CP1021 East Meath North Dublin Reinforcement Project

Step 4a Constraints Report

August 2022

EirGrid

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Contents

Abbreviations	
ACA	Architectural Conservation Areas
AAP	Areas of Archaeological Potential
AEOS	Agri Environmental Options Scheme
AIS	Air insulated
ASI	Archaeological Survey of Ireland
CAFE	Cleaner Air for Europe
CFRAM	Catchment Flood Risk Assessment and Management
CDP	County Development Plan
CSO	Central Statistics Office
EHV	Extra High Voltage
EMF	Electric and Magnetic Field
EPA	Environmental Protection Agency
FCC	Fingal County Council
GDD	Greater Dublin Drainage project
GIS	Geographic Information System
GSI	Geological Survey Ireland
HDD	Horizontal Directional Drilling
HGV	Health Goods Vehicle
IGHS	Irish Geological Heritage Sites
i-WeBS	Irish Wetland Bird Survey
LCA	Landscape Character Area
MVAr	Mega Volt Amps (reactive)
MCA	Multi-Criteria Analysis
MCC	Meath County Council
NIAH	National Inventory of Architectural Heritage
NHA/ pNHA	Natural Heritage Area/ Proposed Natural Heritage Area
NPWS	National Parks and Wildlife Services
OHL	Overhead Line
OPW	Office of Public Works
PWS	Public Water Supply
RMP	Record of Monuments and Places
RPS	Records of Protected Structures
RBMP	River Basin Management Plan
SAC	Special Area of Conservation, designated under the EU Habitats Directive
SI	Statutory Instrument
SMR	Sites and Monuments Record
SPA	Special Protection Area, designated under the EU Birds Directive
TPC	Total Project Cost
TSO	Transmission System Operator
TSSPS	Transmission System Security and Planning Standards
UGC	Underground cable

Abbreviations	
WHO	World Health Organisation
WFD	Water Framework Directive
XLPE	Cross-linked polyethylene

Glossary of Terms	
Joint Bays	A maintenance hole ("man-hole") located at regular intervals along the cable route constructed beneath the ground to facilitate the jointing together of the cables.
Bay	A connection point to a busbar and comprised switchgear and measurement equipment.
Busbar	An electrical conductor located in a station that makes a common connection between several c
Reactive Compensation	The process of supplying reactive power to the network to compensate for reactive power usage at a point in time
Reactive Power	The portion of electricity that establishes and sustains the electric and magnetic fields of alternating current equipment. Reactive power is measures in Megavars (Mvar).
Shunt Reactor	A shunt reactor is a piece of electrical equipment used in high voltage power transmission systems to stabilize the voltage. Usually located within substations.
Switchgear	A combination of electrical equipment such as disconnect and/or circuit breakers used to isolate equipment in or near an electrical station.
Transformer	An item of electrical equipment that allows electrical power to flow between typically two different voltage levels in an alternating current (AC) power system.

Executive Summary

Capital Project 1021 (hereafter referred to as the Proposed Development will reinforce the electricity network between East Meath and North Dublin. The Proposed Development will help meet the growing demand for electricity in the east while also facilitating increasing amounts of renewable electricity generated by windfarms. This growth is due to increased economic activity and the planned connection of new data centres in the region. The Proposed Development aims to strengthen and transfer power across the existing 220kV transmission network from Woodland 400kV substation to the East Meath and North Dublin area. It is proposed to do this through the use of a new 400kV underground cable (UGC) (two phases of conductors in trench approximately 1.5m to 2m wide).

This Constraints Report has been prepared to identify the constraints that will be considered in the identification of route options for the Proposed Development. The Study Area for the Constraints Study is provided in Figure A.

Figure A: Proposed Development Study Area

Types of Constraints

A number of different types of constraints have been identified in order to gather the widest evidence possible to help inform the identification of route options. They are:

- Socio-Economics Factors:
  - Traffic and Transport;
  - Amenity;
  - Human Health;
  - Economy;
  - Utilities and Critical Infrastructure; and

  - Agronomy and Equine.
- Environmental Factors:
  - Biodiversity, Flora and Fauna;
  - Soils and Water;
  - Material Assets – Planning Policy and Land-Use;
  - Landscape and Visual;
  - Cultural Heritage (Archaeological and Architectural Heritage);
  - Noise and Vibration;
  - Air Quality; and
  - Climate Change.

Overview of the Study Area

The Study Area lies within the Eastern and Midland Region of Ireland and is for the most part within the administrative boundaries of Meath and Fingal County Councils. A small portion is also within the northern boundary of Dublin City Council, however for the purposes of the Constraints Study this is not considered in detail as it has the potential to skew the data. Project Ireland 2040 (Government of Ireland, 2021), describes this region as having experienced high levels of population growth in recent decades, at more than twice the national growth rate. If the 2016 trend of internal migration outflows from Dublin to the other regions returns to 2006 levels, the Mid-East Region is projected to show the highest percentage population increases by 2036 – from 690,900 in 2016 to 965,300 by 2036.

There has been a rapid population growth in the rural areas with an increasing number of single rural dwellings, typically in linear form along road fronts. Consistent with Project Ireland 2040's National Strategic Outcome of 'Compact Growth', Meath and Fingal County Development Plans have policies which attempt to focus any expansion of residential and commercial areas into the larger towns of the counties, however it is anticipated that there will be an increase in the number of linear settlements leading into and from both small and large towns.

The feasibility studies in Step 3 identified significant constraints for underground cables in densely populated areas such as Blanchardstown and Swords. These areas have now been excluded from the study area and there are now no major towns in the Study Area. There are a number of other smaller villages and linear settlements with populations below 1,000. In addition to residential populations, these settlements host community facilities such as schools, churches, parks and recreational areas; employment areas; and retail areas.

The Study Area is broadly a tale of two halves:

- The northern/western half is largely rural with agricultural land and small businesses dominating; and

- The southern/eastern half is largely industrial and commercial, dominated by Dublin International airport and the coming together of three major motorways/national roads, the M1, M2/N2 and M3/N3, at the M50 in the vicinity of Finglas and Belcamp.

Major employers in the Study Area include the airport, large Information technology companies such as IBM and Facebook, and pharmaceutical companies.

The proximity to major transport corridors, the city of Dublin and Dublin Airport has prompted a number of planning applications for developments close to the M50 and along the other motorway corridors. There are

also a number of significant infrastructure projects proposed in the Study Area, including the Greater Dublin Drainage project and Metrolink.

