford Lough pNHA, Dunany Point pNHA and Carlingford Lough ASSI.	1	A Construction Environmental Management Plan (CEMP) will be required before commencement of any construction works. Measures including adherence to construction best practice where works occur adjacent or within any streams/drains to prevent deterioration of water quality during construction, e.g. from sediment release or spills. Carry out a Preliminary Ecological Appraisal of the proposed scheme. Mitigation measures required to protect water quality during construction and limit disturbance to wintering waterbirds.

Key Environmental Constraints	Potential Impact Rating (1-3)	Design Considerations and Further Works
Aquatic Species - Water quality impacts to aquatic species. In terms of water quality, the main risk is considered to be during construction phase of the scheme. In terms of habitat modification, the main risk is considered to be during the operational phase of the scheme as water flow and riparian habitats may be modified due to changes in water levels and/or flow.	1	Mitigation measures to be set out in the CEMP including adherence to construction best practice where works occur adjacent or within any streams/drains to prevent deterioration of water quality during construction. A macro-invertebrate survey indicating the Q value and associated chemical rating of streams within and draining the site. An ecological assessment of the streams/rivers within and draining the site (notability with respect to Salmonid suitability and possibly lamprey spawning beds). Further consultation with IFI – Inland Fisheries Ireland –to discuss habitat improvement works to mitigate against further habitat deterioration for aquatic species. Carryout a Preliminary Ecological Appraisal of the proposed scheme.
Invertebrates - The potential impact from disturbance and loss of habitat to Vertigo snails, the marsh fritillary butterfly and the kerry slug.	2	All wet grassland (GS4) and riparian zones which will be directly impacted by construction and/or operational activities will be surveyed for habitat suitability for Vertigo species. Avoid instream works and avoid area of swampy vegetation with potential of supporting protected vertigo species. During summer site walkovers the occurrence of any significant stands of devil's bit scabious will be noted. If these areas are earmarked for construction works or re-wetting, they should be surveyed for marsh fritillary webs in September. Mitigation measures to be set out in the CEMP including adherence to construction best practice where works occur adjacent or within any streams/drains to prevent deterioration of water quality during construction. Carryout a Preliminary Ecological Appraisal of the proposed scheme.
Amphibians and - Common frogs are protected from overexploitation under the Habitats Directive and are protected under the Irish Wildlife Act 1976 (as amended). The project area would be considered likely to support a relatively health population, especially within any pools or drainage in the area. Direct impacts on common frog are likely to occur during construction phase, including direct mortality during vegetation clearance and excavation works, and	2	No specific frog surveys are considered as a requirement; however, frogs will be recorded when observed during other surveys, with particular attention given to breeding sites supporting frog spawn. If during the course of ecological surveys suitable pools/ ponds for newts are identified these will require night-time lamp surveys to determine occupancy by newts, or use of eDNA testing to test for presence/absence if appropriate. However, if the pool/ pond is sufficiently removed from the proposed construction corridor surveys will not be required. Project design should aim to avoid pond habitats. Carryout a Preliminary Ecological Appraisal of the proposed scheme. Pre-construction visits during the spawning season to isolate any breeding sites from construction activities.

Key Environmental Constraints	Potential Impact Rating (1-3)	Design Considerations and Further Works
dewatering of waterbodies (including temporary waterbodies) holding frog spawn. Preliminary assessment of the project area for breeding newts suggested that suitable ponds and drains are present and it was considered likely that newts occur in the vicinity of the proposed scheme.		
Reptile - None identified	3	No further works required.
Birds - The project area occurs within and adjacent to the Dundalk Bay SPA which is designated for range of waterbird species. Winter Birds – foraging, roosting in coastal habitats and fields adjacent to the coast and in the vicinity the proposed scheme. Breeding Birds - potential nesting habitat for birds in the vicinity of the proposed scheme especially along river/drains and hedgerows. Potential for snipe and ground nesting species.	1	Winter waterbird surveys should be undertaken to inform project design and determine where birds are distributed in relation to the project area. It is recommended that bi-monthly surveys are undertaken. As well as counting birds, locations are mapped over the count period. Surveys should target a range of tidal states and should aim to collect information on roosts, including species composition and numbers. It is recommended that breeding bird surveys are conducted for areas where construction works will be occurring or where habitat alteration is proposed. Surveys will provide a baseline and identify any constraints, i.e. nesting birds. Inappropriately timed construction works have the potential to directly impact both breeding and wintering birds and in sensitive locations works should be timed to avoid sensitive periods, i.e. the breeding and wintering seasons (1st March to 31st August, and 1st October to 28th/29th February respectively). Further surveys, consideration of the proposed scheme design and ecological assessment, and application of mitigation measures (e.g. appropriate timing of vegetation clearance, avoiding or limiting works at certain periods of the tidal cycle when birds are using high tide roosts) will determine the exact areas and times during which construction works should be limited. Carryout a Preliminary Ecological Appraisal of the proposed scheme.
Mammals excluding bats - Otters and badgers recorded in area including badger setts. Considered that there was potential for otter holts to occur. Resting places identified occur within/adjacent to construction corridor/operational activities, e.g. disturbance from walker/dogs on greenway.	1	Comprehensive otter/ badger surveys along the embankments. These surveys should be targeted at providing information on otter usage of the river and distribution in relation to the proposed greenway. Carryout a Preliminary Ecological Appraisal of the proposed scheme. Preconstruction badger survey to determine occupancy of known setts. Deploy trip cams to confirm species occupancy.

Key Environmental Constraints	Potential Impact Rating (1-3)	Design Considerations and Further Works
		Implement appropriate exclusion zone buffer around setts/ holts to avoid disturbance during construction and operational activities
Bats - Potential for bat roosting and foraging/commuting habitat within the Project Area. Any work requiring tree or building removal has the potential to directly impact on roosting bats. Or if likely to be significantly indirectly disturbed by construction activity.	1	Avoid removal habitat features for bats where possible to retain connectivity with the wider landscape Additional planting up of features could be used to enhance connectivity or strengthen existing features. Baseline bat activity surveys and static bat detector surveys will be undertaken. Preconstruction surveys of potential roost features if any PRFs are being removed or could be affected by construction works/operational activities. – derogation licence required. Carryout a Preliminary Ecological Appraisal of the proposed scheme.
Invasive Species - The urban setting of this project combined with river corridors means there is a heightened risk of unintentional spreading of any non-native species occurring in the area. The desk-based study did not pick up any records of Third Schedule species within 2km of the project area, however several species are known to occur in the vicinity. Several non-native tree species with lower risk impacts were recorded including sycamore (medium risk) and beech (naturalised – non-native). Of most concern during construction works is the occurrence of winter heliotrope, buddleia and crocosmia (montbretia) within the project area. These species spread rapidly on bare ground created during construction and could have a negative impact on habitat, particularly Annex I coastal habitats. Cord grass (Spartina) in a non-native that occurs widely within the saltmarsh and care should be taken not to move infected sward to other parts of the site	1	Invasive species surveys need to be undertaken during the growing season (May to September) and should focus on the urban sections of the drains/streams in the project area, and in locations where construction works will involve excavation where there will be an increased risk of spreading non-native species. Produce invasive species management plan and carry out programme of treatment as required. The control of invasive species needs to be assessed under the EU Habitats Directive, transposed into Irish law by the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), as amended.

Key Environmental Constraints	Potential Impact Rating (1-3)	Design Considerations and Further Works
during construction to avoid spread this species.		
Fisheries		
Fisheries - The Castletown River and River Fane are used by anglers. There is potential for disturbance to fish stocks associated with in-channel works, or permanent modification of channel banks. This could have an adverse impact on aquatic populations and water quality.	2	Mitigation measures including adherence to construction best practice where works occur adjacent or within any streams/drains to prevent deterioration of water quality during construction. An ecological assessment of the streams/rivers within and draining the site (notability with respect to salmonid suitability). Further consultation with IFI (Inland Fisheries Ireland) is advised if in stream works are proposed. Carryout a Preliminary Ecological Appraisal of the proposed scheme.
Water and Geomorphology		
Impact to WFD Surface Water Bodies (Rivers, Transitional waters and coastal waters). Potential impact to streams, rivers, estuaries and the sea from in channel construction activities resulting in a decline in water quality or prevention of water bodies from achieving their aims. The potential for the scheme to cause long term deterioration in the status of any WFD waterbodies during operation of the scheme.	1	Consideration of the proposed scheme (including construction impacts) under the WFD Regulations. Carryout WFD Screening. Adherence to construction best practice where works occur adjacent or within any streams/drains to prevent deterioration of water quality during construction. Best practice guidance set out in the CEMP will be followed throughout the construction.
Impact to WFD Groundwater Bodies - Potential negative impact to the quality of the local ground water body, or prevention of the water body from achieving its WFD aims.	2	Consideration of the proposed scheme (including construction impacts) under the WFD Regulations. Carryout WFD Screening. Mitigation measures including adherence to construction best practice to prevent deterioration of ground water quality during construction. Best practice guidance set out in the CEMP will be followed throughout the construction.
Impact to Geomorphology - The proposed scheme in-channel works could impact on the characteristics of the river channels including flow, channel dimensions, sediment transport, channel features (bars, bank slopes). Changes to these characteristics can have an effect on the aquatic environment, the	1	The potential impacts to the geomorphology of the effected coastline rivers, streams and drains should be considered during the scheme design including consideration of potential issues associated with scoring and sedimentation. Carryout the geomorphology site walkover to identify the characteristics of the river, potential impacts and feed recommendations to design team.

Key Environmental Constraints	Potential Impact Rating (1-3)	Design Considerations and Further Works
ecology it supports and WFD status. Sedimentation and scouring can cause flow capacity issues and potentially damage both new and existing flood defences. The potential for changes to coastal processes associated with construction and operation of flood defences on the coastline.		Consideration of the proposed scheme (including construction impacts) under the WFD Regulations. Carry out WFD Screening.
Reduced flood risk to people, land and property.	3	No further action required for land outside of the proposed flood storage areas.
Population and Human Health		
Reduced flood risk to people, land and property. Improvements to wellbeing of local population on completion of the works due to less fear and stress of flooding.	3	No further action required for land outside of the proposed flood storage area (see also final row of the Population and Human Health sub-section).
Potential health and safety risk to local community during construction due to presence of construction plant and machinery.	3	Safety measures such as fencing will be used as necessary during construction.
Potential loss of access to PRoW, Permissive Paths or informal paths during construction. The greenway would provide a new scenic route for walkers and cyclists and be of benefit to the local population and tourism in the area.	3	All construction activities will be planned to avoid adversely affecting any PRoWs, Permissive Paths and informal paths. If necessary, temporary diversions will be set up as appropriate.
Increased noise, vibration, air quality and dust impacts to local residents, businesses and recreational users as a result of construction works.	3	All construction will be subject to best construction practice, including considerate working hours to be set out in the CEMP. Nearby residents will be informed of potential timings of work in advance.
Potential for temporary disturbance to recreational users of rivers, estuaries and coastal areas during construction of the scheme.	3	Information on construction programme, footpath/area closures and working area will be made publicly available throughout the construction phase of the scheme.

Key Environmental Constraints	Potential Impact Rating (1-3)	Design Considerations and Further Works
Potential temporary disruption to land currently registered under the GLAS scheme, land proposed for habitat creation.	2	Consultation to be undertaken with all affected landowners and the Department of Agriculture, Food and the Marine as part of the design process.
Traffic and transport		
Reduced flood risk to transport infrastructure.	3	No further action required
Impact to local road network from construction of flood defences - disruption associated with temporary or partial closures of roads to facilitate the constructor of hard flood defences.	2	Construction Traffic Management Plan to be prepared and implemented. All construction will be subject to best construction practice, including considerate working hours that will be set out in the CEMP. The thresholds for a Traffic and Transport Assessment set out in the Traffic and Transport Assessment Guidelines[35] should be reviewed a design and construction methodologies are being developed to confirm if there is a requirement to complete a Traffic and Transport Assessment.
Construction vehicle movements - potential temporary impact to road users from traffic movements associated with construction vehicles during construction of the proposed scheme.	2	Construction Traffic Management Plan to be prepared and implemented. All construction will be subject to best construction practice, including considerate working hours that will be set out in the CEMP.
The impact of the introduction of the greenway and its potential long term impact particularly where it interacts with the local road network.	2	The impacts of the interactions between the exiting local road network and the proposed new greenway need to be considered at the design phase and in the Traffic and Transport Assessment if required.
Archaeology and cultural heritage		
National Monuments in State care or National Monuments subject to a preservation order. The closest monument in State Care or subject to a preservation order is at least 500m from the proposed scheme.	3	No further action required.
Recorded Monuments – There are a number of Recorded Monuments close to proposed flood defences including: 55m to the west to the west of flood defence 1d Recorded Monument LH007-119027, Town	2	It is recommended that all impacts on identified archaeological and heritage sites and their close surroundings including Recorded Monuments, Protected Structures and those listed on the NIAH are avoided through the design of the proposed flood relief scheme.

[35] Transport Infrastructure Ireland, Traffic and Transport Assessment Guidelines, May 2014

Key Environmental Constraints	Potential Impact Rating (1-3)	Design Considerations and Further Works
defences '*The town wall of Dundalk*' Flood defence 1b Recorded Monument (s) LH007-184, LH007-185 and LH007-186, 75m to the west, '*five concentrations of archaeological activity*' 30m to the south of flood defence 11f Recorded Monument LH007-114, '*Marked on the 1835 'OS 6-inch' map as 'Lady's Well*'		Features both above and below ground have varying degrees of statutory protection. All features should be preserved in situ and impacts on their character or setting minimised. The scheme design should give consideration to the protection intentions of the ACAs where scheme elements fall in or close to ACAs boundaries. It is recommended that a Heritage Desk Based Assessment of the site is carried out and any subsequent recommendations be incorporated into the scheme design and construction methodologies as required. Archaeological Impact Assessment is likely to be required due the requirement to carryout ground works in a Zone of Archaeological Potential.
Protected Structures - There are multiple Protected Structures concentrated within Dundalk. Those on or close to the site of the proposed scheme are: Flood defence 4c D027, 0m on the Site of the proposed scheme. Dundalk Bridge. D028, 30m to the south west, No 36 Bridge Street, Dixon's Public House. Flood defence 9b Lhs012-008, 60m to the west, Field House Flood defence 9c Lhs012-025e, Lhs012-025f, 40m to the west, 5 and 6 The Crescent. Lhs012-010, 75m to the west, St Oliver Plunkett's Church. Flood Defence 11a D360, <5m to the north, Brookfield House. Flood Defence 11d D012a D012b, D012c, 50m to the south, Macardle Moore Brewery. D382 to D401, 50m to the north, Brook Street Terrace comprising 20 protected structures.	3	Where works are required on or close to recorded archaeological monuments then appropriate mitigation strategies should be developed in consultation with the National Monuments Service. When the owner or occupier of a property, or any other person proposes to carry out, or to cause, or to permit the carrying out of any work at or in relation to a Recorded Monument or a Registered Monument they are required to give notice in writing to the Minister 2 months before commencing that work. Areas impacted by ground disturbance works required by the proposed scheme may require archaeological investigations. The required measures will be determined during the development design phase in consultation with the National Monuments Service. If there are works associated with the development of the proposed scheme to or within the curtilage of Protected Structures, planning permission may be required including for works which are likely to impact on the setting of the structure. Works which would usually fall under exempted development can be only be carried out without planning if the works would not affect the character of the structure or any element of the structure that contributes to its special interest. If required a request can be made under Section 57 of the Planning & Development Act, 2000, as amended, for the local authority to issue a declaration indicating the types of works that could be carried out without affecting the character of the structure or any element of the structure which contributes to its special interest.

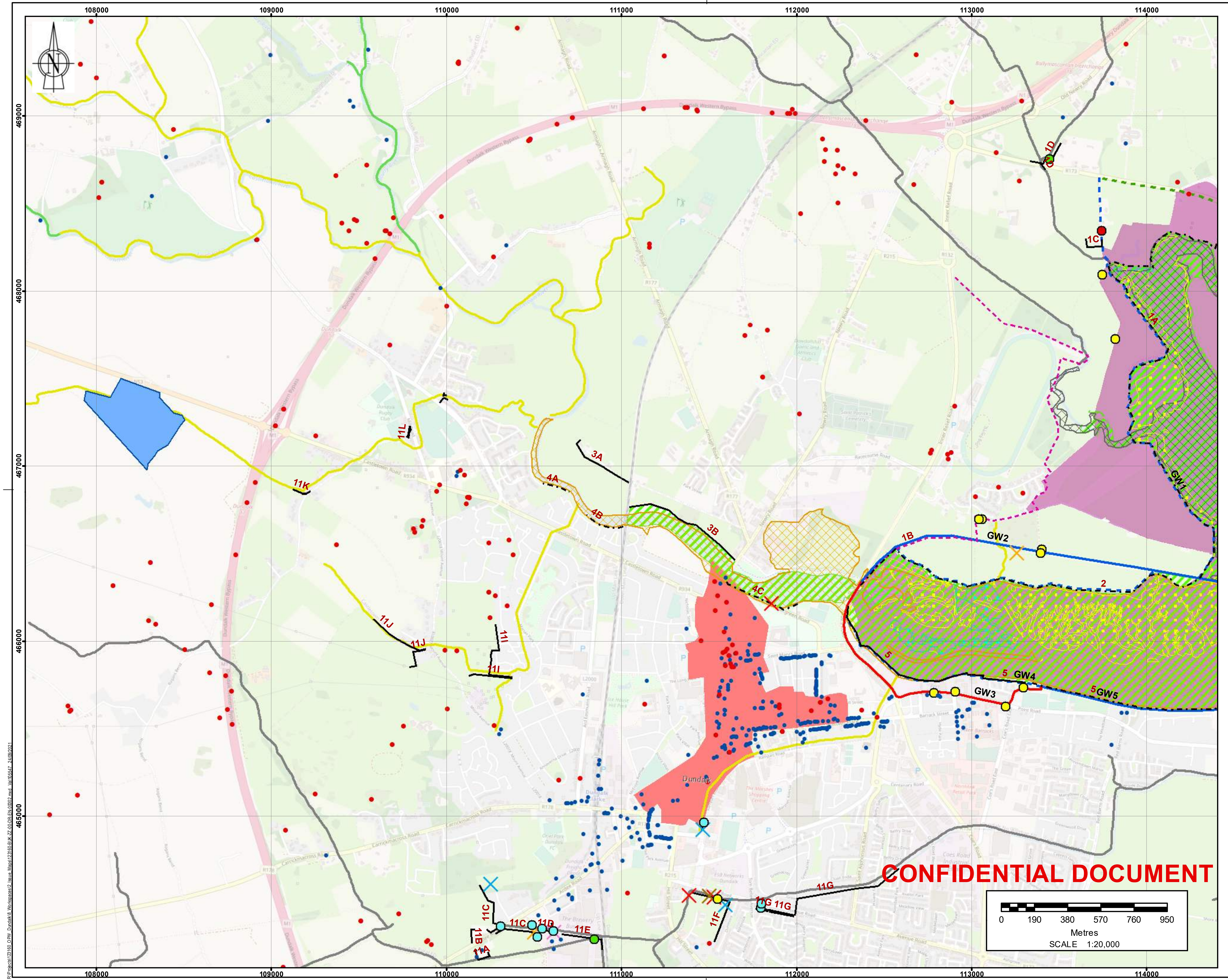
Key Environmental Constraints	Potential Impact Rating (1-3)	Design Considerations and Further Works
National Inventory of Architectural Heritage - Buildings registered on the NIAH list are concentrated within Dundalk include some on the site of and close to the proposed scheme. only one of these is not listed above in the Protected Structures section, this is 13900701, The Towers (House). 50m to the south of flood defence 5. However, it is understood that this property has been demolished.	2	Due to the many Protected Structures and placement of scheme components within ACAs it is recommended that the potential impacts to the settings of these buildings or areas is considered in the heritage study and further assessment work.
Architectural Conservation Areas (ACAs) – Flood defence 6 is located within the Soldiers Point ACA and flood defence 9c is >20m from The Crescent Blackrock ACA.		
Zones of Archaeological Potential - The historic core of Dundalk is designated a Zone of Archaeological Potential. Flood defences 3b 4c and 11h fall within this area.	1	
Unrecorded Archaeological Site – Disturbance to unknown/unrecorded archaeological features during construction.	2	Areas impacted by ground disturbance works required by the proposed scheme (channel widening, construction of hard defences) may require archaeological investigations. The required measures will be determined during the development design phase in consultation with the National Monuments Service and following the recommendations from the Heritage Desk Based Assessment.
Landscape Character		
Landscape Character – Potential long term effects to the Landscape Character of the area associated with development of hard defences.	2	Appropriate design, siting and mitigation measures including opportunities of landscape enhancement should be developed during the scheme design to integrate the proposed scheme within the landscape. The landscape effects associated with the proposed scheme are likely to be contained to the local vicinity of the proposed works due to the likely low profile nature of the interventions proposed. A landscape and visual impact assessment would be used to assess the potential effects on both landscape character and visual amenity as a result of the development proposal. The consideration of landscape character and its