In terms of environmental factors, the refining of the Study Area from Step 3 means there are now no protected sites for nature conservation within the Study Area; there are however numerous important and valued habitats including mature trees and hedgerows lining local roads and field margins, and 15 water bodies.

The water bodies are almost all At Risk of not achieving their Water Framework Directive (WFD) objectives, with ten of the 15 being of Poor status. There are no designated sites of geological importance.

There are areas at risk of flooding associated with the various water bodies in the Study Area. There are sites of cultural heritage importance across the Study Area including National Monuments and listed buildings. There are four Landscape Character areas; but no protected views or scenic routes.

Potential Impacts

The biggest impact the Proposed Development will have will be to reinforce the electricity network between East Meath and North Dublin. Reinforcement of this part of the network is needed to continue to ensure the security of the network feeding the east of Meath and the north of Dublin. It will help meet the growing demand for electricity in the east of the country due to the increased economic activity in recent years while also facilitating increasing amounts of renewable electricity that is generated by windfarms in the west and south of the country and transported for use in the east.

There is, however, a wide variety of potentially adverse impacts on the socio-economic and environmental factors listed above, especially during construction of the Proposed Development. Of particular note will be impacts to Traffic and Transport as a result of installation of the UGC where the infrastructure interacts with the public highway network, and subsequent impacts on communities, businesses and access to community facilities. The potential for this to include disruption to Dublin Airport's operations will be a significant consideration in the development of potential route corridors.

Also of note is the potential for impacts on biodiversity; these will arise where trees and hedgerows need to be removed, where watercourse crossings are required and are not in existing road bridges, and where off-road sections are required across agricultural land and field boundaries. Impacts to trees and hedgerows will involve both temporary vegetation loss for temporary works area, and permanent vegetation loss at off-road cable routes, substations, and associated access routes.

The potential for pollution of watercourses during construction of the Proposed Development is also a factor and would have direct and indirect impacts on aquatic habitats. The Proposed development will be designed to minimise impacts as far as possible – with reference to EirGrid's Evidence Based Environmental Studies – with measures in place during construction and operation to mitigate impacts and to incorporate biodiversity restoration and enhancement. Construction will be undertaken in line with industry best practice and communities and stakeholders will be kept informed throughout.

1. Proposed DevelopmentIntroduction

1.1 What is the Capital Project 1021 Upgrade?

The East Meath-North Dublin Grid Upgrade will strengthen the electricity network in the east of Meath and the north of Dublin to improve the transfer of power across the existing transmission network.

The Proposed Development will add a high-capacity 400 kV underground cable electricity connection from Woodland substation near Batterstown in County Meath to Belcamp substation near Clonshaugh in north Dublin.

1.2 Framework for Grid Development Explained

EirGrid follow a six-step approach when they develop and implement the best performing solution option to any identified transmission network problem. This six-step approach is described in the document 'Have Your Say' published on EirGrid's website[i]. The six steps are shown on a high-level in Figure 1-1. Each step has a distinct purpose with defined deliverables and represents a lifecycle of a development from conception through to implementation and energisation.

Figure 1-1 : EirGrid's six-Step Framework for Grid Development

The Proposed Development is in Step 4 of the above process (and currently in the early part of Step 4 referred to as Step 4a). At the conclusion of Step 3, taking all elements of the Multi Criteria Analysis undertaken in Step 3 into consideration, it was decided that the best performing solution was a 400kV underground cable (UGC)[1] between the existing Woodland 400 kV substation, near Batterstown Co. Meath, and the existing Belcamp 220 kV substation near Dardistown and Coolock in North Dublin. For this stage of the development a worst case scenario of approximately 2 metres will be used as the trench width.

The aim of Step 4 is to determine the route of UGC between Woodland and Belcamp substations.

1.3 Aims and Contents of the Constraints Report

The purpose of this report is to review and update the constraints identified in Step 3 to focus on the best performing option of a 400 kV UGC to Belcamp, and ensure they are considered appropriately in the determination of the route of the Proposed Development. The objective of the Constraints Study is to identify the international, national, county, and local issues that must be taken into account when planning and designing the Proposed Development so that the steps which follow can be properly informed.

[1] The decision-making process is explained in EirGrid's Step 3 Best Performing Option Report (March 2021). Available at: https://www.eirgridgroup.com/site-files/library/EirGrid/Kildare-Meath-Grid-Upgrade-Step-3-Best-Performing-Option-Report.pdf

This report is based on publicly available information and will be updated as the projects evolves. For instance, further information on constraints will be identified from multidisciplinary surveys and assessments, which will be undertaken at a later stage of the project and identified from liaison with stakeholders. The utmost care has been taken in producing this Constraints Report. However, the Study Area is a large area with densely populated sections, and it is not always possible to represent every constraint in this report (e.g. to show every business and each dwelling on a map). The project team has used online mapping and Geographical Information System (GIS) to ensure that details are not missed and will be fully taken into account in the development of route options. This mapping is available for public viewing at: https://www.eirgridgroup.com/the-grid/projects/cp1021/the-project/

The structure of the report is as follows:

- Outline of the Proposed Development
- Background and methodology for Constraints Reporting and Mapping
- The Constraints:
    - Introduction to and Overview of sub study areas including socio-economic and environmental constraints;
    - Socio-economic constraints – whole study area; and
    - Environmental constraints – whole study area.

1.4 Study Area

As part of Step 3, the Study Area was refined by considering a wide variety of factors. These included technical requirements of the Proposed Development, road network presence, settlements, presence of existing electrical utilities, physical constraints e.g. motorway, river or rail crossings and environmental constraints. In particular, the conurbations of Swords and Blanchardstown have been excluded from the Study Area (see Figure 1-2); as has Malahide Estuary, which is a European designated site.

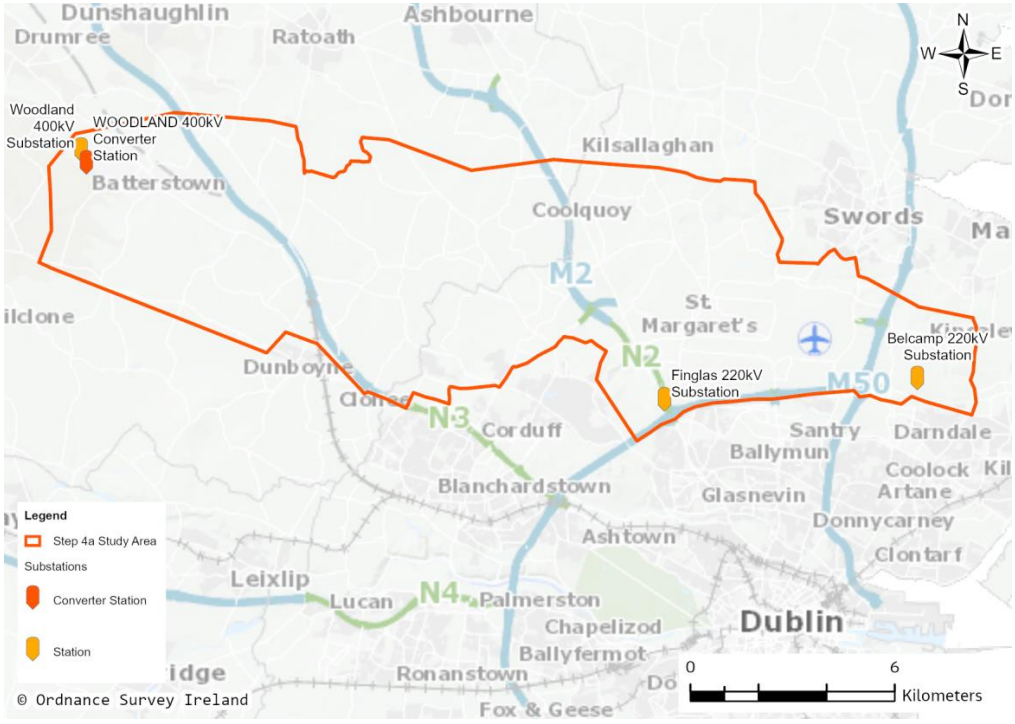

Figure 1-2 Study Area

2. Proposed Development

2.1 Proposed Development Description

2.1.1 Project Solution

The Proposed Development is a 400 kV underground cable (one circuit constructed along one route, approximately 45km) between Woodland 400 kV substation and Belcamp 220/110 kV substation. The single circuit comprises of three cables in a flat formation, buried in a trench of approximately 3m width and 1.5m (see Figure 2-1). Joint bays and associated passing bays (where necessary) will be required at approximately every 500 to 800m along the length of the route. A new 400kV station will be required at Belcamp to facilitate the connection; that is part of a separate project.

Figure 2-1 Typical 400 kV Cable trench

2.1.2 Cable Installation

An important aspect of this technology from a constraint and impacts' perspective is the method used to install the cables. There are three different methods that can be employed to install the cables, depending on the nature of ground and local constraints:

- Trenched (or 'Open Cut'). For the majority of the route, the cables will be installed in ducting using 'Open Cut' techniques this includes the crossing of minor watercourses and other constraints; however, at significant constraints such as railways, major roads, forests, large rivers or canals, trenchless or bridging techniques are more likely to be employed.
- Trenchless: used to pass beneath large rivers, railways, motorways or other significant constraints. There are three potential types of trenchless installation that may be used:
    - Horizontal Directional Drilling (HDD), installed at pinch points like major road crossings or under waterways. This is likely to be the most commonly employed trenchless technique for the Proposed Development;
    - Deep bore tunnel; and
    - Pipe Jacking/micro tunnels.
- Bespoke cable bridges.

Trenched (Open Cut) For the Open Cut method, the proposed trench will be approximately 2m wide and approximately 1.5m deep. Every 500m to 800m joint bays will be installed (buried in the ground) which are approximately 2.5m wide and 10m long. Joint bays located off-road will require permanent access tracks for maintenance purposes, the design and location of which will be determined in consultation with landowners during later steps in the development of the Proposed Development.

In order to install the cables using the Open Cut technique, a temporary working strip or 'swathe' is required to facilitate the construction. This is defined as the area of land required for the construction of high voltage UGC. This is larger than the width of the trench alone as there will be various ongoing construction activities within the temporary working strip. The working area could be offset so that works take place away from the cable trench. For instance, if the cable trench is in a narrow local road, equipment and materials could be stored in a nearby construction compound. These details will be designed, assessed and discussed with landowners before they are agreed. Typical activities include:

- Storage of equipment, and materials;
- Separate storage of excavated topsoil and subsoil for satisfactory reinstatement of farmlands and semi-natural habitats
- Delivery of cable drums to site;
- Excavation of the cable trench;
- Cable drums and accessories deliveries;
- Excavation equipment deliveries;
- Jointing equipment and wellbeing facilities deliveries and removal;
- Specialised backfills deliveries;
- Waste removal; and
- Staff ingress/egress from site.

HDD

For HDD a temporary working area is also required to accommodate the drill rig (size of tractor), material storage, drilling waste storage, surface water treatment, testing facilities for samples, welfare facilities etc. Subject to ground conditions and the width of the crossing and duration of works, a temporary HDD compound of approximately 50 x 60m is required. The 'launch' pit for where the rig, and 'reception' pits (each approximately 3m x 5m) requires the temporary installation of a level hard-standing area on a geotextile base.

2.1.3 Substation Works

There will also be substation extensions required at Woodland and Belcamp for additional infrastructure required to facilitate the connection of the 400 kV UGC to the substations. These are not being progressed as part of this project but as part of separate planning applications, currently proposed to be submitted in Autumn/Winter of 2022/2023. Necessary works at the substation are:

- A new bay will be required for the 400 kV busbars in Woodland;
- New 400 kV gas insulated substation switchgear and associated infrastructure will be required to be constructed at Belcamp to facilitate the new 400 kV circuit; and
- To facilitate the cable connections to the network, reactor devices (100 Mvar) and associated equipment at either end of the cable circuit (possible filters to be determined at design phase to take account of more accurate data) will need to be installed.

2.1.4 Nature-Inclusive Design

The design will incorporate biodiversity restoration and enhancement, and return of farmlands to pre-works condition for all temporary construction areas associated with the UGC installation.

3. Approach to Constraints Report

3.1 Introduction

This section of the report sets out the approach to identifying the specific constraints present in the Study Area.

It also presents the constraints that have been considered and organises them under particular topics to aid understanding and presentation of the assessment findings. These topics were selected as they are the most likely to represent the key considerations, constraints, risks and opportunities for the pProposed Development. The constraints identified are high-level gathered from the desk-based studies carried out under each topic and will be updated, where applicable, following site surveys.

The national picture for Ireland is presented in this section to give the overall context for the choice of the constraints and their associated topics; Section 4 describes the baselines for each topic in relation to the Study Area and considers the key issues and potential impacts in relation to this.