Key Environmental Constraints	Potential Impact Rating (1-3)	Design Considerations and Further Works
		sensitivity and the nature and sensitivity of views and visual amenity potentially affected, combined with an assessment of the magnitude of the change brought about by the development, will inform judgments on the likely significance of effects.
Visual amenity		
Views from footpaths/cycle routes – Possible detrimental impact to the views from local footpath network. During construction and operation.	2	During the scheme design, attention should be given to the potential impact to views from local residential property and users of footpaths. Appropriate design, siting and mitigation measures including opportunities of landscape enhancement should be developed during the scheme design to integrate the proposed scheme within the landscape limiting the visual impact. Due to the low-profile nature of the proposed scheme elements generally, the interventions are expected to have a limited impact on the local visual amenity. However, impacts to longer distance receptors such as views of or from within, valued landscapes such be considered further in a landscape and visual assessment as set out below. A landscape and visual impact assessment would be used to assess the potential effects on both landscape character and visual amenity as a result of the development proposal. The consideration of landscape character and its sensitivity and the nature and sensitivity of views and visual amenity potentially affected, combined with an assessment of the magnitude of the change brought about by the development will inform judgments on the likely significance of effects. A visual baseline study would be established to determine the sensitivity to change of each visual receptor with representative viewpoints being identified. These would provide a context of the views, describe the change and inform the assessment of any impact of the proposals.
Views from Local Residential Property. During construction and operation.	2	
Views from roads. During construction and operation.	2	
Views of or from within, valued landscapes. During construction and operation.	2	
Views from Scenic Routes. During construction and operation.	2	
Soils and geology		
Contaminated Ground – Mobilisation of contaminated sediments to water courses during construction. Impact to construction workers.	1	A review of the available online historical mapping of the area has identified potential sources of contamination on or close to the site of the proposed scheme. It is recommended that a full desk-based assessment with the aim of identifying any contamination risks with soils will be undertaken to assist the scheme design and if required measures to prevent contamination impacts to watercourses. Best practice guidance set out in the CEMP will be followed throughout the construction.
Air quality and noise		
Impact on air quality during construction.	3	Air quality may be temporarily impacted during the construction phase of the scheme from construction vehicle/plant emissions and dust. Best practice guidance

Key Environmental Constraints	Potential Impact Rating (1-3)	Design Considerations and Further Works
		set out in the CEMP will be followed throughout the construction. No air quality effects are anticipated during operation of the scheme.
Noise impacts during construction to local residential property and ecology.	3	Noise impacts will be temporary and limited to the construction phase of the scheme. Best practice guidance will be followed throughout the construction. The potential for construction activities to impact local ecology will be considered following protected species surveys. No noise effects are anticipated during operation of the scheme.
Other Projects and Inter-relationships		
Potential interactions with other projects.	3	Continual review of projects and plans through the design phase and of the potential environmental interactions.

APPENDICES

Appendix A – Environmental Constraints Plan



Note: The limits, including the height and depths of the Works, shown in this drawing are not to be taken as limiting the obligations of the contractor under Contract.

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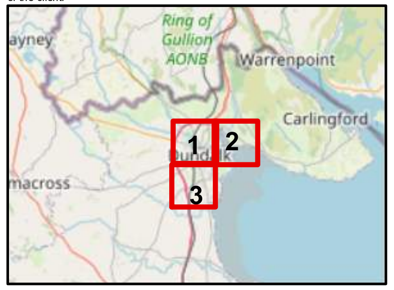
NOTE: Hard Defence, Greenway Route and Potential Storage Area outlines have been digitised from PDFs and are indicative.

NOTE: This map has been distributed as a layered pdf. Layer selection for printing is at the discretion of the client.



SAFETY HEALTH AND ENVIRONMENT INFORMATION

CONSTRUCTION

MAINTENANCE / CLEARANCE / OPERATION

DECOMMISSIONING / DEMOLITION

Rev	Drawn	Chkd	Rvwd	Apprvd	Date	Description
P02	RV	DU	AB	JR	24/09/2021	SUITABLE FOR INFORMATION
P01	RV	DU	AB	JR	28/07/2021	SUITABLE FOR INFORMATION

Designed by: RV
Date: SEPTEMBER 2021

Status:
S2

Client
OPW

Client Drawing No.
XXXXX-XXXX-XX

Binnies UK Limited
Registered Office
Spring Lodge, 172 Chester Road, Helsby, Cheshire, WA6 0AR UK
Tel: +44(0)1737 774155

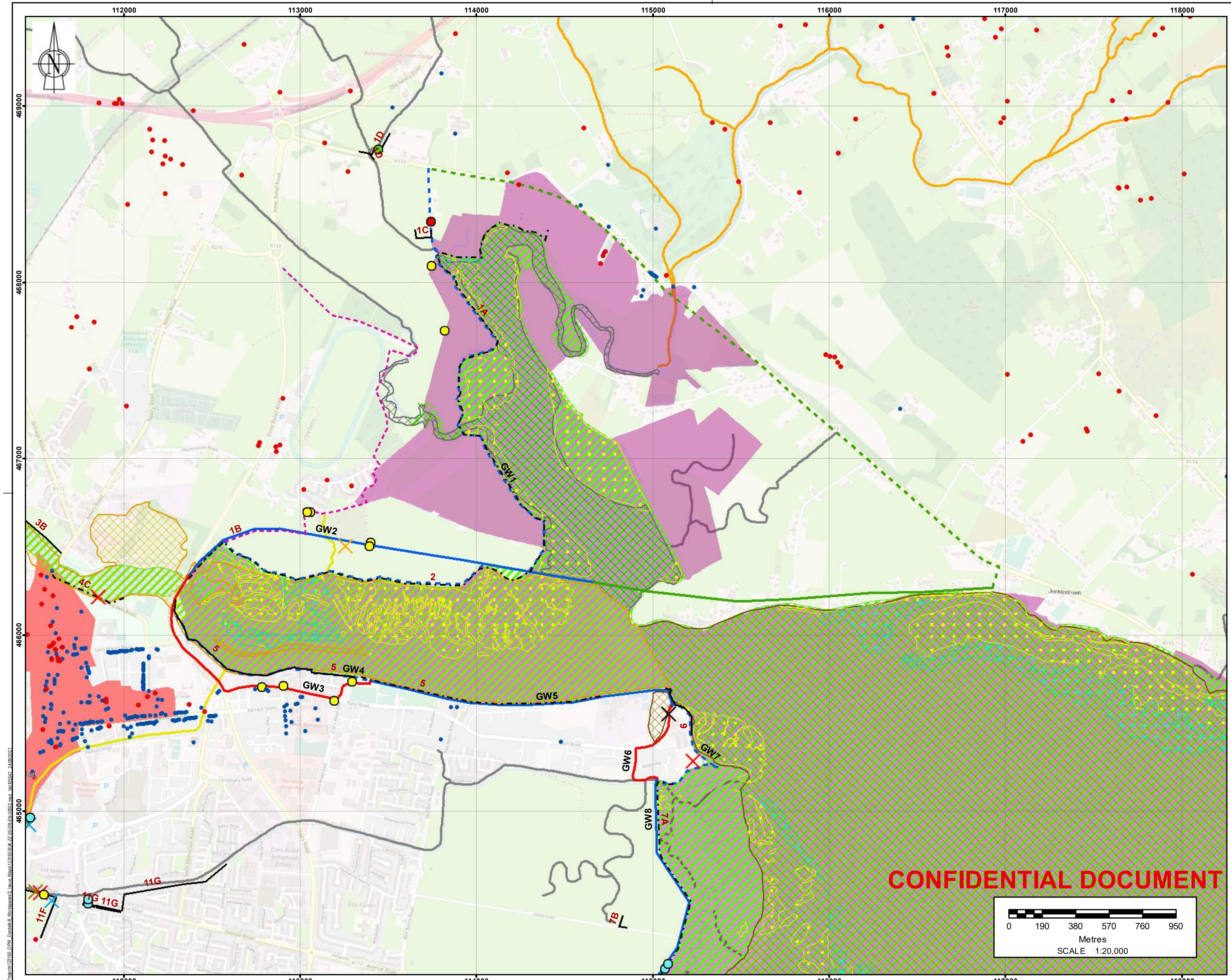
Project:
DUNDALK & BLACKROCK
FLOOD RELIEF SCHEME

Drawing title:
ENVIRONMENTAL CONSTRAINTS
MAP
PAGE 1 OF 3

Drawing scale: 1:20,000
Sheet size: A3

Drawing no. 123160-BUK-ZZ-00-DR-EN-00002
Revision P02

Print Version: Print Quality (300dpi @ A3)



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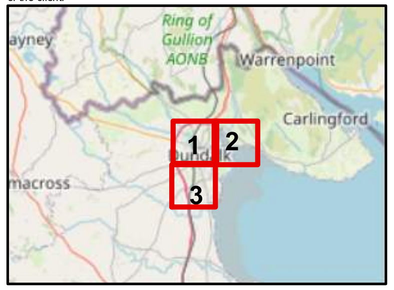

SAFETY HEALTH AND ENVIRONMENT INFORMATION

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DUNDALK & BLACKROCK FLOOD RELIEF SCHEME

Drawing title:

ENVIRONMENTAL CONSTRAINTS MAP PAGE 2 OF 3

Drawing scale: 1:20,000 Sheet size: A3

Drawing no. 123160-BUK-ZZ-00-DR-EN-00002 Revision P02

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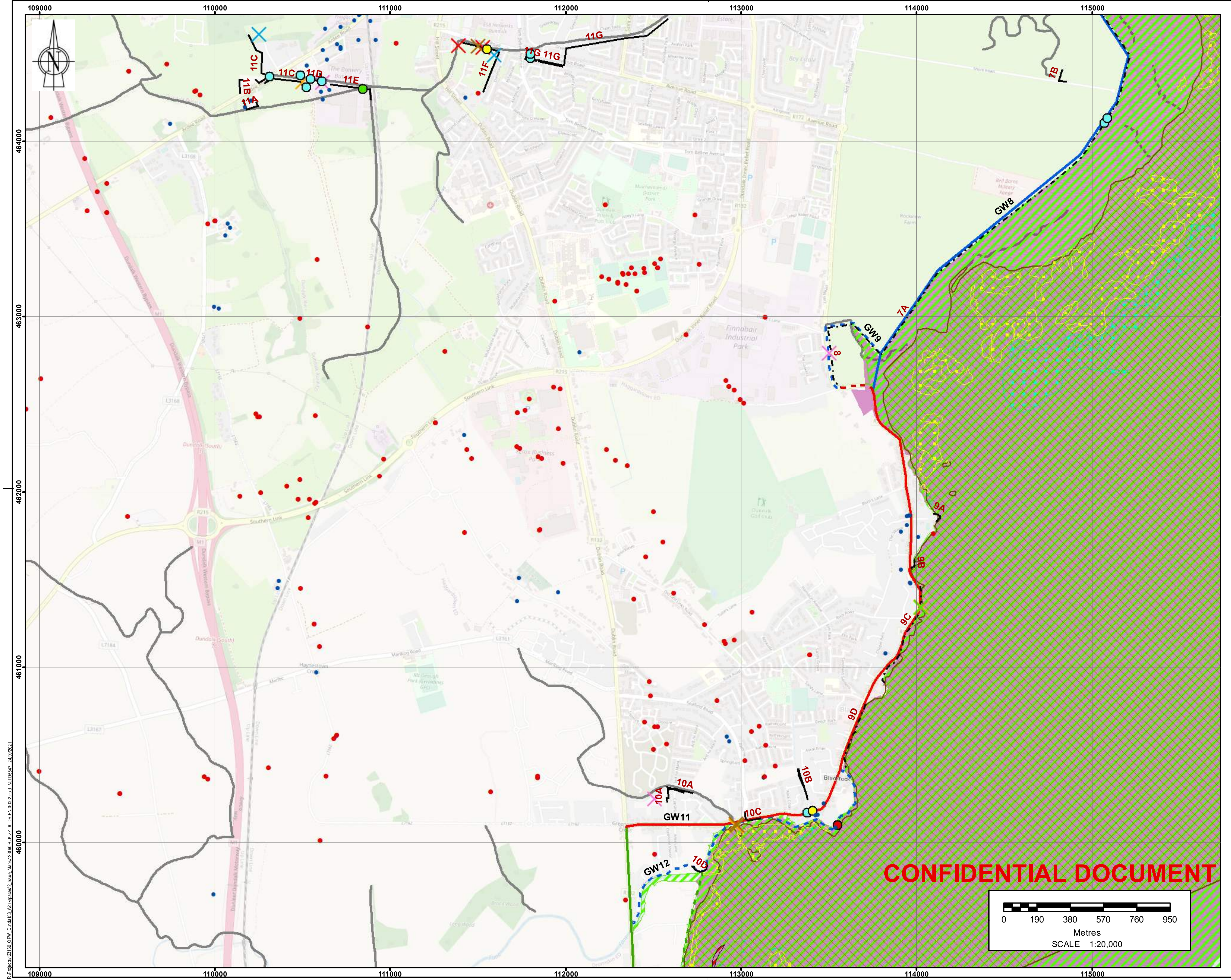

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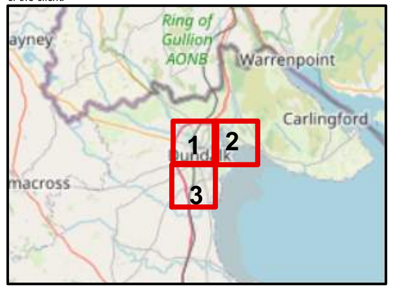

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Project:

DUNDALK & BLACKROCK FLOOD RELIEF SCHEME

Drawing title:

ENVIRONMENTAL CONSTRAINTS MAP PAGE 3 OF 3

Drawing scale: 1:20,000 Sheet size: A3

Drawing no. 123160-BUK-ZZ-00-DR-EN-00002 Revision P02

Print Version: Print Quality (300dpi @ A3)

Legend:

DUNDALK POTENTIAL STORAGE AREAS

DUNDALK HARD FLOOD DEFENCE

ALTERNATIVE LINE FOR NEW FLOOD DEFENCES

NEW FLOOD DEFENCES

UPGRADE EXISTING FLOOD DEFENCES

GREENWAY ROUTE OPTIONS

POTENTIAL GREENWAT ROUTE (OFF ROAD)

POTENTIAL GREENWAT ROUTE (OFF ROAD) ALTERNATIVE ROUTE

POTENTIAL GREENWAT ROUTE (ON ROAD)

POTENTIAL GREENWAT ROUTE (ON ROAD) ALTERNATIVE ROUTE

DUNDALK MAMMAL SURVEY DATA

BADGER, SETT

MAMMAL, BURROW

DUNDALK PRF SURVEY DATA

MODERATE

LOW/MODERATE

LOW

DUNDALK INVASIVE ALIEN SPECIES AND PLANTS SURVEY DATA

BUDDLEIA

CHERRY LAUREL

COTONEASTER

CROCOSMIA

WINTER HELIOTROPE

DUNDALK SALT MARSH SPARTINA

CM SALT MARSH

LS4 MUD SHORES

ECOLOGY

SPECIAL PROTECTION AREAS (SPA)

SPECIAL AREA OF CONSERVATION (SAC)

WFD RIVER WATERBODIES ACTIVE

GOOD

MODERATE

UNASSIGNED

WFD TRANSITIONAL WATERBODIES ACTIVE

POOR

UNASSIGNED

HERITAGE

NATIONAL MONUMENTS

BUILDINGS LISTED FOR NATIONAL INVENTORY ARCHITECTURAL HERITAGE

DUNDALK AND BLACKROCK ZONE OF ARCHAEOLOGICAL

Appendix B - Preliminary Ecological Scoping Report

Preliminary ecological scoping report
for a flood relief scheme
Dundalk to Blackrock, Co. Louth

Woodrow Sustainable Solutions
Upper offices,
Ballisodare centre,
Station road,
Ballisodare,
Co Sligo
Ireland

Tel: 0719140542
Email: info@woodrow.ie

April 2021

STATEMENT OF AUTHORITY

Field surveys were undertaken by a team from Woodrow Sustainable Solutions Ltd., including lead surveyor Juliane Kohlstruck (JK), who was supported by Philip Doddy (PD), Liam Bliss (LB) and Bridget Keehan (BK). Surveyors were responsible for compiling this report and undertaking the GIS mapping. This report has been reviewed by Mike Trewby.

Julie is a field ecologist with Woodrow. She has a BSc and MSc in Landscape Ecology, which she completed in 2020. A semester of the MSc was spent at NUI Galway where she studied models on European environmental legislation and its implementation in Irish law. Julie has carried out extensive vegetation and habitat surveys for research projects in Northern Germany, Central America and South America. In her current role at Woodrow, she is working on projects employing JNCC Phase 1, Fossitt and National Vegetation Classification (NVC) habitat classification survey techniques. In addition to her botanical identification skills, Julie has developed experience undertaking other ecological surveys including mammal, bat, amphibian and invertebrate surveys. Her abiotic skill set includes chemical analysis and pedological/ geological mapping of soil and chemical and morphological quality assessment of waterbodies. Julie is currently applying for membership of CIEEM (Chartered Institute of Ecology & Environmental Management).

Mike Trewby is Senior Ecologist with Woodrow and is the company's field work manager. He is an experienced ecologist with over 20 year's fieldwork and research experience. He is a full member of the CIEEM and conducts detailed, technical ecological assessments of projects including for wind farm and quarry developments, as well as for other large and smaller scale infrastructure and development projects, delivering ecological reporting to a high standard. He has developed his technical expertise in conducting faunal surveys to inform detailed impact assessment and compliance monitoring reports. As a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM), he employs a high degree of competence and professional standard in his approach to environmental assessment.

DOCUMENT CONTROL

Document	Preliminary ecological scoping report for a flood relief scheme, Dundalk to Blackrock, Co. Louth
Client	Binnies on behalf of Louth County Council
Prepared by	Woodrow Sustainable Solutions Ltd., Upper Offices, Ballisodare Centre, Ballisodare, Co Sligo, F91 PE04.
Report compiled by	Woodrow Sustainable Solutions Ltd.
Checked Internally	Mike Trewby (Senior Ecologist)
Client check	Reviewed by Emma Stevens
Status / Version / Date	Draft / D.01/ 19.04.2021

CONTENTS

1 OVERVIEW

Woodrow Sustainable Solutions Ltd (Woodrow) have been engaged by Binnies on behalf of their client Louth County Council to undertake an ecological scoping exercise for a flood relief scheme which encompasses a number of locations from Dundalk to Blackrock, Co. Louth. There are several elements to the proposed project including:

- upgrades to existing hard defences
- construction of new hard defences
- creation of areas for water/habitat
- public amenity features, including view points and upgrade/extension of existing trials to a create coastal greenway leading from north of Dundalk and south through Blackrock village

The aim of the scoping exercise is to identify ecological survey requirements, as well as to highlight obvious concerns and/or constraints at an early stage of project design. This will include identifying any constraints considered not to be mitigatable, that may require amendments to the proposed layout and will involve a high-level survey of habitat and protected mammal features at the proposed project locations, taking account of likely required buffers to avoid impacts on them (including working buffers for protected terrestrial mammals and felling buffers for bats etc).

Figure 1 and **Figure 2** provide maps showing the project location and proposed the features of the project.

A combination of desktop study and field visits were employed to determine the ecological constraints, with the outputs provided in this report including:

- Outline of likely connectivity to European and nationally important Sites
- Scoping report identifying any ecological constraints
- Likely survey and assessment requirements for site

The project area, including all elements were covered during four visits conducting over March 2021, utilising two to three surveyors.

A summary of emerging ecological constraints and survey requirements are provided in **Table 9**

1.1 Terminology used in this report

Project Area – refers to the lands which may be submitted as part of the planning application

Construction footprint – this is the area that will be directly impacted by the development and is often termed the works corridor

QI – Qualifying Interest – refers to species or habitats for which European Site (Natura 2000 Sites) as designated, including SACs – Special Areas of Conservation and SPAs – Special Protection Areas

PRF – Potential Roost Feature – refers to features such as knot holes in trees or cervices in masonry of buildings and bridge that have the potential to be utilised by roosting bats.

1.2 Desk-based study

The desk-based study involved compiling a list of existing biological for the project area and surrounding lands extending out to 2km. The following source were used:

- NPWS - National Parks & Wildlife Service: Data request for 10km square encompassing Dundalk and Blackrock [J00]; and surround 10km squares were also reviewed [H90, H91, J01, J10, J11, N99, O09]
- NBDC - National Biodiversity Data Centre - Biodiversity Maps: 2km report polygon report
- BCI – Bat Conservation Ireland: Data request
- BWI – BirdWatch Ireland: Data request for IWeBS data

Potential for connectivity between the project area and sites designated for nature conservation was investigated utilising the NPWS map viewer[1] and EPA map viewer[2]. For Ramsar sites, Natura 2000 sites (SPA and SAC) where ecological or hydrological connectivity was identified the potential for significant effects on Qualifying Interests (QIs) of those designated was then assessed.

1.3 Field survey methodologies

Field surveys were undertaken at the site on 15-Feb-2021 (JK, PD), 06-Mar-2021 (JK, PD, BK), 24-Mar-2021 (JK, LB, PD), 25-Mar-2021 (JK, LB). Field survey data was recorded using EcoLog (an ecological field data app developed by Woodrow), enabling ecological information and photographs to be georeferenced and subsequently incorporated into a Geographical Information System (GIS). Surveys undertaken included:

- Habitat mapping & identification of non-native plant species – a habitat survey of the development area was undertaken following Fossitt (2000) habitat classification system[3]. Any non-native species were recorded and potential locations requiring further summer (growing season) surveys were identified. In particular surveyors aim to search for signs of plant species listed on Schedule III Part I of S.I. No. 477/2011- European Communities (Birds and Natural Habitats) Regulations 2011 occurring within or adjacent to the site. This Act makes it an offence to plant, spread, or otherwise cause to grow any of the plant species listed in this Schedule (Department of Arts, Heritage and the Gaeltacht (2011).
- Aquatic surveys – preliminary salmonid habitat suitability survey were undertaken; however, fisheries information relies desk-based information.
- Invertebrate surveys – habitat suitability was assessed for potential to support protected invertebrate species, including: marsh fritillary, V*ertigo* species. No aquatic invertebrate surveys were undertaken and investigation of the occurrence of any notably sensitive species such freshwater crayfish or freshwater pearl mussels relies on the desk-based study.
- Amphibians – habitat suitability was assessed for common frog and smooth newt.

[1] National Parks & Wildlife Service: https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=8f7060450de3485fa1c1085536d477ba

[2] Environmental Protection Agency: https://gis.epa.ie/EPAMaps/Water

[3] Fossitt, J. A. (2000) A Guide to Habitats in Ireland. The Heritage Council

- Reptiles – habitat suitability was assessed for common lizard
- Birds – habitat suitability was assessed and a species list was compiled during the visit (winter visit). Maximum annual counts for IWeBS count section has been reproduced to provided indicative numbers wintering waterbirds occurring adjacent to the site.
- Mammals – protected mammal surveys focussing on badgers and otters were conducted within the lands identified for the project and extended the appropriated distances beyond the project area in some cases (badger 30m for badger and 150m for otter). These are field signs surveys using standard methodologies appropriate to different species (e.g. for badger, the field survey included a systematic searches of all fence lines, woodland and scrub habitats within 30m of the project area for evidence of badgers, such as setts, feeding signs, guard hairs, latrines, prints and paths). While coverage of the site was complete, check all suitable habitat for badgers was beyond the survey scope and results should be viewed as indicative.
- Bat potential roost features (PRFs) and an assessment commuting/foraging habitat was undertaken within the project area and an area extending 30m beyond. Assessment of roost and forging/commuting habitat followed those outlined in Collins (2016)[4]

[4] Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edition). The Bat Conservation Trust, London

Figure 1. Map showing flood defence infrastructure for Dundalk-Blackrock flood relief scheme

Figure 2. Map showing greenway feature for Dundalk-Blackrock flood relief scheme

2 SITES DESIGNATED FOR NATURE CONSERVATION

Table 1 provides a list of all the Natura 2000 sites within 15 km of the proposed flood relief scheme at Dundalk-Blackrock. The project area is partly located within and largely adjacent to the Dundalk Bay SPA and Dundalk Bay SAC. As indicated in **Table 1**, there are potential for direct impacts to QI species and habitats within the SPA and SAC. Any displacement effects on wintering waterbirds utilising the Dundalk Bay SPA as a result of the proposed project has the potential impact on population in other SPAs. For instance, brent geese and greylag geese displaced from the Dundalk Bay SPA could re-locate to the Carlingford Lough SPA (RoI & NI) and the Stabannan-Braganstown SPA respectively. Additional birds within these SPAs may compete for resources and have the potential to impact on the integrity of these Natura 2000 sites.

No other source-receptor pathways between Natura 2000 designated sites and the project area were identified.

Ramsar sites are wetlands considered to be of international importance and are designated under the Ramsar Convention (The Convention on Wetlands), which is an intergovernmental environmental treaty established by UNESCO in 1971 and in effect since 1975. There are two Ramsar sites within 15km of the project area, including Dundalk Bay and Carlingford Lough.

Dundalk Bay qualifies as a Ramsar site as it is internationally important for waterbirds, supporting over 20,000 wintering waterbirds and regularly holding > 1% thresholds for flyaway population of Northwest European/East Atlantic winter species of waterbirds, as listed in **Table 1** for the Dundalk Bay SPA. The extent of the Dundalk Bay Ramsar site encompasses both the Dundalk Bay SAC and SPA; and is described as "*an open sea bay with extensive saltmarshes, intertidal sand and mudflats encompassing the estuaries of the four rivers*".

The Carlingford Lough SPA in Northern Ireland is mirrored by a Ramsar site of the same name; and qualifies for Ramsar status by holding internationally important for wintering waterbirds (> 20,000 birds), and supports Internationally important number of wintering brent geese and breeding sandwich terns (as listed for in **Table 1** for the Carlingford Lough SPA). The site is described as having "*mudflats, saltmarsh, small rocks, and shingle islands on the border with Ireland*".

The potential for significant effects on the Dundalk Bay and Carlingford Lough Ramsar sites from development related activities, will be same as outline for the QIs of the Dundalk Bay SPA/SAC and the Carlingford Lough SPA (NI), respectively.

In terms of nationally important sites designated for nature conservation, there were no Natural Heritage Areas (NHAs) within 15km of the proposed project. As listed is **Table 2**, there are 13 proposed Natural Heritage Area (pNHAs) within 15 km of the project area, with potential source-receptor pathways already identified under the corresponding SAC and SPA for the Dundalk Bay pHNA; and corresponding SPAs for the Carlingford Lough pNHA and Stabannan-Braganstown pNHA. The Dunany Point pNHA, a site of largely geological interest, overlaps with the Dundalk Bay SPA; brent geese are noted as unitising both sites, therefore there is potential for impacts to the foraging resources for geese within pNHA if birds are displaced due to the project. No source-receptor pathways between other pNHAs and the project area were

identified. In Northern Ireland there were a further 13 ASSI and one Nature Reserve within 15km of the proposed project area. No source-receptor pathways were identified, with exception of the Carlingford Lough ASSI. As for the corresponding SPA, there is potential for brent geese, if displaced from Dundalk Bay due to the project, to impact on resource availability within Carlingford Lough.

Table 1. Potential connectivity and nature of potential impacts on all Natura 2000 sites within 15 km of the proposed development

Site name	Qualifying Interests (QIs)	Distance from site	Source-receptor linkage	Potential for significant effects and nature of potential impacts
Dundalk Bay SPA [004026]	• Great Crested Grebe (*Podiceps cristatus*) [A005] • Greylag Goose (*Anser anser*) [A043] • Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] • Shelduck (*Tadorna tadorna*) [A048] • Teal (*Anas crecca*) [A052] • Mallard (*Anas platyrhynchos*) [A053] • Pintail (*Anas acuta*) [A054] • Common Scoter (*Melanitta nigra*) [A065] • Red-breasted Merganser (*Mergus serrator*) [A069] • Oystercatcher (*Haematopus ostralegus*) [A130] • Ringed Plover (*Charadrius hiaticula*) [A137] • Golden Plover (*Pluvialis apricaria*) [A140] • Grey Plover (*Pluvialis squatarola*) [A141] • Lapwing (*Vanellus vanellus*) [A142] • Knot (*Calidris canutus*) [A143] • Dunlin (*Calidris alpina*) [A149] • Black-tailed Godwit (*Limosa limosa*) [A156] • Bar-tailed Godwit (*Limosa lapponica*) [A157] • Curlew (*Numenius arquata*) [A160] • Redshank (*Tringa totanus*) [A162] • Black-headed Gull (*Chroicocephalus ridibundus*) [A179] • Common Gull (*Larus canus*) [A182] • Herring Gull (*Larus argentatus*) [A184] • Wetland and Waterbirds [A999]	0km Proposed development site is partly within the SPA	Yes	*Construction phase* • Potential for disturbance to wintering waterbirds due to construction related activities occurring adjacent to the SPA. • Water pollution (hydrocarbons and sedimentation) due construction works has the potential to impact water quality which could affect the food availability for winter waterbirds. *Operational phase* • Disturbance to wintering birds due people utilising proposed greenway • Potential for alteration of coastal habitats utilised by wintering waterbirds as a result of changes in water levels and flooding regimes. Depending on the resultant wetting regimes and habitats potentially created there could be positive impacts on some waterbird species and negative for others.
Dundalk Bay SAC [000455]	• Estuaries [1130] • Mudflats and sandflats not covered by seawater at low tide [1140] • Perennial vegetation of stony banks [1220] • Salicornia and other annuals colonising mud & sand [1310] • Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] • Mediterranean salt meadows (Juncetalia maritimi) [1410]	0km Proposed development site is partly within the SAC	Yes	*Construction phase* • Potential for direct loss of protected coastal habitats • Water pollution (hydrocarbon and sediment) has the potential to impact QI habitats occurring downstream or adjacent to project area *Operational phase* • Potential for changes in water levels and flooding regimes that could impact on QI habitats, notably the effect of coastal squeeze on salt marsh habitats 'trapped' between hard coastal defences and rising sea levels. • Depending on the resultant wetting regimes and habitats potentially created there could be positive impacts on some habitats, e.g. tidal inundation may allow for the creation of more salt marsh.

Site name	Qualifying Interests (QIs)	Distance from site	Source-receptor linkage	Potential for significant effects and nature of potential impacts
Carlingford Lough SPA [004078]	• Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] • Wetland and Waterbirds [A999]	*c.* 11.1km	Yes	There maybe inchange of wintering brent geese between Carlingford Lough SPA and the project area (Dundalk Bay SPA). Birds potentially displaced from the Project Area by construction and operational activities could re-locate to the Carlingford Lough SPA, which could place extra pressure on foraging resources
Stabannan-Braganstown SPA [004091]	• Greylag Goose (*Anser anser*) [A043]	*c.* 7.2km	Yes	There maybe inchange of wintering greylag geese between Stabannan-Braganstown SPA and the project area (Dundalk Bay SPA). Birds potentially displaced from the Project Area by construction and operational activities could re-locate to the Stabannan-Braganstown SPA, which could place extra pressure on foraging resources
Carlingford Mountain SAC [000453]	• Northern Atlantic wet heaths with Erica tetralix [4010] • European dry heaths [4030] • Alpine and Boreal heaths [4060] • Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230] • Blanket bogs (* if active bog) [7130] • Transition mires and quaking bogs [7140] • Alkaline fens [7230] • Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) [8110] • Calcareous rocky slopes with chasmophytic vegetation [8210] • Siliceous rocky slopes with chasmophytic vegetation [8220]	*c.* 2.9km	No	NONE The Carlingford Mountain SAC is linked hydrologically with the Project Area as the tributaries of the Ballymacscanlan River (Flurry R.) flow off the hills and into Ballymacscanlan estuary, north of Dundalk. However, given that the SAC is upstream of the Project Area, there is no potential for the proposed project to impact on any of the QI habitats for the Carlingford Mountain SAC.
Carlingford Shore SAC [002306]	• Annual vegetation of drift lines [1210] • Perennial vegetation of stony banks [1220]	*c*. 13.8km	No	NONE
Natura 2000 sites in Northern Ireland				
Carlingford Lough SPA [UK9020161]	• Light-bellied Brent Geese (*Branta bemicla hrota*) [A046] • Breeding Sandwich Tern (*Stema sandvicensis*) • Breeding Common Tern (*Sterna hirundo*) • Wetland and Waterbirds [A999]	*c*. 14.1km	Yes	There maybe inchange of wintering brent geese between Carlingford Lough SPA and the project area (Dundalk Bay SPA). Birds potentially displaced from the Project Area by construction and operational activities could re-locate to the Carlingford Lough SPA, which could place extra pressure on foraging resources
Slieve Gullion SAC [UK0030277]	• European dry heaths [4030]	*c*. 8.5km	No	NONE
Rostrevor Wood SAC [UK0030277]	• Old sessile oak woods with Ilex and Blechnum in the British Isles	*c*. 13.5km	No	NONE
Derryleckagh SAC [UK0016620]	• Transition mires and quaking bogs • Old sessile oak woods with Ilex and Blechnum in the British Isle	*c*. 14.0km	No	NONE

Table 2. Nationally Protected Sites in RoI (NHAs, pNHAs) and NI (NR, ASSI) within 15km of the proposed development.

Site name	Features of Conservation Interest	Distance from site	Source-receptor linkage	Potential for significant effects and nature of potential impacts
Dundalk Bay pNHA [000455]	• See info for Dundalk Bay SAC	Within	Yes	See details for Dundalk Bay SAC
Stabannan-Braganstown pNHA [000456]	• See info for Stabannan-Braganstown SPA	*c*. 7.2km	Yes	See details for Stabannan-Braganstown SPA
Dunany Point pNHA [001856]	• Geological interest, with examples of coastal habitats, with the occurrence of light-belied brent geese noted	*c*. 13km	Yes	Partly in Dundalk Bay SPA & disturbance due to project related activities could impact brent geese distribution in the area
Carlingford Lough pNHA [000452]	• See info for Carlingford Lough SPA (RoI) – wintering waterbirds	*c*. 11.1km	Yes	As for SPA – displaced waterbirds potentially adding to pressure on resources
Carlingford Mountain pNHA [000453]	• See info for Carlingford Mountain SAC	*c*. 3.4km	No	NONE
Trumpet Hill (Louth) pNHA [001468]	• Semi-natural mixed deciduous woodland • Rocky outcrops	*c*. 2.4km	No	NONE
Woodland at Omeath Park pNHA [001465]	• Wet, semi-natural deciduous woodland	*c*. 9.4km	No	NONE
Drumcah, Toprass and Cortial Loughs pNHA [001462]	• Freshwater lakes with marshland	*c*. 1.7km	No	NONE
Darver Castle Woods pNHA [001461]	• Mixed wet deciduous woodland • Diverse orchid understory	*c*. 6.4km	No	NONE
Stephenstown Pond pNHA [001803]	• Open water body (artificial)	*c*. 4.9km	No	NONE
Ravensdale Plantation pNHA [001805]	• Conifer woodland and broadleaved woodland	*c*. 4.3km	No	NONE
Liscarragh Marsh pNHA [001451]	• Freshwater lake and marsh	*c*. 11km	No	NONE
Louth Hall & Ardee Wood pNHA [001616]	• Two woodland sites	*c*. 12.0km *c*. 13.5km	No	NONE
Northern Ireland: Nature Reserves & ASSI - Areas of Special Scientific Interest				
Rostrevor Forest [NR5]	• Oak woodland	*c*. 13.5km	No	NONE
Rostrevor Forest ASSI[ASSI178]	• Oak woodland	*c*. 13.5km	No	NONE
Carrickastickan ASSI [ASSI215]	• Semi-natural grassland and lowland meadow	*c*. 4.5km	No	NONE
Slieve Gullion ASSI [ASSI198	• Dry heath and fen complex	*c*. 8.9km	No	NONE
Cloghinny ASSI [ASSI293]	• Geological interest	*c*. 7.8km	No	NONE
Glendesha ASSI [ASSI292]	• Geological interest	*c*. 9.1km	No	NONE
Clermont & Anglesey Mountain [ASSI409]	• Heathland	*c*. 7.1km	No	NONE
Mullaghbane ASSI [ASSI291]	• Geological interest	*c*. 9.3km	No	NONE
Loughaveely ASSI [ASSI206]	• Wetland complex of standing water, swamp, fen, cutover bog, neutral grassland and scrub	*c*. 8.0km	No	NONE

Site name	Features of Conservation Interest	Distance from site	Source-receptor linkage	Potential for significant effects and nature of potential impacts
Lurgan Lough ASSI [ASSI204]	• Fens • Eutrophic standing waters	*c*. 9.0km	No	NONE
Carlingford Lough ASSI [ASSI103]	• See info for Carlingford Lough SPA (NI) - wintering waterbirds & breeding terns	*c*. 10.0km	Yes	As for SPA – displaced waterbirds potentially adding to pressure on resources
Cashel Loughs ASSI [ASSI189]	• Fens (invertebrate community)	*c*. 10.9km	No	NONE
Levallymore ASSI [ASSI214]	• Lowland meadow	*c*. 13.0km	No	NONE
Cam Lough [ASSI231]	• Mesotrophic lake	*c*. 13.0km	No – upstream hydological connection via Flurry River	NONE

3 SURVEY RESULTS

For each of the project features, the survey results are detailed in the following tables. **Table 3** provides habitat information on the occurrence of habitat types (Fossitt, 2000), including any non-native species recorded. **Table 4** provides information on the occurrence of faunal features.