3.2 Preparation of Constraints Report

3.2.1 Information Gathering

The constraints identified are, in general, based on a review of publicly available datasets. All sources and references are listed at the end of this report. The following draft and adopted County Development Plans (CDP), Local Area Plans, and mapping were reviewed:

- Meath County Development Plan 2021-2027[ii];
- Fingal County Development Plan 2017-2023[iii]; and
- Draft Fingal Development Plan 2023 – 2029[iv]

The following online resources were also referenced to inform this report:

- Meath County Council[v];
- Myplan.ie Mapping[vi]:
- Central Statistics Office, CSO[vii].
- Data.gov.ie[viii];
- National Parks and Wildlife Services, NPWS[ix];
- National Biodiversity Data Centre[x];
- Irish Ramsar Wetland Committee[xi];
- Environmental Protection Agency (EPA) mapping[xii];
- Geological Survey Ireland, GSI[xiii];
- National Monuments Service[xiv]
- National Inventory of Archaeological Heritage[xv];
- Heritage Mapping[xvi]
- GeoHive[xvii];
- Irish Wetland Bird Survey, i-WeBS[xviii];
- EirGrid Project Related Documents[xix]; and

- The Karst of Ireland (GSI, Geological Survey Ireland, International Association of Hydrologists, Irish Association of Economic Geology, 2000[xx].

3.2.2 GIS Constraints Mapping

Geographic Information System (GIS) mapping has been used to display the key datasets that inform this report. Where appropriate these maps are embedded within the report for ease of reference.

Datasets

GIS datasets were collated from a variety of sources including direct data downloads from open source authority sites. A number of datasets were already held or gathered by Jacobs; these were checked as appropriate to ensure they were up to date and a copy was imported into the pProposed Development's databases.

All data licenses were checked to ensure they were available for use. Each dataset then went through a technical check to ensure they were complete, correct and relevant. All datasets were re-projected to IRENET95 Irish Transverse Mercator projection system (EPSG:2157). Where possible, ArcGIS layer files were then used to ensure each dataset was symbolised in line with the authoritative body it was sourced from. The data sourced for constraints mapping is detailed in Appendix A.

3.2.3 Guidelines

This Constraints Report has been undertaken with reference to the following guidance and methodologies:

- Environmental Protection Agency. 2017. Guidelines on The Information To Be Contained In Environmental Impact Assessment[2] Reports (Draft)[xxi];
- EirGrid. 2015. Cultural Heritage Guidelines for Electricity Transmission Projects[xxii];
- EirGrid. 2014. EirGrid Evidence Based Environmental Studies.[xxiii];
- EirGrid, 2014. Your Grid, Your Views, Your Tomorrow. Responding to Equine Concerns[xxiv]; and.
- EirGrid. 2020. Ecology Guidelines for Electricity Transmission Projects[xxv].

3.3 Topics

The constraints have been organised into the following topics:

- Socio-Economics Factors:
  - Traffic and Transport;
  - Amenity;
  - Human Health;
  - Economy;
  - Utilities and Critical Infrastructure; and
  - Agronomy and Equine.
- Environmental Factors:
  - Biodiversity, Flora and Fauna;
  - Soils and Water;

[2] The Proposed Development has not yet been subject to a screening to determine if an Environmental Impact Assessment (EIA) is required. This will be at a later step in the project.

- Material Assets – Planning Policy and Land-Use
- Landscape and Visual;
- Cultural heritage (Archaeological and Architectural);
- Noise and Vibration;
- Air Quality; and
- Climate Change.

4. Baseline Reporting

4.1 Introduction

This section of the report sets out the baseline conditions present in the Study Area and highlights the potential constraints/impacts associated with the identified topics.

4.2 Assumptions and Limitations

Before the baseline and potential impacts are outlined there are a number of assumptions that have been made for the Proposed Development:

- The cable will be installed in sections equal to the length of cable on drum (approx. 700m);
- Preference will be given to installing the cables in the public road network in local areas, and vegetation screening which is designed to function for biodiversity;
- It is not known if the cables can be laid in bridges crossing rivers; it is assumed that this would be utilized wherever possible; where there is insufficient depth in the road, open cut or trenchless crossings of the rivers to the side of the bridges will be carried out;
- The cables will be connected into Belcamp and Woodland substations as cables and there will be no requirement for Overhead Line (OHL) connections at either end of the route; and
- It is estimated that the construction of the Proposed Development will have a duration of up to three years assuming no unforeseen delays. The construction duration will be refined at the next step of the Proposed Development (i.e. Step 5) when further design and assessment will be carried out.

The potential impacts identified in the following sections are not based on a preferred route or final design of the Proposed Development. They have been included in this report as potential constraints to the project which will be taken into consideration. The potential impacts could be resolved by routing, design, and/or mitigation measures and may not occur. Further assessment will be completed throughout the next stages of the project to ensure all impacts are fully considered.

4.3 Baseline Reporting – Overview

The Study Area has been sub-divided into several smaller sections where similar opportunities and constraints exist (see Figure 4.1).

The sub-study areas are as follows:

- Area A: Woodland Surrounding Area
- Area B1: M2 to Kilbride
- Area B2: North of Corduff
- Area C1: Kilbride to M3
- Area C2: St Margaret's to Swords
- Area D: Finglas Surrounding Area
- Area E: North of Dublin Airport
- Area F: South of Dublin Airport
- Area G: Belcamp Surrounding Area

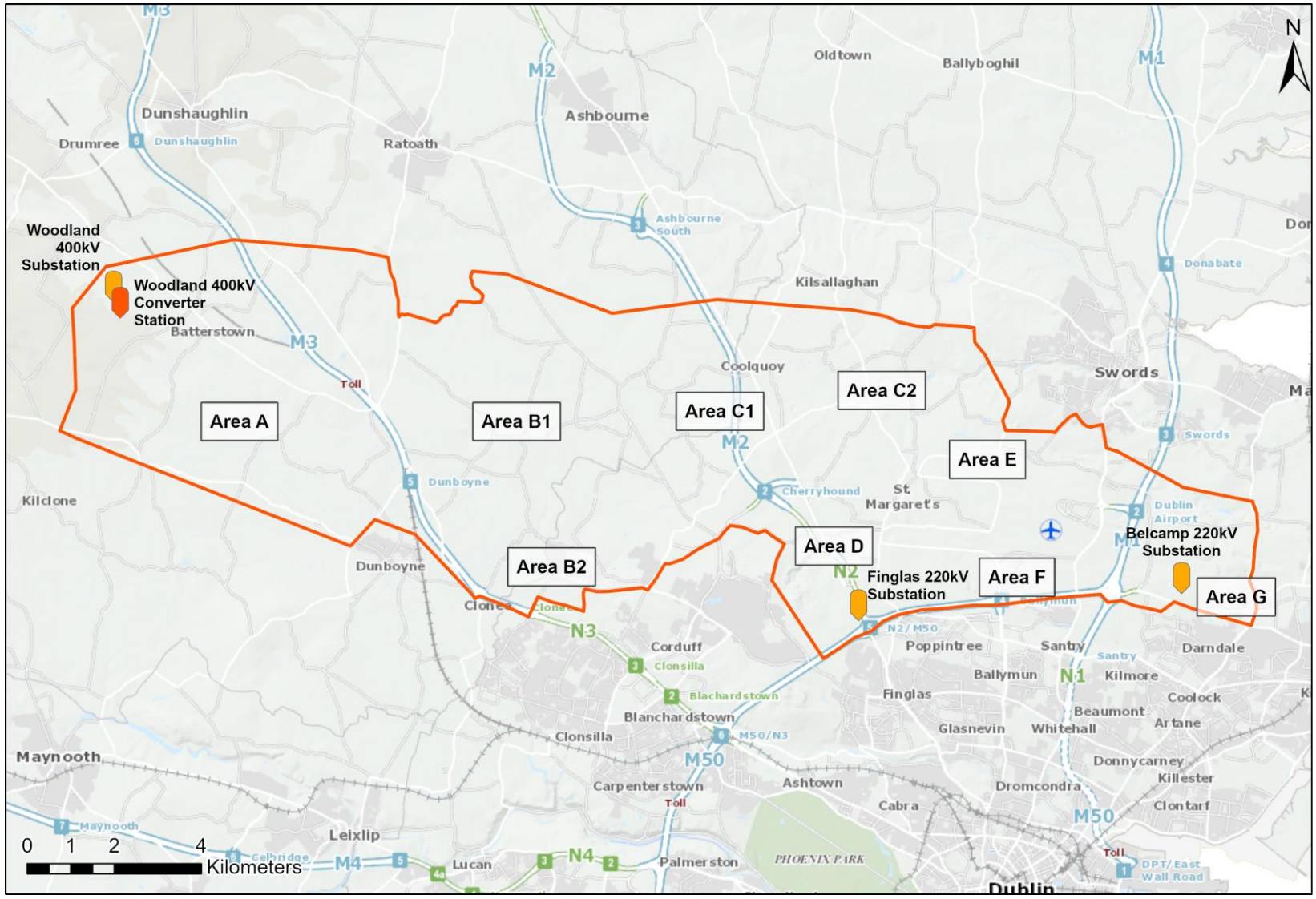

Figure 4-1 Overview map of sub-study areas

A summary of the characteristics of each sub-study area is provided in this section.

An overview of the various constraints across the whole Study Area is provided in Sections 4.4 and 4.5.

4.3.1 Sub-study Area A

Area A is located in the westernmost part of the Study Area and includes the area surrounding the existing Woodland 400kV substation and swathe of agricultural land bounded to the south by the R156 and to the north by the M3.

The Area is largely rural with a number of linear settlements and communities along local and regional roads, notably, Batterstown and Moyleggan on the R154 to the north, Lismahon and Warrenstown in the central area and Harlockstown and Morganstown along the R156. Dunboyne is to the south of this Area but outside of, having been excluded as a viable area for routing the UGC during Step 3 of the project.

Key transport corridors run through the Area including the M3 motorway, R154 and R156 regional roads and one railway which terminates in the southern section of the area, north of Dunboyne. The Area is criss-crossed by a number of narrow local roads.

There are approximately 25 commercial and community assets within the Area, including Thorntons Recycling Centre, Dunboyne College of Further Education and Bracetown Business Park. Equine businesses include Ballymaglassan Stud Farm, Karlswood Equestrian Centre and Woodpark Stud Farm. Land-use is largely agricultural comprised mainly of pastures with a small area of non-irrigated arable land.

There are three landscape character areas (LCA) in this Area; South-East Lowlands LCA), Ward Lowlands LCA and a small area of Tara Skyrne Hills LCA to the west. It is situated within the Tolka river basin where three waterbodies drain the area; Tolka_020, Tolka_010 and Dunboynestream_010.

4.3.2 Sub-study Area B1

Area B1 comprises a wide corridor between the M3 motorway at Pace and Bracetown Business Park in the west to Kilbride in the east.

The Area is largely rural, however there are several commercial and industrial areas in the west close to the M3. Settlements in the area are linear, generally, along local roads and include Pace, Caulstown, Belgree, and Kilbride.

There is one major transport corridor in the Area; the M3. The regional road R147 travels in a north to south direction at the western edge of the Area and the Area is criss-crossed by narrow local roads. There are no railways in the Area.

There are approximately 20 community and commercial assets in the Area. Community assets include Kilbride GFC Sports Club and Kilbride National School. Commercial enterprises in the Area notably include MSD Ireland Pharmaceuticals and the Kilsaran Group headquarters. Both are based in Pace, close to the M3. There are several businesses at the Bracetown Business Park and there is a large retail outlet of Avoca is in the Area close to the M3 also. Land-use is predominately agricultural, made up of pastures and non-irrigated arable lands. Equine industries include a small number of stud farms and an equestrian sales centre.

The Area is located within the Ward Lowlands LCA. It is within the Tolka and Broadmeadow River basins with four water bodies draining the area; Tolka_020, Pinkeen_010, Ward_010 and Ward_020.

4.3.3 Sub-study Area B2

Area B2 is a broad corridor of land bounded to the west by the R147 and M3, to the south by the northern edge of Blanchardstown and stretches to the southern section of Kilbride Road, where it intersects with Area C.

The Area is a mix of commercial and industrial complexes, suburban housing developments and a small amount of agricultural land. Key settlements are Damastown, Macetown Middle, Tyrrelstown and Hollywoodgrath. Clonee, Blanchardstown and Mulhuddart are just outside this Area and the main study area having been excluded as viable areas for routing the UGC during Step 3 of the project.

To the west of the Area, there is a major transport corridor in the form of the M3; regional road R147 is also in this vicinity; a significant local road, Damastown Road zigzags through commercial areas and joins the R121. The R121 travels in a north-easterly direction to Kilbride Road. Bracetown 200kV substation is located to the west of the Area.

There are approximately 20 community and commercial assets in the Area. Community facilities include Mulhuddart Cemetery, Le Cheile Secondary School, Tyrrelstown House, Tyrrelstown Park and cricket club. There is a large golf course at Hollystown however this has recently closed. Commercial enterprises are significant in this Area and include a large Facebook datacentre, an IBM Campus, a number of pharmaceutical companies and a variety of industrial premises. There is limited agricultural land in the Area; where there is it is largely pastureland.