3.1 Habitats

3.1.1 Potential constraints

Site visits were undertaken on 15-Feb-2021, 06-Mar-2021, 24-Mar-2021, 25-Mar-2021. While habitat surveys for preliminary ecological appraisals can be undertaken year-round, the optimal season is April – September. As a result, follow-up botanical survey will be required in certain areas.

The site visits were undertaken in early spring, before most plants were in leaf and/or easy to identify. Hence, it is recommended that more detailed habitat survey work is undertaken during the growing season. Surveys should target the edge of the salt marsh to assess the presence of Annex I habitats that could be present within the works corridor. Optimal survey periods for salt marsh are between May and October (JNCC, 2014).

The urban setting of this project combined with river corridors means there is a heightened risk of unintentional spreading of any non-native species occurring in the area. During the site visit there was no evidence of any Third Schedule invasive species. However, surveys conducted out of the growing season have the potential to miss certain annual or biannual species that have foliage that dies off during the winter, e.g Japanese knotweed (*Fallopia japonica*) or Himalayan balsam (*Impatiens glandulifera*).

The desk-based study did not pick up any records of Third Schedule species within 2km of the project area, however several species occur in the vicinity - see **Table 6**. During the scoping surveys several non-native tree species with lower risk impacts were recorded including sycamore (medium risk) and beech (naturalised – non-native). Of most concern during construction works is the occurrence of winter heliotrope, buddleia and crocosmia (montbretia) within the project area. These species spread rapidly on bare ground created during construction and could have a negative impact on habitat, particularly Annex I coastal habitats. Cord grass (*Spartina)* in a non-native that occurs widely within the saltmarsh and care should be taken not to move infected sward to other parts of the site during construction to avoid spread this species.

3.1.2 Survey requirements

- Invasive species surveys need to be undertaken during the growing season and should focus on the urban sections of the drains/streams in the project area. In particular locations where construction works will involve excavation and there is an increased risk of spreading non-native species.
- More detailed habitat survey work should be undertaken during the growing season along the coast which supports salt marsh to assess the presence and quality of Annex I habitats that could be present.
- It is recommended that consultation with National Park and Wildlife Service (NPWS) is sort to determine what level of construction and operational activities are considered appropriate along this stretch of coast line, especially within salt marsh habitats. This will also highlight survey requirements.


N
Dundalk
Non-native/invasive Species
Buddleia
Cherry laurel
Cotoneaster
Crocosmia
Petasites hybridus
Rosa rugosa
Winter heliotrope
Areas Containing Spartina
CM1_Lower_Salt_Marsh
CM_Salt_Marsh
LS4_Mud_Shores
Defense type
New
New - alternative
Upgrade existing
Dundalk_passive_flow_control
Dundalk_Areas_for_potential_habitat_creation
0 0.5 1 2
Km
woodrow

3.2 Aquatic Species

3.2.1 Potential constraints

Several protected aquatic species known to occur in the project area have the potential to be impacted by the project including: lamprey species, salmon and otter. The river flowing through the project area are also known to support brown trout, sea trout and eels. The WFD catchment encompassing the project area is not reported as supporting freshwater pearl mussel and there are only a small number of white-clawed crayfish records from the upper catchment, beyond the Zone of Influence for the project.

In terms of water quality and disturbance, the main risks are considered to be during construction phase of the project. It is anticipated that appropriate mitigation measures can be implemented as part of a construction management plan to ensure avoidance of any adverse impacts and that there will be no significant effects on either downstream water quality or habitat disturbance for these species.

In terms of habitat modification, the main risk is considered to be during the operational phase of the project as water flow and riparian habitats may be modified due to changes in water levels and/or flow. However, it is considered that with appropriate pre-construction surveys and mitigation measures, any residual effects on these species will be negligible.

3.2.2 Survey requirements

- A macro-invertebrate survey indicating the Q value and associated chemical rating of streams within and draining the site in order to form an appropriate baseline.
- An ecological assessment of the streams/rivers within and draining the site (notability with respect to Salmonid suitability and possibly lamprey spawning beds).
- Further consultation with IFI – Inland Fisheries Ireland –to discuss habitat improvement works to mitigate against further habitat deterioration for aquatic species.

3.3 Invertebrates

3.3.1 Potential constraints

Table 5 provides a list of existing records for protected invertebrates within the project area and shows that occurrence is limited. As mentioned in the section covering aquatic species freshwater pearl mussel and white-clawed crayfish are not known to occur in catchment area. Likewise, other invertebrate species likely to result in significant constraints for proposed developments include species of *Vertigo* snails, the marsh fritillary butterfly and the kerry slug. None of these species are known to occur within the Zone of Influence of the proposed development.

Of these species it is possible that marsh fritillary could occur in the project area. These butterflies are the only insect species occurring in Ireland that is listed on Annex II of the Habitats Directive, which requires EU member states to designate SACs to protect this species and monitor the status of the national population. There are no designated sites near the project area with marsh fritillary is listed as a QI. The occurrence of this species is largely restricted to locations where the larval foodplant devil's-bit scabious (*Succisa pratensis*) occurs. Areas of wet grassland is the project area have the potential to support devil's-bit scabious, however it was considered unlikely that the plant occurs at densities sufficient to support a marsh fritillary colony.

3.3.2 Survey requirements

- All wet grassland (GS4) and riparian zones which will be directly impacted by construction and/or operational activities will be surveyed for habitat suitability for *Vertigo* species.

- During summer site walkovers the occurrence of any significant stands of devil's bit scabious will be noted. If these areas are earmarked for construction works or re-wetting, they should be surveyed for marsh fritillary webs in September.

3.4 Amphibians and reptile

3.4.1 Potential constraints

Common frogs are protected throughout their European range under the Habitats Directive and the Project Area would be considered likely to support a relatively healthy population, especially within the pools and drains within the area. In the absence of mitigation direct impacts on common frog are likely to occur during construction phase, including direct mortality during vegetation clearance and excavation works, and dewatering of waterbodies (including temporary waterbodies) holding frog spawn. To minimise any significant impacts upon the local frog population, it is recommended that this species is included within the proposed mitigation measure for the Application Site, including pre-construction visits during the spawning season to isolate any breeding sites from construction activities.

While there were no records for smooth newts generated by the desk-based study within the project area, they can be under recorded. It is considered likely there is potential for this species occur; if the right conditions were available which is typically ponds that are fish free and support some vegetation for laying eggs on. Potentially suitable ponds or pools were considered limited within the project area. In addition, smooth newts cannot tolerate the saline environments offered by tidal pools even within upper salt marsh where rain water has a dilution effect.

For common lizards there no current records of the species occurring within the project area and the closest records are from the Carlingford Mountains. The habitat suitability assessment did not find any significant expanses of habitats or areas capable of supporting lizards and this species was considered unlikely to occur in the project area.

3.4.2 Survey requirements

- No specific frog surveys are considered as a requirement; however, frogs will be recorded when observed during other surveys, with particular attention given to breeding sites supporting frog spawn.
- If during course of ecological surveys suitable pools/ ponds for newts are identified these will require night time lamp surveys to determine occupancy by newts. However, if the pool/ pond is sufficiently removed from the proposed construction corridor surveys will not be required. Project design should aim to avoid pond habitats.

3.5 Avi-Fauna

3.5.1 Potential constraints

The desk-top study, see bird species listed in **Table 5**, shows occurrence of waterbirds in the surrounding project area. The project area occurs within and adjacent to the Dundalk Bay SPA which is designated for range of waterbird species.

In terms of breeding waders salt marshes can offer nesting opportunities for lapwing, redshank, curlew and snipe. However, grazing across the salt marsh was noted as being relatively tight which will limit cover for ground nesting birds. Curlew may have historically nested in this area; however, any historic sites are likely to have become abandoned in recent years, as the Irish curlew population has undergone catastrophic declines. Likewise, any redshank breeding records are likely to be historic. If the areas adjacent to the coast and along the flood plain remain wet of the summer it possible that breeding snipe may occur. Areas with

woodland and scrub often support breeding woodcock and it is likely that this species breeds and winters in the area.

In terms of general breeding bird assemblages at the hard defences; the treelines, hedgerows and scrub would be likely to support more common and widespread woodland and scrub nesting species like robin, blackbird, wren, tit species and willow warbler. Certain types of hedging are known to favoured by certain species, for instance goldcrest often utilise leylandii. Construction works during the breeding season could potentially result in direct impact on birds nesting in scrub and trees. Some areas where grassland management is less intensive, e.g. upper saltmarsh may support ground nesting passerines including meadow pipits and skylarks. Yellowhammer are species listed as occurring within 2km of the project area; however, dominance of grassland habitat means this species may not occur in high densities; as breeding yellowhammer are typically associated with cereal production.

In terms of habitat availability for riverine species, rivers, streams and ditches were assessed as offering limited nesting habitat for kingfishers or sand martin, which typically require vertical sandy banks for excavation of nesting holes. Man-made structures offer ample nesting opportunities for dippers and grey wagtails and these species tend to prefer areas with rapids and exposed rock; which at least over the survey period were not widely available. Likewise, habitat availability for common sandpipers was limited and this species requires gravel banks and islands for breeding. Sedge warblers, little grebes, coots, moorhens and water rails are species typically associated with nesting habitat in emergent vegetation along rivers and drains. The relatively narrow extent of this type of cover is likely to limit the breeding densities for these species.

Inappropriately timed construction works have the potential to directly impact on breeding birds and ideally works should be timed to avoid sensitive periods, i.e. the breeding season (1st March to 31st August).

This project may involve re-wetting of areas, which is likely to attract waterbirds into the area. Therefore, baseline surveys to demonstrate the potential positive impact will be important.

3.5.2 Survey requirements

- Winter waterbird surveys should be undertaken to inform project design and determine where birds are distributed in relation to the project area. It is recommended that bi-monthly surveys are undertaken. As well as counting birds, locations are mapped over the count period. Surveys should target a range of tidal states and should aim to collect information on roosts, including species composition and numbers.
- It is recommended that breeding bird surveys area are conducted for areas where construction works will be occurring or where habitat alteration is proposed. Surveys will provide a baseline and identify any constraints, i.e. nesting birds.
- Breeding bird surveys should be undertaken following common bird census (CBS) methodology, as described in Gilbert *et al*. (1998)[5] - summarising Marchant (1983)[6] and Marchant *et al*. (1990)[7]. This approach, which employs territory mapping, is appropriate where there is a requirement to map the distribution of breeding birds across an entire site. Strict application of CBS methodology, which is undertaken for long-term population monitoring and high levels of accuracy in mapping breeding distribution, requires a minimum of 10 visits between March and July, conducted at intervals of at least 10 days apart. This level of detail is not required for this project and two to three visits will suffice. Sections of stream/drains and hedgerows will be the core focus habitats for the breeding bird surveys.

[5] Gilbert, G., Gibbions, D.W. & Evans, J. (1998). *Bird Monitoring Methods*. RSBP
[6] Marchant, J.H. (1983). *BTO Common Bird Census Instructions*. BTO, Tring
[7] Marchant, J.H., Hudson, R., Carter, S.P. & Whittington, P. (1990). *Population Trends in British Breeding Birds*. BTO, Tring.

- Surveys can commence from sunrise and are undertaken over the early morning period for a duration of up to four hours. It is advised that surveyors avoid the hour before sunrise (i.e. the dawn to sunrise period). It is also suggested that incorporating up to two evening visits can be useful for more accurately mapping the occurrence of certain species, e.g. grasshopper warblers and snipe that tend to be more vocal at dusk. Surveys should not be undertaken in unfavourable weather conditions, specifically moderate to strong winds (greater than Beaufort F5), persistent rain and/or in poor visibility.
- The whole site is covered at a slow pace in a single visit and the route adopted should take surveyors within 50 m of all parts of the site, with this interval decreasing on a discretionary basis for areas where closer inspections may be required, e.g. dense scrub. All hedgerows should be walked. The direction of the survey route should be varied between visits to remove any bias in timings of coverage.
- Surveyors identify and record the activity of birds on a map of the site. At the end of the season the maps for the series of visits are analysed together. This highlights concentrations or clusters in breeding activity for species and a picture emerges showing the location of breeding territories across the site. On this basis the number of territories for each species within the site can be reported.
- In addition, it is recommended that lowland breeding wader surveys are undertaken in area targeted for re-wetting. The appropriate methodology is detailed in Gilbert *et al*. (1998) and follows O'Brien & Smith (1992)[8]. These surveys should incorporate a dawn/dusk survey element to for breeding snipe (this species tends to be most active around these times).

3.6 Mammals

3.6.1 Potential constraints

Given the range of habitats available in the project area, it is considered that hedgehog, Irish mountain hare, stoat, badger, otters, foxes, red squirrel and possibly pine marten have the potential to occur. There is a requirement for proposed developments to identify the resting places of badgers (setts) and otters (holts) to ensure that appropriate mitigation measures are implemented to avoid disturbance to these species. During the site visits several badger setts were identified and some unassigned burrows could have been otter holts. Burrowing activity was concentrated on embankments. Both badger scats and otter spraints were recorded.

No red squirrel or pine marten signs were detected during scooping surveys. Probably due to the limited availability of woodland with the project area.

Lundy *et al* (2017)[9] provide a habitat suitability index for Irish bats at the landscape scale. There are five categories ranging from low to high suitability. Based on this classification system the project area is classed as:

- *Moderate-low* for Nathusius' pipistrelle
- *Moderate* for Daubenton's bat, whiskered bat
- *Moderate-high* for brown long-eared bat
- *High for* soprano pipistrelle, common pipistrelle, Leisler's bat, natterer's bat

[8] O'Brien, M.G. & Smith, K.W. (1992). Changes in the status of waders breeding on wet lowland grasslands in England and Wales between 1982 and 1989. *Bird Study* 89: 165-176

[9] Lundy, M.G., Aughney, T., Montgomery, W.I., & Roche, N., (2011*) Landscape conservation for Irish bats & species specific roosting characteristics*. Bat Conservation Ireland.

The onsite preliminary assessment of habitat suitability for bats considered that the project area is a lowland site in an urban to sub-urban setting. Connectivity to the wider landscape is provide by a network of hedgerows and the stream/drains are potential foraging features, especially for *Myotis* species. The urban environment, in particular light pollution can have a negative impact on bats, with some light sensitive species being displaced and other being attracted to the increased insect activity around lights. Buildings and other man-made structures can provide roost features for bats, and for example within the project area several old houses were assessed as providing roof spaces and crevices for roosting bats. The predominately, open nature of the landscape, i.e. limited occurrence of woodland is likely to favour pipistrelles and Leisler's bats over species like brown long-eared bats that typically favour more cluttered environments.

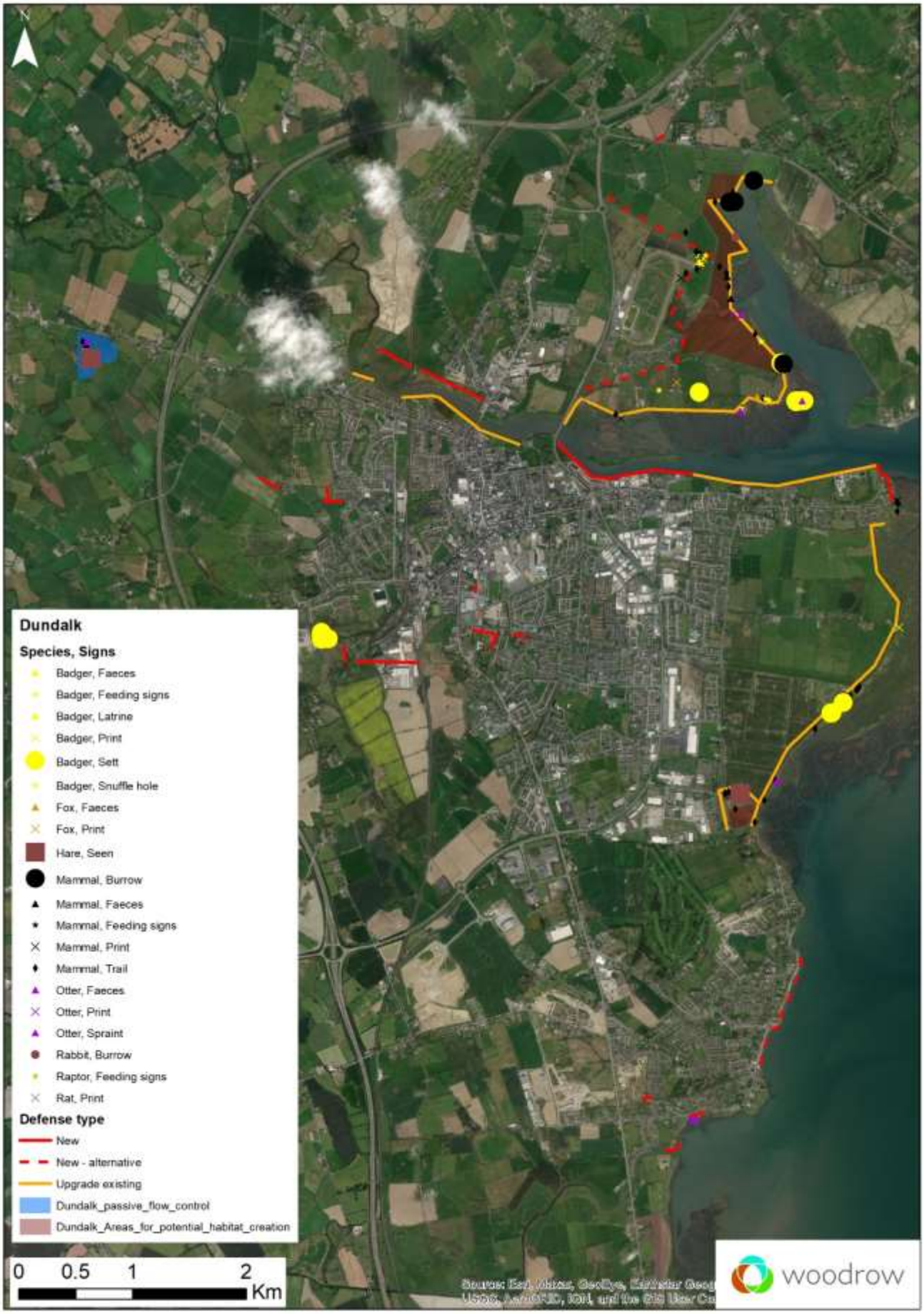
Preliminary assessment of habitat suitability for bats identified a number of potential roost features (PRFs) mostly potential tree roosts with PRFs ranging from low to moderate suitability. An assessment of foraging foraging/commuting features available for bats ranged in suitability from moderate to high. Lighting and breaks in connectivity were noted as negative features. The BCI data request returned a single record of a known natterer's bats roost adjacent to the project area.