There are four LCAs in the Area: South-east Lowlands LCA; The Ward Lowlands LCA; River Valleys/Canals LCA; and Low Lying Agricultural LCA. It is within the Tolka river basin where three water bodies drain the area: Tolka_030; Pinkeen_010; and Powerstown (Dublin)_010.

4.3.4 Sub-study Area C1

Area C1 is the largest of the sub-areas, rural in nature becoming slightly suburban towards the south of the Area. It stretches from Newtown Commons in the north to Kilshane in the south, from Kilbride in the west to Newpark in the east and is bisected by the M2 motorway.

Most communities are in the form of linear settlements along regional and local roads, with a small number of villages where housing estates, commercial premises and services provide a more defined settlement area. Key settlements include Baytown, Mabestown, Coolquoy, Ward Cross, Hollystown, Hollywoodgrath and Broghan.

The M2 motorway, R121 and R132 regional roads are the key transport corridors. There are a number of narrow local roads crossing the Area west to east. There are no railways in this Area.

There are approximately 25 community and commercial assets in this Area. Community facilities include Hollystown Golf Club (now closed), Kilbride National School and Kilkoskan National School. Commercial enterprises are general small local businesses with few exceptions to this. Land-use is predominately agricultural comprising of pastures and non-irrigated crop lands. There are some equine related industries, although few stud farms. There is a holiday (caravan) park to the southeast of the area and small guesthouses in the larger settlements.

There are three LCAs in the Area: the Ward Lowlands LCA, Rolling Hills with Tree Belts LCA and Low-Lying Agricultural LCA. It is in the Broadmeadow River basin where three water bodies drain the area; Ward_030, Ward_020 and Ward_010.

4.3.5 Area C2

Area C2 is in the north-east of the Study Area. It stretches from Sugarstown in the north to St Margaret's in the south, from Ward Cross in the west to the western edge of Swords in the east; it is bisected north to south by the R122.

Whilst settlements are generally linear in character, similar to other Areas in the north and west of the Study Area, there is a greater number of small housing estates and cul-de-sacs here. Main settlements include Sugarstown, Lauristown, Ward Cross, Tyrellstown, Kilbrook, St Margaret's and Knocksedan.

The R122 travels in a north south direction through the Area and is joined by the R121 at Chapel Midway. There are a number of local roads criss-crossing the Area. This Area is close to Dublin International Airport; further details on this are provided in the summary for Areas E and F.

There are approximately 20 community and commercial assets in the Area. Community facilities include Corrstown Golf Club, St Margaret's Golf Course and Ward Cross Indoor Football centre. Commercial enterprises are largely located to the south and east of this Area and include a significant number of industrial greenhouses in the lands to the north of the airport, bounded to the east by the R108. Agricultural land use is generally pasture- land with some non-irrigated arable land. Its agronomy ranges from small farms to equine facilities including Monks Field Equestrian and Forrest Equestrian Centre.

There are two LCAs in this Area: Low lying Agricultural LCA and Rolling Hills with Tree Belts LCA. It is within the Broadmeadow River basin and three waterbodies drain the area; Broadmeadow_030, Ward_030 and Ward_040.

4.3.6 Area D

Area D is in the southwest of the Study Area. It stretches from the M50 in the south to Broghan in the north; from Huntstown in the west to St Margaret's in the east. It is bisected by the M2/N2 motorway/national road.

There are few residential settlements in the Area which is a mix of agricultural and industrial/commercial in terms of predominant land use. Communities within the Area include Broghan, Newtown, Kilshane Cross, Coldwinters, Johnstown, Huntstown and Baslekin. Residential areas within this Area are in small clusters, along local roads and to the north of the Area closer to St Margaret's.

There are a number of commercial enterprises and centres including Newtown House Business Park, Dublin Airport Logistics Park, Huntstown power station, Huntstown quarry and Finglas substation. Key transport corridors are the M2/N2, the M50 and regional road R135. There is a small number of farms which is mostly pastureland although some complex cultivation of the land also exists; much of the farmland in the south of this Area has been identified for future developments. Proposed developments in the area include the Datacentre north of Finglas substation and the Greater Dublin Drainage (GDD) Project, which crosses the Area west to east also just north of Finglas substation.

The Area is in the Low Lying-Agricultural LCA. It is in the Broadmeadow River basin drained by the Ward_030 water body.

4.3.7 Areas E and F

Areas E and F lie directly adjacent to Dublin Airport (north and south of the airport respectively), in the south-eastern section of the Study Area. Area E is bounded to the north by the suburbs of Swords, and the south by Dublin Airport; Area F is bounded to the north by Dublin Airport and to the south by the M50. Both stretch from St Margaret's in the west to the M1 in the east.

There are few residential settlements in these Areas. St Margaret's, a small village to the west and Forest Little, a suburb of Swords, being the main exceptions.

There are a number of community and commercial assets. Prominent community facilities include St. Margaret's Catholic Church, Forrest Little Golf Club, Silloge Park Golf Club, Ballymun Kickhams GAA Club, Dardistown Cemetery and the National Show Centre. The proximity to the airport means there are also hotels in these areas, notably the Carlton Hotel on the R132 south of the entrance to the airport. There are many smaller commercial enterprises and centres associated with the airport, including car parking, car rental, Horizon logistics park and several motor-related businesses immediately north of the M50 on the R132.

Key transport corridors are the M1, M50, the R132, the R108 and Naul Road. Outside of the airport, land is largely agricultural, except for the areas immediately adjacent to the airport to the south and east of it. Agriculture is mostly pastureland. The proposed route of GDD cuts through Area F from east to west, across Silloge Golf Club and towards the M1, which it will cross to reach a proposed new WwTP at Belmont. The proposed route for Metrolink crosses Areas E and F in a north south direction and will be in a tunnel beneath Dublin Airport

Both Areas are in the Low-Lying Agricultural LCA. Area E is in the Broadmeadow and Mayne River basins drained by three waterbodies; Ward_030, Sluice_010 and Gaybrook_010. Area F is in the Mayne River basin with two waterbodies present; Mayne_010 and Santry_010.

4.3.8 Area G

Area G is the Area surrounding the existing Belcamp 220kV substation. It is bounded to the west by the M1, to the north by Baskins Lane, to the east by Malahide Road (R107) and to the south by the R139.

There are linear settlements along all of the significant transport corridors in this Area; communities include Baskin, Kinsealy, Balgriffin, Belmayne, Northern Cross and Priorswood. The R139 forms the northern boundary of Dublin City Council; south of this road there is extensive residential development. Newer development has begun to the north of this road and east of Malahide Road with additional housing proposed and under construction to the northwest of Northern Cross roundabout. In the central area of this Area there are few residential properties; it is almost entirely agricultural land.

There are several community facilities in this Area, including Innisfails GAA Club, Trinity Care Anovo Care Nursing Home and the Clayton Hotel Dublin Airport. There are also two large cemeteries on Malahide Road: Fingal Cemetery and Balgriffin Cemetery. Washington Monument, a key tourism attraction, is at Belcamp College, an area northwest of Northern Cross, currently under development for new housing. There are small businesses along the key transport corridors; there are no large businesses or business parks. Belcamp 220kV substation is in the south of this Area, off the R139.

Key transport corridors are Baskin Lane, Malahide Road, the R139, Stockhole Lane and the M1. The R139 and Stockhole Lane house an aviation fuel line which leads to the airport. Land-use is mostly agricultural comprising non-irrigated arable land. Agronomy includes Newtown Stud Farm on Baskin Lane. Several future developments are proposed for the area including the GDD sewer and WwTP and the East-West Distributor Road. Both of these developments are proposed to be located immediately north of land at Belcamp substation; the road would be between the WwTP and Belcamp substation.

The Area is in the Low Lying Agricultural LCA. It is in the Mayne River basin with two waterbodies present; Santry_010 and Mayne_010.

4.4 Baseline Reporting – Socio-Economic Factors

4.4.1 Traffic and Transport

Baseline

The Study Area is situated in a strategic transport gateway, with important air, road and rail networks providing access to and from Dublin and the rest of Ireland. There are three motorways (M1, N2/M2, and the N3/M3) and numerous regional and local roads within the Study Area. A short branch of the Dublin to Sligo rail line terminates in the Study Area, north of Dunboyne. Dublin Airport, Ireland's primary international airport, is also located in the Study Area.

The breakdown of road types within the Study Area is:

- Motorway: 28km
- National Roads: 9km
- Regional Roads: 66km
- Local Roads: 131km

Meath and Fingal County Development Plans (CDPs) report that many residents of the county commute for employment. Transport routes within the Study Area are particularly important for commuting purposes for the residents to reach their places of employment. A very small percentage of those in employment work within the local government areas; Meath 15% and Fingal 16%. The commuting patterns in Meath and Fingal predominantly rely on private car transport as shown in Table 4.1.

Table 4.1 Commuting Patterns in Meath and Fingal

Commuting Pattern:	Fingal	Meath
Use of Private Car Transport	38%	46%
Use of Bus and / or Rail	14%	9%
Walk or Cycle	12%	9%

Congestion is anecdotally reported along major road transport links, particularly within and on approach to large settlements.

In 2019, Dublin Airport carried approximately 33 million passengers (CSO 2021). It is served by the M1, M50 and local regional roads. A new rail link (Metrolink) is proposed from Swords to Dublin which will include a station at the airport. A new east-west distributor road is proposed immediately north of Belcamp substation which will facilitate transport to the M1 and the airport from north Dublin.

Potential Impacts

From a transport and traffic perspective, potential impacts include:

- Accessibility of the existing roads during construction: As a UGC route would be largely in the public road, there are potentially very significant impacts on local and regional roads during its construction. Public roads in the Study Area vary in their widths, with some being only 4m wide. If routing is in more narrow roads, installation may necessitate whole road closures and diversions for short periods of time. In the wider roads, one carriageway may require to be closed, resulting in the need for traffic management measures This will result in restrictions to the accessibility of the existing roads during the construction phase. There may also be disrupted access to homes, businesses and community facilities. These impacts can be managed; a Construction Traffic Management Plan will be prepared and accompany the planning application for the Proposed Development in Step 5 of the project. The Construction Traffic Management Plan will consist of a variety of continually changing traffic management interventions along the route of the Proposed Development to alleviate the impacts on the operational road network.

- Traffic flow capacity: The additional traffic flows generated primarily by the construction stage of the Proposed Development will also have an impact on the surrounding road network. There is likely to be driver delay and disruption to commuters and regional distribution networks. A Traffic Impact Assessment will be carried out at later stages of the project which will address the specific requirements of Meath County Council (MCC) / Fingal County Council (FCC) and set out the receiving environment, future opening year conditions, likely traffic generated by the construction and operation of the Proposed Development. Traffic surveys will inform this assessment through identifying the baseline traffic conditions and a traffic analysis exercise will be carried out appropriately.
- Disruption to the road network surrounding Dublin Airport could have serious implications for its operations and could result in knock-on effects on other major transport corridors such as the M1 and M50, given the high number of passengers using the airport each day. A detailed assessment of the potential impacts on the airport will be carried out in consultation with DAA , and Meath and Fingal County Councils' Roads Departments.
- Capability of the Local Road Network for Heavy Goods Vehicle (HGV) traffic: The potential impact that HGVs accessing the Proposed Development will have on the surrounding road network (which consists of narrow carriageway widths and tight kerb alignments in some locations) is also a potential constraint. Road layout drawings, including the site access designs, will be prepared as part of the planning application to determine the capability of the local road network.
- Vulnerable road users: These are defined as non-motorised users of roads and include pedestrians, equestrians, and cyclists. Potential impacts as a result of whole or partial road closures include longer journeys and changes to local travel patterns; changes in amenity; and potential individual and community severance. Indirect impacts include the potential for changes in perceived fears for safety. An assessment of these potential changes will be carried out as part of the Traffic Impact Assessment and mitigation measures will be identified to minimise any impacts.

4.4.2 Amenity

Baseline

Travelling west to east between the Woodland substation towards the Belcamp substation, the density of properties increases. Swords, Dublin Airport and areas of Blanchardstown are the major constraints between the two substations. The Study Area has been refined at this step to reflect this, with Swords and Blanchardstown being excluded. Outside of these, much of the population lives in linear communities or rural clusters along regional and local roads. These linear communities and rural clusters largely comprise of residential properties however there are also community receptors (religious centres, schools, recreational amenities and parks, etc.) and commercial receptors (employment centres, retail and other commercial properties) present within these communities and also the larger settlements.