3.6.2 Survey requirements.

- Comprehensive otter survey along the embankments within the project area to identify all holts (including natal holts), couches, slides, paths and spraint locations. Trip cameras should be employed to aid survey work and the survey will extend to suitable habitat within 150m of the project area (specifically for areas judged to be potentially impacted by the project). Trip cams should be employed at the holts already identified to determine activity levels. These surveys should be targeted at providing information on otter usage of the area and distribution in relation to the proposed greenway. The preliminary ecological surveys have identified the core target for otter surveys as Greenway sections: GW1, GW2 and GW8. In addition, the woodland adjacent to FD1 should be checked for holts and FD2 should also be covered again, as not all sections could be accessed during preliminary surveys.
- Several badger setts were located along the embankments proposed as part of the Greenway (and as noted above some of the burrows identified may have been otter holts). It is recommended that selected sections of the Greenway are targeted for additional mammal surveys to ensure comprehensive coverage a 30-50m buffer (depending on the scope of the construction works proposed). As for the targeted otter surveys, general mammal walkover surveys should cover the following sections of the proposed Greenway including GW1 (FD3), GW2 and GW8 (FD7). Flood defences FD1 and FD2 will also be covered during otter surveys.
- It is considered that for some of the hard defences, walkover inspections conducted during the scoping exercise are sufficient to determine levels of mammal activity and no badger or otter resting places were identified. This includes for Flood Defences 4, 5, 6, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 where badger setts/otter holts were not identified. Note: The badger setts located adjacent to FD23 were considered sufficiently removed from the proposed works (i.e. > 30m); so as no to be impacted. No further surveys are required at the locations listed above and the current assessment will be valid for 12 months. Should project timelines extend beyond this period, then the areas should be re-checked to ensure that there is no new protect mammal activity in these areas.
- Any work requiring tree or building removal has the potential to directly impact on roosting bats, with works such as tree removal or construction activities, including use of lighting adjacent to a bat roost can indirectly lead to impacts on roosting bats. As a first line of mitigation avoidance should be employed, i.e. retain the feature and implement appropriate exclusion zone buffers (typically up to 30m depending on the scale of the works being conducted). If removal cannot be avoided, then features in areas were works

are scheduled will require roost surveys (emergence/re-entry surveys roost and/or inspections) to determine occupation, species, number of bats and type of roost (hibernation, maternity, mating, transitional). This will identify the most appropriate season for timing of works when roosts are not occupied. Removal of a roost feature requires a mitigation plan and loss must be compensated for by the provision of appropriately designed and setup replacement roosts.

- It may be useful to undertake a baseline bat survey; and this would include deploying several units that record bat activity and undertaking one or two bat transects along the length of the scheme. This information can be useful in the development of lighting and planting schemes to enhance the area for bats.


Dundalk
Species, Signs
Badger, Faeces
Badger, Feeding signs
Badger, Latrine
Badger, Print
Badger, Sett
Badger, Snuffle hole
Fox, Faeces
Fox, Print
Hare, Seen
Mammal, Burrow
Mammal, Faeces
Mammal, Feeding signs
Mammal, Print
Mammal, Trail
Otter, Faeces
Otter, Print
Otter, Spraint
Rabbit, Burrow
Raptor, Feeding signs
Rat, Print
Defense type
New
New - alternative
Upgrade existing
Dundalk_passive_flow_control
Dundalk_Areas_for_potential_habitat_creation
0 0.5 1 2
Km
woodrow


Dundalk
Roost Potential
High
Moderate/High
Moderate
Low/Moderate
Low
Defense type
New
New - alternative
Upgrade existing
Dundalk_passive_flow_control
Dundalk_Areas_for_potential_habitat_creation
0 0.5 1 2
Km

Table 3. Habitat types occurring in the project area

Project feature code(s) **FD** = flood defence **GW** = greenway	**Survey effort**	**Natura 2000 sites**	**Habitat types Fossitt (2000) codes**	**Potential EU Annex I habitats**	**Non-native species**	**Habitat constraints, issues & comments**
North Area - Ballymascanlan estuary						
FD1	Full habitat survey - partly covered for mammal	Hydrologically linked to Dundalk Bay SAC & SPA	BC1, FW1, FW2, WL2	Nil	Beech	Adjacent watercourse with connectivity to SAC
FD2	Partly covered	Hydrologically linked to Dundalk Bay SAC & SPA, with section in SAC	BL2(embankment), BL3, FS1, FW1, FW2, GA1, CS3, WD4, WL1,	Nil	Conifer plantation (mostly larch)	Adjacent watercourse with connectivity to SAC
Northern habitat creation area	Partly covered	Within Dundalk Bay SAC & SPA	BL2(embankment), CM1/2, CW2, FS1, FW1, FW2, GA1, CS3, WD4, WL1, WL2, WS1	Atlantic salt meadows	None recorded	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
FD3 - existing embankment/ GW1 - alternative, along coast	Full habitat survey - partly covered for mammal	Within Dundalk Bay SAC & SPA	BL2(embankment), CM1/2, CW2, FS1, FW1, FW2, GA1, GS3, LS4, WL1, WS1	Atlantic salt meadows Mudflats & sandflats	None recorded	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
GW2 - along dismantled railway	Full habitat survey - partly covered for mammal	Partly within Dundalk Bay SAC & SPA	BL2(embankment), CM1/2, CW2, ED3, FW1, FW2, GA1, CS3, WL1, WS1	Atlantic salt meadows	Winter heliotrope	Majority of trail upgrade would be removed from potentially sensitive habitats along coast
West of Castletown Bridge, along Castletown River						
FD13	Full habitat survey - partly covered for mammal	Hydrologically linked to Dundalk Bay SAC & SPA	GA1, GS4, WL1	Nil	None recorded	Hydrologically linked to Dundalk Bay SPA and SAC
FD14	Full habitat survey - partly covered for mammal	Hydrologically linked to Dundalk Bay SAC & SPA	CW2, FW4, GS2, GS4, WL1, WL2, WS1	Nil	None recorded	Adjacent to Dundalk Bay SPA, hydrologically linked to Dundalk Bay SAC
FD15	Full habitat survey - partly covered for mammal	Hydrologically linked to Dundalk Bay SAC & SPA	FS1, GA1, GA2, WL1, WS1	Nil	None recorded	Hydrologically linked to Dundalk Bay SPA and SAC
FD16	Full habitat survey - partly covered for mammal	Directly adjacent to Dundalk Bay SPA and hydrologically linked to Dundalk Bay SAC	BL1, CM2, CW2, FS1, GA2, GS2, WD5, WL1, WL2, WS1,	Atlantic salt meadows	Buddleia	Adjacent to Dundalk Bay SPA, hydrologically linked to Dundalk Bay SAC
Western - Passive flow control area						
Western - Passive flow control area	Full habitat survey - partly covered for mammal	Hydrologically linked to Dundalk Bay SAC & SPA	FS1, FW2, FW4, GA1, GS4, WL2, WS1	Nil	None recorded	Watercourse with connectivity to SAC
Dundalk - South harbour/estuary						
FD4 - Sean O'Mahonys GAA Club - Eastern By-pass Bridge	Partly walked and viewed from adjacent road/track	Within or directly adjacent to Dundalk Bay SPA and SAC	CM, GA2, GS2, MW4, WD1, WL1, WL2, WS1	Estuaries	Spartina	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
FD5 - Sewage Work's - Sean O'Mahonys GAA Club	Full walkover survey	Within or directly adjacent to Dundalk Bay SPA and SAC	CC1, GA2, GS2, MW4, WS1	Nil	None recorded	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
FD6 - Soldier Point	Full walkover survey	Within or directly adjacent to Dundalk Bay SPA and SAC	CC1, CM1, GA2	Atlantic salt meadows	Spartina	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
GW3: Sean O'Mahonys GAA Club - Eastern By-pass Bridge - via road	Walked/driven	Hydrologically linked to Dundalk Bay SAC & SPA	GA2, WS1	Nil	None recorded	Avoids direct impacts to SAC/SPA
GW4: Sean O'Mahonys GAA Club - Eastern By-pass Bridge	Partly walked and viewed from adjacent road/track	Within or directly adjacent to Dundalk Bay SPA and SAC	CM, CW2 GA1, GA2, GS2, MW4, WD1, WL1, WL2, WS1	Estuaries	Spartina	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
GW5: Sewage Work's - Sean O'Mahonys GAA Club	Full walkover survey	Within or directly adjacent to Dundalk Bay SPA and SAC	CC1, GA2, GS2, MW4, WS1	Estuaries	None recorded	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
GW6: Soldier Point-Blackwater River - via road	Driven/walked	Hydrologically linked to Dundalk Bay SAC & SPA	CW2, GA2	Nil	Rosa rugosa	Avoids direct impacts to SAC/SPA
GW7: Soldier Point-Blackwater River - via coast	Full walkover survey	Within or directly adjacent to Dundalk Bay SPA and SAC	CM1, CW2, GA2	Atlantic salt meadows (	Spartina, Buddleia	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
Dundalk east coast						

Project feature code(s) **FD** = flood defence **GW** = greenway	Survey effort	Natura 2000 sites	Habitat types Fossitt (2000) codes	Potential EU Annex I habitats	Non-native species	Habitat constraints, issues & comments
FD7	Full walkover survey	Boundary of Dundalk Bay SPA and SAC	BC1, BL2, CW2, CM1/2, FW4, GA1, WL1, WL2, WS1	Atlantic salt meadows	Spartina	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
FD8	Full walkover survey	Boundary of Dundalk Bay SPA and SAC	BC1, BL2, CM2, GA1, GS2, WL2	Atlantic salt meadows	None recorded	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats - will for barrier for salt marsh
GW8	Full walkover - landward side of embankment less comprehensively covered	Boundary of Dundalk Bay SPA and SAC	BC1, BL2, CW2, CM1/2, FW4, GA1, WL1, WL2, WS1	Atlantic salt meadows	Spartina	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
GW9	Full walkover survey	Boundary of Dundalk Bay SPA and SAC	BC1, BL2, CM2, GA1, GS2, WL2	Atlantic salt meadows	Cherry laurel	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
Southern habitat creation area	Partly walked and viewed from adjacent road/track	Within or directly adjacent to Dundalk Bay SPA and SAC	BC1, BL2, CM2, GA1, GS2, WL2	Atlantic salt meadows	None recorded	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
Blackrock						
FD9	Full walkover survey	Within Dundalk Bay SAC and SPA	BL1, CB1, CC1, CM2, GA2, GS2, LR2, LS2, SR2, WS1	Atlantic salt meadows Mudflats and Sandflats	Winter heliotrope, Petasites hybridus	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
FD10	Full walkover survey	Within Dundalk Bay SAC and SPA	CM, FS1, GA2, GS2	Atlantic salt meadows Mudflats and Sandflats	Winter heliotrope, Spartina, Crocosmia	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
FD11	Full walkover survey	Hydrologically linked to Dundalk Bay SAC & SPA	ED3, FS1, FW2, GA1, GA2, WS1	Nil	Cherry laurel	Hydrologically linked to Dundalk Bay SPA and SAC
FD12	Full walkover survey	Within Dundalk Bay SAC and SPA	CM2, CW2, GA2, WS1	Atlantic salt meadows	None recorded	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
GW10 - short section along road to coast	Full walkover survey	Hydrologically linked to Dundalk Bay SAC & SPA	CM2, GA1, GS2, WL1	Atlantic salt meadows	None recorded	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
GW11 - on road R172	Full walkover/windscreen survey	Within or directly adjacent to Dundalk Bay SPA and SAC	BL1, CB1, CC1, CM1/2, FS1, FW2, GA1, GA2, GS2, LR2, LS2, LS4, SR2, WL1, WL2, WS1	Atlantic salt meadows Mudflats and Sandflats	Winter heliotrope, Petasites hybridus, Spartina, Crocosmia	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
GW12 - alternative along coast	Full walkover survey	Within or directly adjacent to Dundalk Bay SPA and SAC	CM2, CW2, FS1, GA1, GA2, GS2, LS4, WL1, WS1	Atlantic salt meadows	Winter heliotrope, Spartina, Crocosmia	Within/adjacent to SAC - potential for impacts on salt marsh/ coastal habitats
Dundalk north-west						
FD17	Full walkover survey	Hydrologically linked to Dundalk Bay SAC & SPA - via underground drain	BC3, GA1, GA2, WL1, WS1	Nil	None recorded	Watercourse with connectivity to Natura 2000 sites
FD18	Full walkover survey	Hydrologically linked to Dundalk Bay SAC & SPA - via underground drain	FW4, GA1, WL2	Nil	None recorded	Watercourse with connectivity to Natura 2000 sites
Dundalk - centre						
FD19	Full walkover survey	Hydrologically linked to Dundalk Bay SAC & SPA - via Blackwater River	BL2, FS1, FW2, GA1, WL1, WS1	Nil	Buddleia, Cotoneaster, Crocosmia	Watercourse with connectivity to Natura 2000 sites
FD20	Full walkover survey	Hydrologically linked to Dundalk Bay SAC & SPA - via Rampart river	BC4, FW2, GA2	Nil	None recorded - out of season	Watercourse with connectivity to Natura 2000 sites
FD21	Full walkover survey	Hydrologically linked to Dundalk Bay SAC & SPA - via Blackwater River	ED3, FW2, GA2, WL2	Nil	None recorded - out of season	Watercourse with connectivity to Natura 2000 sites
Dundalk south-west						
FD22	Ful walkover	Hydrologically linked to Dundalk Bay SAC & SPA - via Blackwater River	GA2, GS4, FW4, WL1, WL2	Nil	Leylandii	Watercourse with connectivity to Natura 2000 sites
FD23	Not all areas accessible	Hydrologically linked to Dundalk Bay SAC & SPA - via Blackwater River	BL3, FW4, GA1, GS4, WS1, WL2	Nil	Leylandii	Watercourse with connectivity to Natura 2000 sites

Table 4. Faunal species occurring in the project area

Project feature code(s) **FD** = flood defence **GW** = greenway	**Survey effort**	**Evidence of mammals**	**Bat habitat assessment**	**Bird interest**	**Amphibian habitat assessment**	**Fisheries assessment**	**Invertebrate assessment**
North Area - Ballymascanlan estuary							
FD1	Full habitat survey - partly covered for mammal	None observed	Strong foraging features for bats, with connectivity to the wider landscape. Tree with Moderate & Low PRFs	Potential foraging habitat for wintering waterbirds in cereal	Limited - flowing water	Not assessed	N/A
FD2	Partly covered	Badgers sign, including latrine	Strong foraging features for bats, with connectivity to the wider landscape. Small number of Moderate PRFs identified in treeline/hedgerows	Wintering waterbirds	Potential in ponds & pools	Ballymascanlan estuary has small salmon & sea trout run associated with Flurry River, which also supports a wild brown trout population. Fish populations of other rivers flowing into Ballymascanlan estuary are unknown	Potential for devil's-bit scabious
Northern habitat creation area	Partly covered	Badger setts, unidentified mammal burrows, evidence of otters	Strong foraging features for bats, with connectivity to the wider landscape. High PRF in farm buildings, adjacent to area. Moderate PRFs identified in treeline.	Wintering waterbirds	Potential in ponds & pools		Potential for devil's-bit scabious
FD3 - existing embankment/ GW1 - alternative, along coast	Full habitat survey - partly covered for mammal	Badger setts, unidentified mammal burrows, evidence of otters	Strong foraging features for bats, with connectivity to the wider landscape. High PRF in farm buildings, adjacent to trail.	Wintering waterbirds	Limited - saline conditions		N/A
GW2 - along dismantled railway	Full habitat survey - partly covered for mammal	Badger setts and latrines	Strong foraging features for bats, with connectivity to the wider landscape. - no PRFs	Wintering waterbirds	Potential in ponds & pools		Potential for devil's-bit scabious
West of Castletown Bridge, along Castletown River							
FD13	Full habitat survey - partly covered for mammal	None observed	Strong foraging features for bats, with connectivity to the wider landscape. - no PRFs	Wintering waterbirds	Limited - no ponds/pools	Castletown River - supports salmon, brown trout, sea trout, eels, lamprey species	N/A
FD14	Full habitat survey - partly covered for mammal	None observed	Strong foraging features for bats, with connectivity to the wider landscape. - no PRFs	Wintering waterbirds	Limited - no ponds/pools		Potential for devil's-bit scabious
FD15	Full habitat survey - partly covered for mammal	None observed	Strong foraging features for bats, with connectivity to the wider landscape. - no PRFs	Wintering waterbirds	Limited - no ponds/pools		Potential for devil's-bit scabious
FD16	Full habitat survey - partly covered for mammal	None observed	Strong foraging features for bats, with connectivity to the wider landscape. - no PRFs	Wintering waterbirds	Limited - no ponds/pools		Potential for devil's-bit scabious
Western - Passive flow control area							
Western - Passive flow control area	Full habitat survey - partly covered for mammal	Badger and otter signs, hare seen	Moderate foraging features for bats, with connectivity to the wider landscape. - no PRFs	Scrub cover for breeding birds, with some wet areas with potential for breeding snipe	Potential in ponds & pools	Tributary of Castletown River, which is a salmon fishery	N/A
South estuary							
FD4 - Sean O'Mahonys GAA Club - Eastern By-pass Bridge	Partly walked and viewed from adjacent road/track	None observed	Moderate foraging features for bats in woodland near bridge, with some connectivity to the wider landscape - No PRFs otherwise relatively exposed - No PRFs noted	Wintering waterbirds	Limited - mostly built environment	N/A	N/A
FD5 - Sewage Work's - Sean O'Mahonys GAA Club	Full walkover survey	None observed	Relatively exposed, limited strong habitat features - No PRFs	Wintering waterbirds	Limited - built environment	N/A	N/A
FD6 - Soldier Point	Full walkover survey	Unidentified prints and trails on salt marsh	Relatively exposed, limited strong habitat features - No PRFs	Wintering waterbirds	Limited - saline conditions	N/A	N/A
GW3: Sean O'Mahonys GAA Club - Eastern By-pass Bridge - via road	Walked/driven	None observed	Urban setting limited natural features for bats and lighting impacts for sensitive species - Moderate PRFs identified in several abandoned buildings along Quay Street	Limited - urban setting	Limited - built environment	N/A	N/A
GW4: Sean O'Mahonys GAA Club - Eastern By-pass Bridge	Partly walked and viewed from adjacent road/track	None observed	Moderate foraging features for bats in woodland near bridge, with some connectivity to the wider landscape	Wintering waterbirds	Limited - mostly urban	N/A	N/A

Project feature code(s) **FD** = flood defence **GW** = greenway	Survey effort	Evidence of mammals	Bat habitat assessment	Bird interest	Amphibian habitat assessment	Fisheries assessment	Invertebrate assessment
			- No PRFs otherwise relatively exposed - No PRFs noted				
GW5: Sewage Work's - Sean O'Mahonys GAA Club	Full walkover survey	None observed	Relatively exposed, limited strong habitat features - No PRFs	Wintering waterbirds	Limited - saline conditions	N/A	N/A
GW6: Soldier Point-Blackwater River - via road	Driven/walked	Unidentified prints	Moderate foraging features for bats, with some connectivity to the wider landscape - No PRFs	Limited cover for breeding birds	No suitable waterbodies noted	N/A	N/A
GW7: Soldier Point-Blackwater River - via coast	Full walkover survey	Unidentified prints and trails on salt marsh	Relatively exposed, limited strong habitat features - No PRFs	Wintering waterbirds	Limited - saline conditions	N/A	N/A
Dundalk east coast							
FD7	Full walkover survey	Badger setts, unidentified mammal burrows	Strong foraging features for bats, with connectivity to the wider landscape. - Low PRFs	Wintering waterbirds	Limited - saline conditions	N/A	N/A
FD8	Full walkover survey	Mammal trials, Hare seen	Moderate foraging features for bats, with connectivity to the wider landscape. - no PRFs	Wintering waterbirds	Limited - saline conditions	N/A	N/A
GW8	Full walkover - landward side of embankment less comprehensively covered	Badger setts, unidentified mammal burrows	Strong foraging features for bats, with connectivity to the wider landscape. - Low PRFs	Wintering waterbirds	Limited - saline conditions	N/A	N/A
GW9	Full walkover survey	Mammal trials, Hare seen	Moderate foraging features for bats, with connectivity to the wider landscape. - no PRFs	Wintering waterbirds	Limited - saline conditions	N/A	N/A
Southern habitat creation area	Partly walked and viewed from adjacent road/track	Mammal trials, Hare seen	Moderate foraging features for bats, with connectivity to the wider landscape. - no PRFs	Wintering waterbirds	Limited - saline conditions	N/A	N/A
Blackrock							
FD9	Full walkover survey	None observed	Relatively exposed, limited strong habitat features, urban setting with lighting - No PRFs	Wintering waterbirds	Limited - urban setting	N/A	N/A
FD10	Full walkover survey	Otter signs	Relatively exposed, limited strong habitat features - No PRFs	Wintering waterbirds	Limited - saline conditions	N/A	N/A
FD11	Full walkover survey	None observed	Moderate foraging features for bats, with some connectivity to the wider landscape - No PRFs	Cover for breeding birds	Potential in reed beds	Salmonid suitability limited	N/A
FD12	Full walkover survey	None observed	Relatively exposed, limited strong habitat features - No PRFs	Wintering waterbirds	Limited - saline conditions	N/A	N/A
GW10 - short section along road to coast	Full walkover survey	None observed	Moderate foraging features for bats, with some connectivity to the wider landscape - No PRFs	Wintering waterbirds	No suitable habitats noted	N/A	N/A
GW11 - on road R172	Full walkover/windscreen survey	Otter signs	Moderate foraging features for bats, with some connectivity to the wider landscape - suburban gardens, only a few trees noted with moderate and low PRFs	Wintering waterbirds	No suitable habitats noted	N/A	N/A
GW12 - alternative along coast	Full walkover survey	Otter signs	Relatively exposed, limited strong habitat features, although old lifeboat house provides moderate/high PRF	Wintering waterbirds	Limited - saline conditions	N/A	N/A
Dundalk north-west							
FD17	Full walkover survey	None observed	Strong foraging features for bats, with connectivity to the wider landscape. - Low PRFs	Farmland birds	Potential in pools adjacent to stream	Salmonid suitability limited	N/A
FD18	Full walkover survey	None observed	Strong foraging features for bats, with connectivity to the wider landscape. - Low PRFs	Farmland birds	Potential in pools adjacent to stream		Potential for devil's-bit scabious
Dundalk centre							
FD19	Full walkover survey	None observed	Moderate foraging features for bats, with some connectivity to the wider landscape - Moderate PRF in old shed - urban lighting	Wetland habitats with potential for snipe	Urban area - no suitable habitat	Salmonid suitability limited	N/A
FD20	Full walkover survey	None observed	Foraging options limited to trees in gardens and along channelised stream - Low PRFs in ivy clad tree - urban lighting	Limited cover for breeding birds	Potential in standing water in drain, also swamp in area		N/A

Project feature code(s) **FD** = flood defence **GW** = greenway	**Survey effort**	**Evidence of mammals**	**Bat habitat assessment**	**Bird interest**	**Amphibian habitat assessment**	**Fisheries assessment**	**Invertebrate assessment**
FD21	Full walkover survey	None observed	Moderate foraging features for bats, with some connectivity to the wider landscape. - Low PRFs in trees - urban lighting	Some cover for breeding birds	Potential in standing water in drain		N/A
Dundalk south-west							
FD22	Ful walkover	Badger setts to north	Strong foraging features for bats, with connectivity to the wider landscape. - Low PRFs	Cover for breeding birds - including snipe, meadow pipit and skylark	Potential in wet grassland	Salmonid suitability limited	Wet grassland with potential for devil's-bit scabious
FD23	Not all areas were accessible	None observed	Strong foraging features for bats, with connectivity to the wider landscape. - Low PRFs		Potential in wet grassland		

4 EXISTING ECOLOGICAL RECORDS

Records of all species noted in the vicinity of the project area were obtained from the NBDC, NPWS and BCI databases. Details of all protected and endangered species recorded within 2 km of the of the project area, are summarised in **Table 5 Table x**, which also shows the likelihood (based on habitat availability) of these species occurring on the in the project area. Existing records of invasive species are provided in **Table 6**. Irish Wetland Bird Survey IWeBS count data (annual peak counts) are provided for selected count sections adjacent to the project area.

Table 5. Existing ecological records for protected and/ or notable species (2 km)

- The second column indicates species list on Annex II & IV of Habitats Directive, with third column indicating bird species listed on Annex I of the Birds Directive and the fourth column shows species protected under the Wildlife Act, as amended
- Key to Red List Status: EX = Extinct; RE = Regional Extinct; CR = Critically Endangered; EN = Endangered; NT = Near Threatened; VU = Vulnerable; LC = Least Concern; DD = Data Deficient
- FPO = Plant species listed on the Flora Protection Order
- BoCCI = Bird of Conservation Concern in Ireland 2014-2019 (Colhoun & Cummins, 2013), R = Red listed, A = amber listed, G = Green listed – **NOTE**: BoCCI 2014-2019 has been updated by BoCCI 2020-2026 (Gilbert *et al*. 2021) and when status has been upgraded or downgraded this indicated with ↑ or ↓ respectively
- Key to likelihood of species presence: 1 = Confirmed; 2 = Likely; 3 = Possible; 4 = Unlikely; 5 = None
- Data sources: **NBDC** = National Biodiversity Recorded Centre, **NPWS** = National Parks & Wildlife Service, **BCI** = Bat Conservation Ireland, **IWeBS** = Irish Wetland Bird Survey, **Atlas** = Balmer, D.E., Gillings, S., Caffrey, B.J., Swann, R.L., Downie, I.S. & Fuller R.J. (2013). *Bird Atlas 2007–11: The Breeding and Wintering Birds of Britain and Ireland*. BTO, Thetford, **IFI** = Delanty, K., Kelly, F.L., McLoone, P., Matson, R., O' Briain, R., Gordon, P., Cierpal, D., Connor, L., Corcoran, W., Coyne, J., Feeney, R., Morrissey, E. (2017). Fish Stock Assessment of the River Barrow Catchment (2015). Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24, Ireland
- *Likelihood of occurrence in project area for mobile species relates to the use of the area for breeding, foraging or commuting. For bird species likelihood of occurrence is applied to the population – breeding, winter, breeding & winter or passage to which the BoCCI listing is applied, e.g. the black-headed gulls breeding population is red listed, therefore although species may be recorded in the area; if there are no breeding sites/potential breeding sites within the zone of influence they are noted as not or unlikely to occur as a breeding species

Species name	Hab. Dir. (An. II/ IV)	Birds Dir. (Annex I)	Wildlife/Fisheries Acts	Red List Status	FPO species	BoCCI	Likelihood in project area*	Likelihood within 2 km	Most recent record	Record source
Henbane (Hyoscyamus niger)				NT			3	2	Nil	NPWS
Oysterplant (Mertensia maritima)				VU	Y		4	3	1900	NPWS
Shepard's-needle (Scandix pecten-veneris)				EX			5	4	1896	NPWS
Annual Knawel (Scleranthus annuus)				DD	Y		3	3	1900	NPWS
Agabus (Gaurodytes) conspersus				EN			3	3	1987	NBDC
Labiobaetis atrebatinus				EN			3	3	1947	NBDC
Ochthebius (Asiobates) auriculatus				NT			3	3	1930	NBDC
Ochthebius (Ochthebius) marinus				NT			3	2	1996	NBDC
Large Red Tailed Bumble Bee (Bombus (Melanobombus) lapidarius)				NT			2	1	2020	NBDC
Dark Green Fritillary (Argynnis aglaja)				VU			3	1	2019	NBDC
Andrena (Melandrena) nigroaenea				VU			3	2	2019	NBDC
Lake Orb Mussel (Musculium lacustre)				VU			3	3	1905	NBDC
Common Whorl Snail (Vertigo (Vertigo) pygmaea)				NT			3	3	1905	NBDC
Marsh Whorl Snail (Vertigo (Vertigo) antivertigo)				VU			3	3	1905	NBDC
Moss Bladder Snail (Aplexa hypnorum)				VU			3	3	1905	NBDC
Moss Chrysalis Snail (Pupilla (Pupilla) muscorum)				EN			3	3	1905	NBDC

Species name	Hab. Dir. (An. II/ IV)	Birds Dir. (Annex I)	Wildlife/Fisheries Acts	Red List Status	FPO species	BoCCI	Likelihood in project area*	Likelihood within 2 km	Most recent record	Record source
Smooth Grass Snail (Vallonia pulchella)				VU			3	3	1905	NBDC
Tree Snail (Balea (Balea) perversa)				VU			3	3	1905	NBDC
Prickly Snail (Acanthinula aculeata)				NT			3	3	1905	NBDC
Lamprey species	Y		Y	NT/ LC			3	3	2017	IFI
Brown Trout (Salmo trutta)			Y	LC			2	1	2017	IFI
Atlantic Salmon (Salmo salar)	Y		Y	VU			2	1	2017	IFI
European Eel (Anguilla anguilla)			Y	CR			3	2	2017	IFI NBDC
Common Frog (Rana temporaria)			Y				2	1	2018	NBDC NPWS
Barn Owl (Tyto alba)			Y			R	2	1	2011	Atlas
Black-headed gull (Larus ridibundus)			Y			R↓	1	1	2017	IWeBS
Common Scoter (Melanitta nigra)			Y			R	1	1	2019	IWeBS
Curlew (Numenius arquata)			Y			R	1	1	2019	IWeBS
Corn Crake (Crex crex)		Y	Y			R	5	4	1972	NBDC
Dunlin (Calidris alpina)		Y	Y			R	1	1	2019	IWeBS
Goldeneye (Bucephala clangula)			Y			R	1	1	2019	IWeBS
Golden Plover (Pluvialis apricaria)			Y			R	1	1	2019	IWeBS
Grey Partridge (Perdix perdix)			Y			R	3	3	1991	NBDC
Herring gull (Larus argentatus)			Y			R↓	1	1	2019	IWeBS
Knot (Calidris canutus)						R	1	1	2019	IWeBS
Lapwing (Vanellus vanellus)			Y			R	1	1	2019	IWeBS
Pintail (Anas acuta)			Y			R	2	1	2019	IWeBS
Pochard (Aythya ferina)			Y			R	3	3	1984	NBDC
Quail (Coturnix coturnix)			Y			R	3	3	1991	NBDC
Redshank (Tringa totanus)			Y			R	3	1	2017	IWeBS
Shoveler (Anas clypeata)			Y			R	1	1	2019	IWeBS
Twite (Carduelis flavirostris)			Y			R	3	1	2011	Atlas
Tufted Duck (Aythya fuligula)			Y			R	3	1	2019	IWeBS
Wigeon (Anas penelope)			Y			R	1	1	2019	IWeBS
Woodcock (Scolopax rusticola)			Y			R	3	2	1991	NBDC
Velvet Scoter (Melanitta fusca)			Y			R	3	1	2016	NBDC
Yellowhammer (Emberiza citrinella)			Y			R	3	1	2017	NBDC
Bar-tailed godwit (Limosa lapponica)		Y	Y			A	1	1	2019	IWeBS
Barnacle Goose (Branta leucopsis)			Y			A	4	1	2015	IWeBS
Black-tailed Godwit (Limosa limosa)			Y			A	1	1	2019	IWeBS
Brent Goose (Branta bernicla)			Y			A	1	1	2019	IWeBS
Common Guillemot (Uria aalge)			Y			A	3	3	1984	Atlas
Common Gull (Larus canus)			Y			A	1	1	2019	IWeBS

Species name	Hab. Dir. (An. II/ IV)	Birds Dir. (Annex I)	Wildlife/Fisheries Acts	Red List Status	FPO species	BoCCI	Likelihood in project area*	Likelihood within 2 km	Most recent record	Record source
Common Sandpiper (Actitis hypoleucos)			Y			A	3	2	1991	NBDC
Coot (Fulica atra)			Y			A	2	1	2017	NBDC
Cormorant (Phalacrocorax carbo)			Y			A	1	1	2019	IWeBS
Gannet (Morus bassanus)			Y			A	2	2	2011	NBDC
Goosander (Mergus merganser)			Y			A	3	2	2015	IWeBS
Great Black-backed Gull (Larus marinus)			Y			A↓	1	1	2019	IWeBS
Great Crested Grebe (Podiceps cristatus)			Y			A	1	1	2019	IWeBS
Great Northern Diver (Gavia immer)		Y	Y			A	1	1	2019	IWeBS
Greater White-fronted Goose (Anser albifrons)		Y	Y			A	1	1	2019	IWeBS
Greenshank (Tringa nebularia)			Y			A	1	1	2019	IWeBS
Grey Plover (Pluvialis squatarola)			Y			A	1	1	2013	IWeBS
Greylag Goose (Anser anser)			Y			A	1	1	2019	IWeBS
Hen Harrier (Circus cyaneus)		Y	Y			A	3	1	2011	Atlas
House Martin (Delichon urbicum)			Y			A	2	1	2011	Atlas
House Sparrow (Passer domesticus)			Y			A	2	1	2011	Atlas
Jack snipe (Lymnocryptes minimus)			Y			A	3	1	2013	IWeBS
Kestrel (Falco tinnunculus)			Y			A↑	2	1	2011	Atlas
Kingfisher (Alcedo atthis)		Y	Y			A	3	1	2017	NBDC
Kittiwake (Rissa tridactyla)			Y			A↑	2	1	2016	NBDC
Lesser Black-backed Gull (Larus fuscus)			Y			A	1	1	2019	IWeBs
Linnet (Carduelis cannabina)			Y			A	2	1	2011	Atlas
Little Grebe (Tachybaptus ruficollis)			Y			A	2	1	2019	IWeBS
Manx Shearwater (Puffinus puffinus)			Y			A	3	1	2016	NBDC
Mediterranean Gull (Larus melanocephalus)		Y	Y			A	3	2	1984	NBDC
Merlin (Falco columbarius)		Y	Y			A	2	1	2011	Atlas
Mute Swan (Cygnus olor)			Y			A	1	1	2011	Atlas
Oystercatcher (Haematopus ostralegus)			Y			A	1	1	2019	IWeBS
Red Kite (Milvus milvus)			Y			A	3	2	2003	NBDC
Red-throated Diver (Gavia stellata)		Y	Y			A	1	1	2019	IWeBS
Roseate Tern (Sterna dougallii)		Y	Y			A	2	1	2016	NBDC
Ruff (Philomachus pugnax)		Y	Y			A	1	1	2019	IWeBS
Sand Martin (Riparia riparia)			Y			A	2	2	1991	Atlas
Sandwich Tern (Sterna sandvicensis)		Y	Y			A	2	1	2016	NBDC
Scaup (Anas marila)			Y			A	3	2	2015	IWeBS
Shelduck (Tadorna tadorna)			Y			A	1	1	2019	IWeBS
Short-eared Owl (Asio flammeus)		Y	Y			A	3	3	1984	NBDC
Skylark (Alauda arvensis)			Y			A	2	1	2011	Atlas
Slavonian Grebe (Podiceps auritus)			Y			A	1	1	2019	IWeBS

Species name	Hab. Dir. (An. II/ IV)	Birds Dir. (Annex I)	Wildlife/Fisheries Acts	Red List Status	FPO species	BoCCI	Likelihood in project area*	Likelihood within 2 km	Most recent record	Record source
Snipe (Gallinago gallinago)			Y			A↑	1	1	2019	IWeBS
Spotted Flycatcher (Muscicapa striata)			Y			A	3	2	1991	NBDC
Spotted Redshank (Tringa erythropus)			Y			A	1	1	2019	IWeBS
Starling (Sturnus vulgaris)			Y			A	2	1	2011	Atlas
Stock Pigeon (Columba oenas)			Y			A↑	3	2	2011	Atlas
Swallow (Hirundo rustica)			Y			A	2	1	2017	NNDC
Swift (Apus apus)			Y			A↑	2	1	2011	Atlas
Teal (Anas crecca)			Y			A	1	1	2019	IWeBS
Tree Sparrow (Passer montanus)			Y			A	2	1	2013	NBDC
Wheatear (Oenanthe oenanthe)			Y			A	2	2	1991	Atlas
Whooper Swan (Cygnus cygnus)		Y	Y			A	1	1	2019	IWeBS
Black-throated Diver (Gavia arctica)		Y	Y			G	3	2	2013	IWeBS
Little Egret (Egretta garzetta)		Y	Y			G	1	1	2019	IWeBS
Peregrine Falcon (Falco peregrinus)		Y	Y			G	2	1	2011	Atlas
Curlew Sandpiper (Calidris ferruginea)						G↑				
Mallard (Anas platyrhynchos)			Y			G↑	1	1	2019	IWeBS
Red-breasted merganser (Arenaria interpres)			Y			G↑	1	1	2019	IWeBS
Ringed plover (Charadrius hiaticula)			Y			G↑	1	1	2019	IWeBS
Turnstone (Arenaria interpres)			Y			G↑	1	1	2019	IWeBS
Brown Long-eared Bat (Plecotus auritus)	Y		Y				3	2	2008	BCI
Lesser Noctule (Nyctalus leisleri)	Y		Y				2	1	2018	BCI NBDC
Daubenton's Bat (Myotis daubentonii)	Y		Y				2	1	2017	BCI
Natterer's Bat (Myotis nattereri)	Y		Y				2	1	2017	BCI
Whiskered Bat (Myotis mystacinus)							3	3	2018	BCI NPWS
Pipistrelle (Pipistrellus pipistrellus)	Y		Y				2	1	2018	BCI NBDC
Soprano Pipistrelle (Pipistrellus pygmaeus)	Y		Y				2	1	2018	BCI NBDC
West European Hedgehog (Erinaceus europaeus)			Y				2	2	2018	NBDC, NPWS
Eurasian Pygmy Shrew (Sorex minutus)			Y				2	2	2018	NBDC
Eurasian Red Squirrel (Sciurus vulgaris)			Y				3	3	2009	NBDC, NPWS
Irish Hare (Lepus timidus subsp. hibernicus)			Y				3	2	2018	NPWS
Irish Stoat (Mustela erminea subsp. hibernica)			Y				3	3	1969	NPWS
Eurasian Badger (Meles meles)			Y				2	1	2018	NBDC, NPWS
Pine Marten (Martes martes)			Y				3	2	2015	NBDC, NPWS
European Otter (Lutra lutra)	Y		Y				2	1	2018	NBDC, NPWS
Common Seal (Phoca vitulina)	Y		Y				2	1	2019	NBDC

Species name	Hab. Dir. (An. II/ IV)	Birds Dir. (Annex I)	Wildlife/Fisheries Acts	Red List Status	FPO species	BoCCI	Likelihood in project area*	Likelihood within 2 km	Most recent record	Record source
Grey Seal (Halichoerus grypus)	Y		Y				3	3	2003	NPWS NBDC
Common Porpoise (Phocoena phocoena)	Y		Y				2	1	2012	IWWG NBDC
Common Dolphin (Delphinus delphis)	Y		Y				3	1	2015	IWWG NBDC
Bottle-nosed Dolphin (Tursiops truncates)	Y		Y				3	2	2012	IWWG NBDC

Table 6. Existing ecological records of invasive species (2 km)

Species name	Invasive status	Likelihood on Application Site	Likelihood within 2 km	Most recent record	Record Source
Japanese Knotweed (Fallopia japonica)	Third Sch. - High	3	3	2020	NBDC
Rhododendron ponticum	Third Sch. - High	3	2	2019	NBDC
Indian Balsam (Impatiens glandulifera)	Third Sch. - High	3	2	2019	NBDC
Canada Goose (Branta canadensis)	Third Sch. - High	3	3	2014	NBDC
Greylag Goose (Anser anser) -ferel	Third Sch	3	3	2011	NBDC
American Mink (Mustela vison)	Third Sch. - High	2	1	1990	NBDC
Black Rat (Rattus rattus)	Third Sch. - High	5	3	1968	NPWS
Brown Rat (Rattus norvegicus)	Third Sch. - High	2	2	2015	NBDC
Eastern Grey Squirrel (Sciurus carolinensis)	Third Sch. - High	3	1	2018	NBDC
Three-cornered Garlic (Allium triquetrum)	Third Sch. - Med.	3	2	2020	NBDC
Cherry Laurel (Prunus laurocerasus)	High	2	1	2020	NBDC
House Mouse (Mus musculus)	High	2	2	2013	NBDC
New Zealand Flatworm (Arthurdendyus triangulates)	High	2	1	2020	NBDC
Butterfly-bush (Buddleja davidii)	High	2	1	2020	NBDC
Common Cord-grass (Spartina anglica)	High	1	1	2020	NBDC
Sycamore (Acer pseudoplatanus)	Medium	1	1	2020	NBDC
Evergreen Oak (Quercus ilex)	Medium	3	1	2019	NBDC
Narrow-leaved Ragwort (Senecio inaequidens)	Medium	2	1	2019	NBDC
Black Currant (Ribes nigrum)	Medium	3	2	2011	NBDC
Himalayan Honeysuckle (Leycesteria formosa)	Medium	3	1	2019	NBDC
European Rabbit (Oryctolagus cuniculus)	Medium	2	1	2018	NBDC

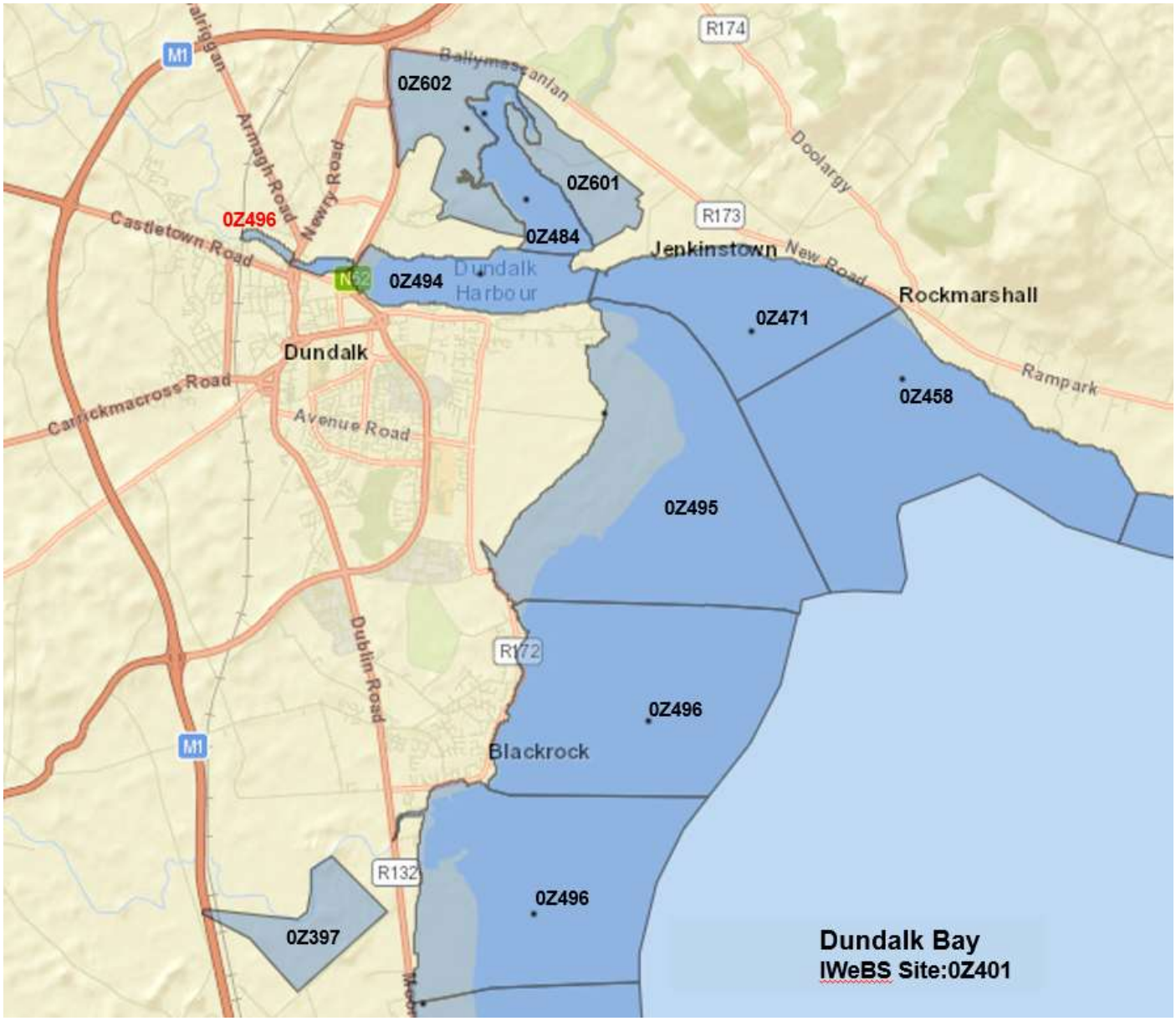


Figure 3. IWeBS count sections surrounding project area

Table 7. IWeBS data – Sub-site annual peak counts for sections of Dundalk Bay (Site: 0Z401) – Habrbour and Ballymascanlan

IWeBS sub-site code - name	**0Z494** - Dundalk Harbour							**0Z484** - Ballymascanlan estuary.							**0Z601** - Ballymascanlan fields East							**0Z602** - Ballymascanlan fields West						
Species	2017/18	2018/19	2014/15	2015/16	2016/17	2017/18	2018/19	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Bar-tailed Godwit	67	80				67	80							22														
Black-headed Gull	200	300				200	300	85	80	85	60	56	26	200													65	
Black-tailed Godwit	1850	450				1850	450	147	50	40	68	64	140	197						320							60	
Black-throated Diver									1																			
Common Gull	100	50				100	50	12	6	16		2	4	156														
Cormorant	50					50		15	5	1	6	16	10	2														
Curlew	110	240				110	240	23	7	1	4	20	30	168						2							2	15
Curlew Sandpiper									1																			
Dunlin	250	652				250	652	112	131		40	50	200	245							85							
Golden Plover	2000	2500				2000	2500	450	3200	150	450	200	1800	1000							900							160
Goldeneye	5					5		2				2		4														
Great Black-backed Gull								6	2		1			2														
Great Crested Grebe	1	14				1	14	2				1		1														
Greenshank	2					2			3	1				3														
Grey Heron	6	2				6	2	4	9	3	8	15	14	9														
Grey Plover		2					2	1																				
Herring Gull	2	14				2	14	3			12	12	2	15														
Knot		650					650							87														
Lapwing	100	2000				100	2000	200	503	40	18	16	85	188						650	96						1500	400
Lesser Black-backed Gull														2														
Light-bellied Brent Goose	200	428				200	428		5	15	6	6	80	35														
Little Egret	14	17				14	17	9	7	13	12	18	18	5														
Little Grebe	2					2																						
Mallard	100	65				100	65	45	60	33	62	50	54	30													5	
Mute Swan								45	47	19	29	42	18	5														
Oystercatcher	150	235				150	235	150	248	6	40	60	65	200						50	6						30	
Pintail	35	15				35	15	2					2															
Red-breasted Merganser	6	5				6	5	1			1			2														
Redshank	200	420				200	420	120	175	38	45	80	142	150														
Ring-billed Gull																											300	
Ringed Plover		16					16	6	6		6		24	35														

IWeBS sub-site code - name	0Z494 - Dundalk Harbour							0Z484 - Ballymascanlan estuary.							0Z601 - Ballymascanlan fields East							0Z602 - Ballymascanlan fields West						
Species	2017/18	2018/19	2014/15	2015/16	2016/17	2017/18	2018/19	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Ruff									3	3	3	5	5	5														
Shelduck	50	35				50	35	2	80	2	6	16	12	22														
Shoveler		2					2																					
Slavonian Grebe													1															
Snipe										2		2																
Spotted Redshank									1	1	1																	
Teal	85	235				85	235	36	47	22	23	25	120	22														
Turnstone	15	24				15	24	12		2	21		12	14														
Whooper Swan	4					4			4			4															4	5
Wigeon	220	385				220	385	20	18	3	6		22	85														

Table 8. IWeBS data – Sub-site annual peak counts for sections of Dundalk Bay (Site: 0Z401) – Outer bay to Blackrock

IWeBS sub-site code - name	**0Z471** - Fitzpatrick's - Blue Anchor							**0Z495** - Marsh South							**0Z496** - Blackrock Corniche							**0Z497** - Lurgangreen North						
Species	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Barnacle Goose																								1				
Bar-tailed Godwit	68	26	18		54	35	55	350	930	850	350	300	1600	230	2260	1105	620	138	383	720	870	810	770	630	1190	800	645	750
Black-headed Gull	150	120	200	100	152	80	200	68	465	30	140	13	40	25	190	310	61	33	36	39	84	300	330	118	160	62	70	90
Black-tailed Godwit	550	850	480	260	1420	389	179	265	1500	20	162	360	71	180	250	56	21	373	770	310	265	680	3540	540	1385	932	770	980
Common Gull	150	100	150	200	22	52	200	11	150	7	15		265	6	35	127	8	9	6	11	45	555	350	350	120	180	430	50
Common Scoter								65					45		410	24	400	1300	100	1						580		
Cormorant	4	15	36	6	16	6	9	38	6	18	10	37	25	46	35	34	13	4	16	2	1	2	22	7	9	6	4	4
Curlew	154	86	55	68	85	61	150	130	330	40	73	163	55	58	126	71	31		15	47	94	141	100	132	146	310	155	142
Dunlin	581	350	300	200	250	150	824	1730	480	1200	169	2000	600	630	965	190	173	136	430	475	156	950	1040	743	550	400	825	710
Golden Plover			150					3		500						1		1200				6000	6160	5000	3500	8000	4400	3950
Goldeneye	2		2					37	3	6	1	8	3		60	21	5	4	11	21	1	42	43	21	45	26	30	27
Goosander																								1				
Great Black-backed Gull		6	2	2	6		2	2	10	5	11	1	4		23	7	8	1	2	2	2	30	23	75	85	61	8	5
Great Crested Grebe	6		4	15	2		32	4		6	6	3	1	4	21		9	34	37	1	57	5		1	2	6	2	2
Great Northern Diver	5	6	2	2			14		1		1				3	6				2			7					
Greenland White-fronted Goose																								18		7	26	19
Greenshank		2	1	2		1		8	4	9	11	11	4	7	3	2	1		1	2	3	13	11	5	11	10	6	3
Grey Heron	9	9	9	7	9	5	9	2	3		2						4	1	4	3	1	2	3	4	4	4	3	4
Grey Plover	4	4	3	1		4	4	64	152	72	107	12	78	63	258	83	11	81	55	35	108	150	66	86	70	87	45	49
Greylag Goose																						43	90	449	2	550	6	165
Herring Gull	6	20	35	24	2		50	5	15	21	6	2	4	14	30	80	8	5	17	6	4	63	40	96	55	205	45	18
Jack Snipe																						1						
Knot	300	739	150	185	400	185	900	610	560	700	750	3500	4000	470	880	4100	1300	550	2430	290		700	1250	3000	5050	2500	3500	830
Lapwing	278	246	492	200	200	250	85	101	410	202	2	55	50					1	1			1180	1950	1528	465	3500	885	470
Lesser Black-backed Gull		1	41					4	3	2	4				6	1	8	4	6	3	2	5	15	15	49	1	1	4
Light-bellied Brent Goose	280	150	120	350	123	168	468	523	42	98	90	45	30	108	59	78	10	15	25	45	48	750	1150	515	855	615	561	1900
Little Egret	2	6	6	9	6	18	14	14	7	5	4	5	6	4	1	1	2	1	2	1	1	8	15	3	7	31	2	9
Little Grebe								1		2												2						
Long-tailed Duck															3													
Mallard	85	150	80	100	55	68	35	80	32	60	120	60	45	25	69	127	39	121	241	68	6	205	130	161	630	260	90	59
Moorhen	2			1		2																						

IWeBS sub-site code - name	0Z471 - Fitzpatrick's - Blue Anchor							0Z495 - Marsh South							0Z496 - Blackrock Corniche							0Z497 - Lurgangreen North						
Species	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Mute Swan				4	2																	12	2	3	6	3		1
Oystercatcher	550	658	485	487	694	300	754	1393	2730	645	30	1200	1700	910	1320	1120	464	255	870	1040	1058	1538	2150	712	1400	3200	940	690
Pink-footed Goose																								98				14
Pintail		17	4	2	6			9	41	66	32	95	90	31	79	65	74	15	248	93	7	119	94	38	141	27	59	40
Red-breasted Merganser	9	2	6	20		2		8	5	4	4		1	5	24	8	1	1	17	5	10	8	4	5	1	6	4	3
Redshank	485	417	250	287	265	124	210	320	185	200	195	90	60	275	93	372	132	119	131	135	188	193	286	430	410	355	141	445
Red-throated Diver	1			1				1					1		5	2	4	1	16								1	
Ring-billed Gull																		1	1	1	1							
Ringed Plover	65	41	4	84	50	51	65	42		3	29				97	152	199	83	68	32	32	5	1	39			20	
Ruff																									1	8	2	2
Sanderling			2	1													3	1						1				
Sandwich Tern																	2											
Scaup																	4											
Shelduck	45	112	26	65	112	42	41	14	98	48	32	41	27	53	30	99	2	3	25	33		93	148	157	379	142	204	180
Shoveler																						6		2	5		2	
Slavonian Grebe								3	2	2	1		1		4	2	3		5	3	2	1	3	1	2	2	2	6
Snipe				5						3		1	1	2								1	1	8	1		1	4
Spotted Redshank				1						1												1						
Teal	145	90	55	28	50	210	128	62	38	75	58	61	22	32	66	152	62	15	250	45	31	205	274	210	70	250	135	197
Tufted Duck											2						5											
Turnstone	23	23	20	40	16	32	35	35	8	1	4			1	4	5	4	20	20	22	2	30	7	3	1		1	1
Unidentified wader sp.										300												100		200				
Whimbrel				2																								
Whooper Swan				4	6	4		1													3							
Wigeon	30	40	50	80	56	80	185	75	99	31	73	55	18	17		70		5	58	30		115	210	175	420	800	65	15

5 SUMMARY

Table 9. provides a summary of the emerging ecological constraints and outlines the likely survey requirements for the flood relief scheme at Dundalk-Blackrock, Co. Louth.

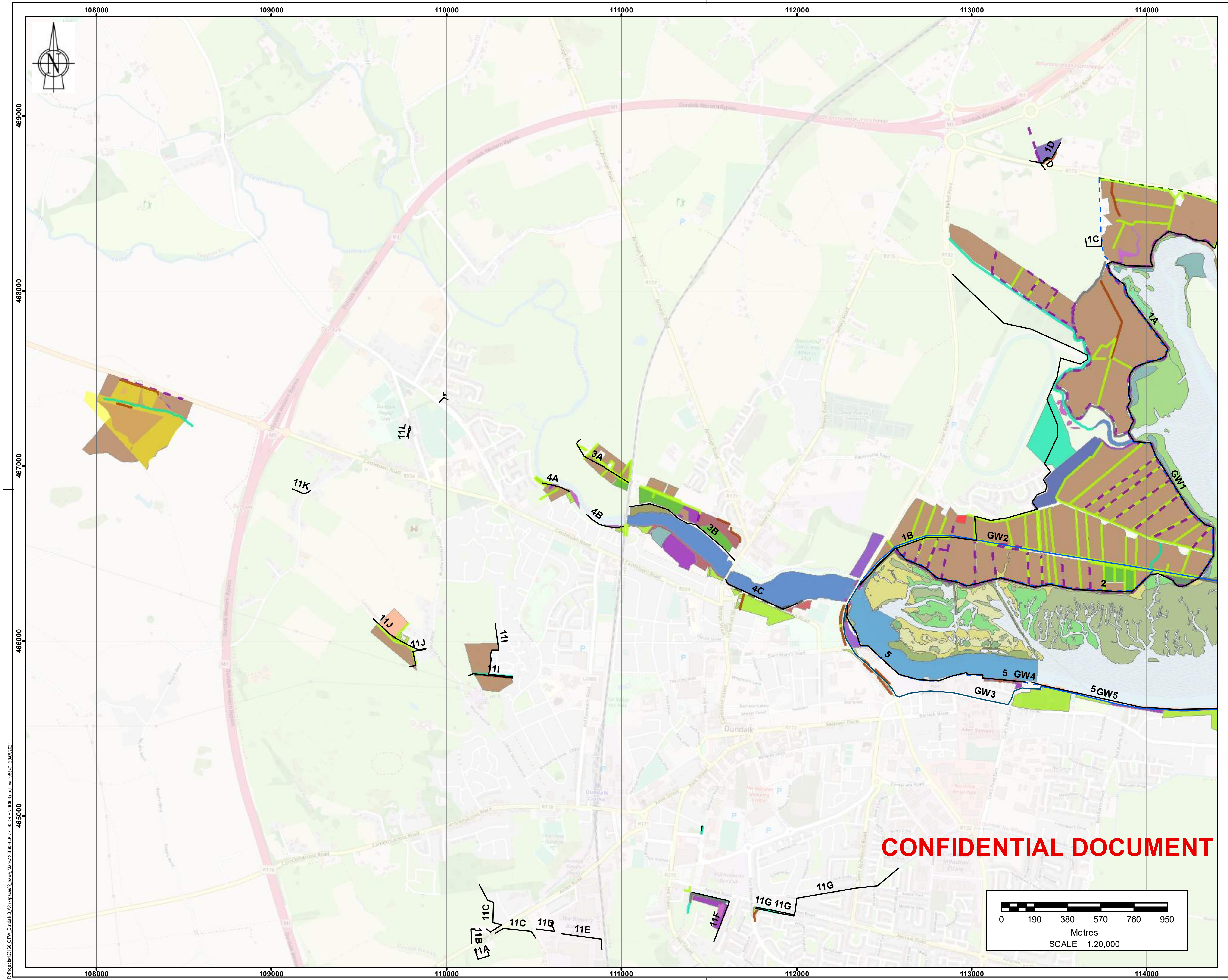
Table 9. Summary of the emerging ecological constraints and the likely survey requirements for the proposed flood relief scheme at Dundalk-Blackrock

Ecological feature	Emerging constraints - desk top	Constraints identified after site visit	Project design recommendations	Baseline survey/ consultation requirement
Natura 2000 sites	Source-receptors linkage identified via hydrological link for QIs within Dundalk Bay SPA and SAC	QI species – wintering water birds QI habitats – salt marsh, mudflats & sandflats, estuaries,	Mitigation measures required to - protect water quality during construction. - Limit disturbance to wintering waterbirds	Natura Impact Statement
Nationally important sites	None	None	NA	None identified
Habitat	Annex I habitat likely to occur within or adjacent to the Project Area. include: [1130] Estuaries [1140] Mudflats and sandflats not covered by seawater at low tide [1220] Perennial vegetation of stony banks [1310] Salicornia and other annuals colonizing mud and sand [1330] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1410] Mediterranean salt meadows (Juncetalia maritimi)	Survey conducted out of the optimal season.	Mitigation measures may be needed to avoid, or compensate for, loss of salt marsh	➢ Survey areas along the coast where proposed flood defences or greenway may impinge on salt marsh habitats. ➢ Consultation with NPWS to determine survey requirements ➢ Invasive species surveys during the growing season for areas where works scheduled.
Aquatic species	Requirement to protect against potential for downstream pollution, especially during construction	Salmonid populations, lamprey species, eel	Mitigation measures where works will occur adjacent to or within any rivers/streams/drains	➢ Baseline aquatic surveys including a macro-invertebrate survey indicating the Q value and associated chemical rating of streams within and draining the site.

Ecological feature	Emerging constraints - desk top	Constraints identified after site visit	Project design recommendations	Baseline survey/ consultation requirement
				➢ An ecological assessment of the streams/rivers within and draining the site (notability with respect to Salmonid suitability). ➢ Further consultation with IFI (Inland Fisheries Ireland) is advised if in stream works are proposed
Invertebrates	No constraints identified.	Potential for devil's-bit scabious to occur	Avoid instream works and avoid area of swampy vegetation with potential of supporting protected vertigo species	➢ Check areas of wet grassland for devil's -bit scabious – the food plant of marsh fritillary butterfly. If significant patches of suitable habitat identified, then larval web surveys should be undertaken in September.
Amphibians	Potential frog and newt breeding sites	No breeding site confirmed. Suitable breeding sites for newts limited by saline influence.	Avoid frog/newt spawning sites during construction.	➢ If suitable newt habitat identified falls within the construction footprint, additional surveys will be required to determine occupancy by newts ➢ Pre-construction visits during the spawning season to isolate any breeding sites from construction activities
Reptiles	Habitats not suitable for common lizard – limited records	NA	NA	None identified
Birds	WINTER BIRDS – foraging, roosting in coastal habitats and fields adjacent to the coast. BREEDING BIRDS - potential nesting habitat for birds especially along river/drains and hedgerows. Potential for snipe and ground nesting species.	Need surveys to confirm occurrence of breeding species	Avoid construction works during the bird breeding season (March-August, inclusive)	➢ Winter birds bird usage mapping ➢ Baseline survey - Breeding bird surveys (2/3 visits mapping territories April to June), incorporating baseline breeding wader (snipe) and woodcock surveys ➢ Kingfisher suitability survey/riverine bird surveys not required, as river was assessed as offering low suitability
Terrestrial mammals	Otters and badgers recorded in area including badger setts Considered that there was potential for otter holts to occur. Resting identified occur within/adjacent to construction	Several badger setts identified within the Project Area Possible otter holt identified within the Project Area	Implement appropriate exclusion zone buffer around setts/ holts to avoid disturbance during construction and operational activities	➢ Comprehensive otter/ badger surveys along the embankments ➢ Preconstruction badger survey to determine occupancy of known setts. ➢ Deploy trip cams to confirm species occupancy.

Ecological feature	Emerging constraints - desk top	Constraints identified after site visit	Project design recommendations	Baseline survey/ consultation requirement
	corridor/operational activities, e.g. disturbance from walker/dogs on greenway.			
Bats	Potential for bat roosting and foraging/commuting habitat within the Project Area.	Limited number of PRFs identified within the Project Area	➢ Avoid removal habitat features for bats where possible to retain connectivity with the wider landscape ➢ Additional planting up of features could be used to enhance connectivity or strengthen existing features.	➢ Baseline bat activity surveys. recommend one dusk bat transect (2-3 hours) and deployment 3 to 5 static bat detectors for up to 5 nights (May to July) ➢ Preconstruction surveys of potential roosts (emergence/re-entry surveys and /or inspections under licence), if any roosting features are classed above *Low* PRF and are being removed or can be affect by construction works/operational activities. – derogation licence required

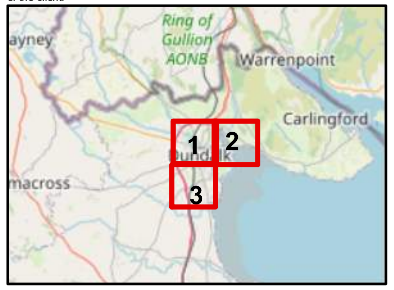
Appendix C – Habitat Figures



Note: The limits, including the height and depths of the Works, shown in this drawing are not to be taken as limiting the obligations of the contractor under Contract.

NOTE: Hard Defence, Greenway Route and Potential Storage Area outlines have been digitised from PDFs and are indicative.

NOTE: This map has been distributed as a layered pdf. Layer selection for printing is at the discretion of the client.



SAFETY HEALTH AND ENVIRONMENT INFORMATION

CONSTRUCTION

MAINTENANCE / CLEARING / OPERATION

DECOMMISSIONING / DEMOLITION

Rev	Drawn	Chkd	Rvwd	Apprvd	Date	Description
P01	RV	DU	AB	JR	29/09/2021	SUITABLE FOR INFORMATION

Designed by: RV Date: SEPTEMBER 2021

Status: S2

Client

OPW

Client Drawing No.
XXXXX-XXXX-XX

Binnies UK Limited
Registered Office
Spring Lodge, 172 Chester Road, Helsby, Cheshire, WA6 0AR UK
Tel: +44(0)1737 774155

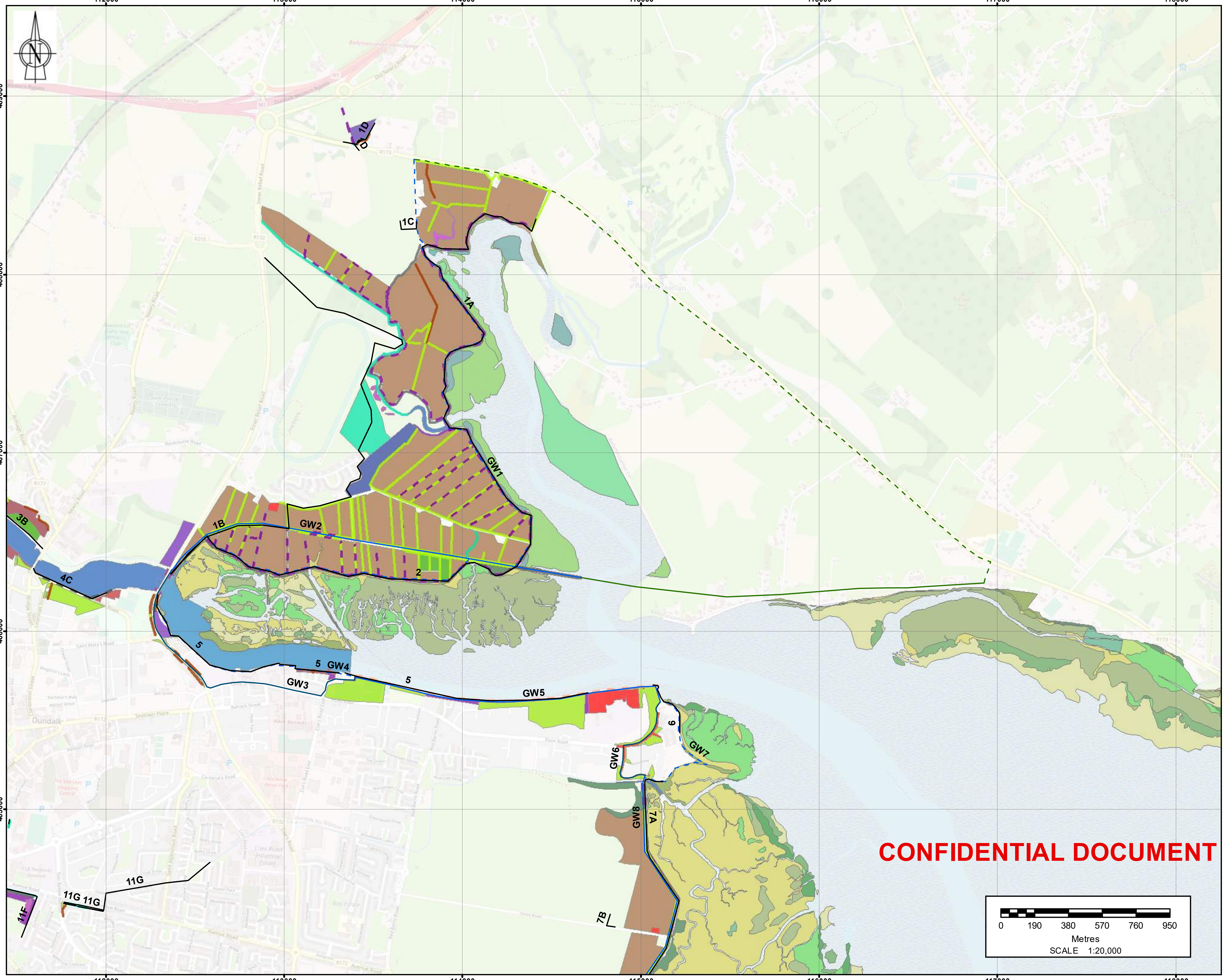
Project:
DUNDALK & BLACKROCK FLOOD RELIEF SCHEME

Drawing title:
HABITATS MAP
PAGE 1 OF 3

Drawing scale: 1:20,000 Sheet size: A3

Drawing no. 123160-BUK-ZZ-00-DR-EN-00003 Revision P01

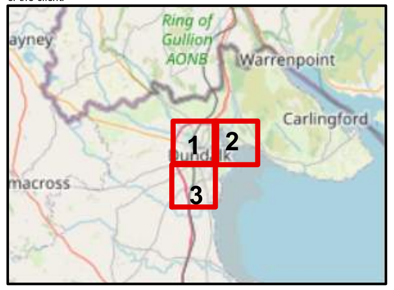
 Print Version: Print Quality (300dpi @ A3)



Note: The limits, including the height and depths of the Works, shown in this drawing are not to be taken as limiting the obligations of the contractor under Contract.

NOTE: Hard Defence, Greenway Route and Potential Storage Area outlines have been digitised from PDFs and are indicative.

NOTE: This map has been distributed as a layered pdf. Layer selection for printing is at the discretion of the client.



SAFETY HEALTH AND ENVIRONMENT INFORMATION

CONSTRUCTION

MAINTENANCE / CLEARING / OPERATION

DECOMMISSIONING / DEMOLITION

Rev	Drawn	Chkd	Rvwd	Apprvd	Date	Description
P01	RV	DU	AB	JR	29/09/2021	SUITABLE FOR INFORMATION

Designed by: RV Date: SEPTEMBER 2021

Status: S2

Client: OPW

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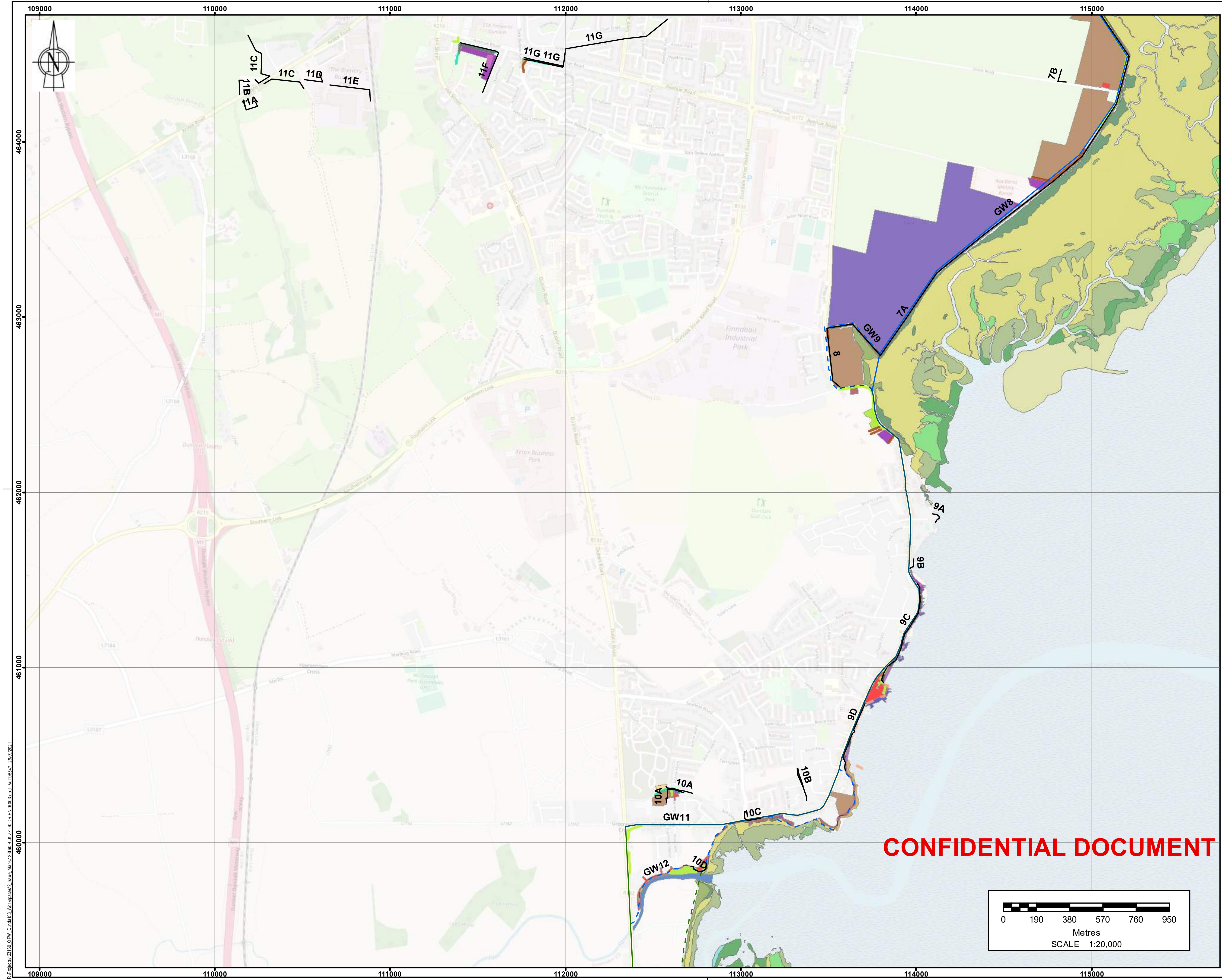

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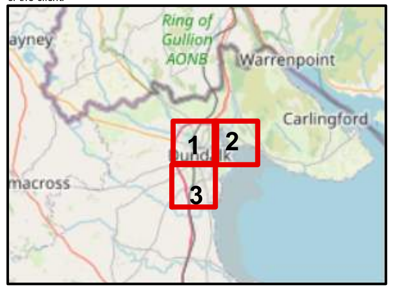

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Legend

DUNDALK LINEAR HABITATS

- BL1 STONE WALLS AND OTHER STONEWORK
- BL2 EARTH BANKS
- CC1 SEA WALLS PIERS AND JETTIES
- FW2 DEPOSITING LOWLAND RIVERS
- FW4 DRAINAGE DITCHES
- WL1 HEDGEROWS
- WL2 TREELINES

DUNDALK HABITATS

- BC1 ARABLE CROPS
- BC3 TILLED LAND
- BC4 FLOWER BEDS AND BORDERS
- BL3 BUILDINGS AND ARTIFICIAL SURFACES
- CB1 SHINGLE AND GRAVEL BANKS
- CM2 UPPER SALT MARSH
- CW2 TIDAL RIVERS
- ED3 RECOLONISING BARE GROUND
- FS1 REED AND LARGE SEDGE SWAMPS
- GA1 IMPROVED AGRICULTURAL GRASSLAND
- GA2 AMENITY GRASSLAND IMPROVED
- GS2 DRY MEADOWS AND GRASSY VERGES
- GS3 DRY HUMID ACID GRASSLAND
- GS4 WET GRASSLAND
- LR2 MODERATELY EXPOSED ROCKY SHORES
- LS2 SAND SHORES
- LS4 MUD SHORES
- MW4 ESTUARIES
- SR2 MODERATELY EXPOSED INFRALITTORAL ROCK
- WD1 MIXED BROADLEAVED WOODLAND
- WD4 CONIFER PLANTATION
- WD5 SCATTERED TREES AND PARKLAND
- WS1 SCRUB

DUNDALK AND BLACKROCK SALT MARSH MONITORING PROJECT

- 1310 SALICORNIA FLATS
- 1310/SPARTINA MOSAIC
- 1330 ATLANTIC SALT MEADOWS
- 1330/OTHER SM (CM2) MOSAIC
- 1330/ROCKY SHORE MOSAIC
- 1410 MEDITERRANEAN SALT MEADOWS
- ASM DOMINATED WITH SOME SPARTINA
- ASM/SPARTINA MOSAIC
- ISOLATED SPARTINA CLUMPS ON MUD (5%)
- OTHER (NON SALT MARSH)
- OTHER SM (CM2)
- POTENTIAL ASM/SPARTINA MOSAIC
- POTENTIAL SPARTINA SWARDS
- POTENTIAL ISOLATED SPARTINA CLUMPS ON MUD (5%)
- SPARTINA CLUMP/MUDFLAT MOSAIC (50/50)
- SPARTINA SWARD DOMINATED WITH SOME ASM
- SPARTINA SWARDS
- POTENTIAL ASM DOMINATED
- POTENTIAL BRACKISH MARSH CM2

PROPOSED SHEME

- POTENTIAL GREENWAT ROUTE (OFF ROAD)
- POTENTIAL GREENWAT ROUTE (OFF ROAD) ALTERNATIVE ROUTE
- POTENTIAL GREENWAT ROUTE (ON ROAD)
- POTENTIAL GREENWAT ROUTE (ON ROAD) ALTERNATIVE ROUTE
- POTENTIAL GREENWAT ROUTE (OUTSIDE SCOPE OF PROJECT)
- POTENTIAL GREENWAT ROUTE (OUTSIDE SCOPE OF PROJECT) ALTERNATIVE ROUTE
- DUNDALK POTENTIAL STORAGE AREAS
- DUNDALK HARD FLOOD DEFENCE