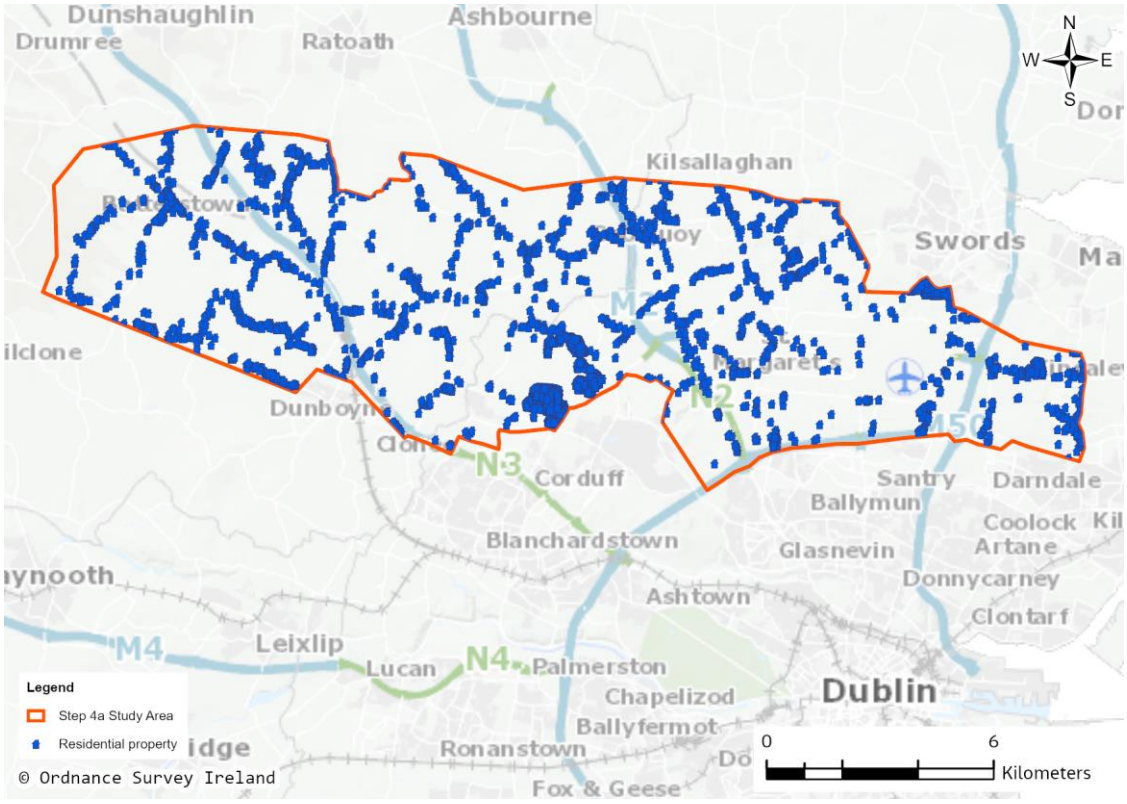

Figure 4-2 Properties (Residential and Commercial) in the Study Area

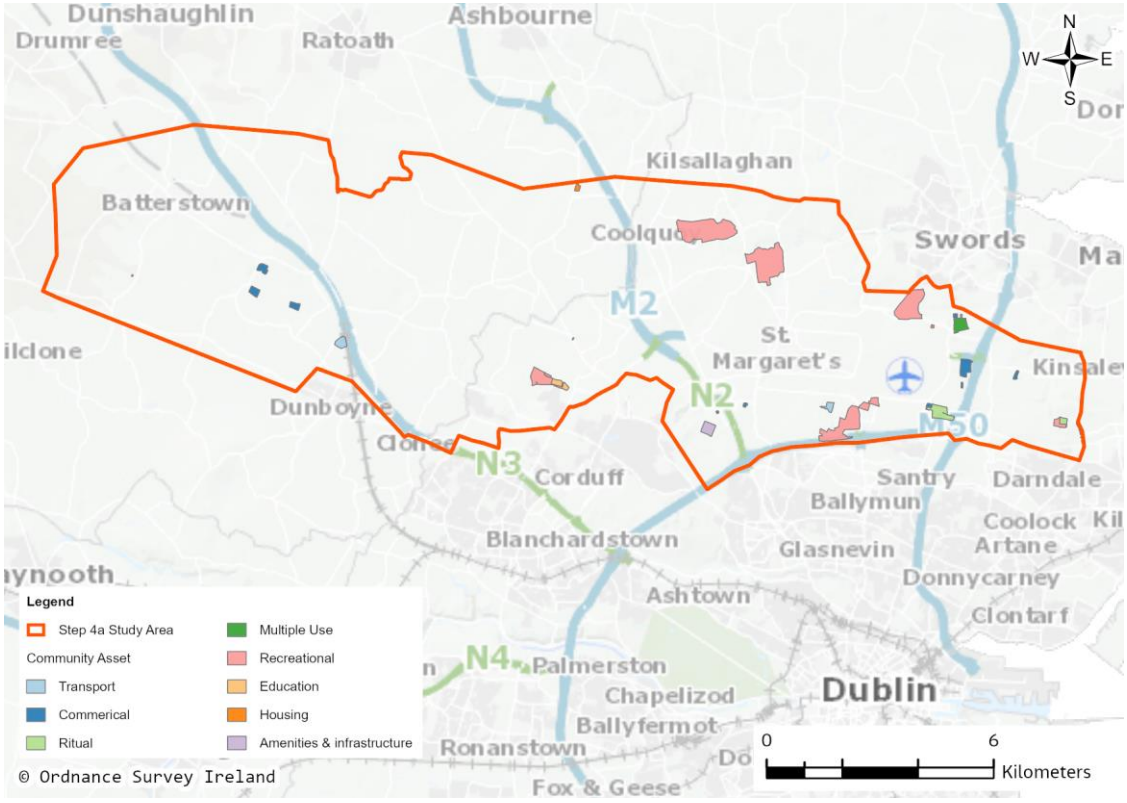

Figure 4-3 Community Infrastructure in the Study Area

Population Overview

The Study Area lies within the Eastern and Midland Region of Ireland and is for the most part the Study Area within the administrative boundaries of Meath and Fingal County Councils. A small portion is also within the northern boundary of Dublin City Council, however for the purposes of the Constraints Study this is not considered in detail as it has the potential to skew the data.

County Meath

The population of Meath has increased from 162,831 in 2006 to 184,135 in 2011 and 195,000 in 2016, representing a growth of 13% to 2011 and 20% to 2016. Over a 25-year period (1991-2016) County Meath experienced an 81.5% increase in its population.

The number of households in Meath grew from 31,798 in 1996 to 64,234 in 2016; a 49% increase, although household size declined during the same period, from an average of 3.42 to 3 persons per household (CSO, 2016).

Fingal County Council

The population in Fingal has almost doubled in the past 25 years, rising from 152,766 in 1991 to 296,214 in 2016. Between the period 2011 and 2016 the population in Fingal increased by 7.4% (22,029 persons), this is considerably higher than the national average growth rate of 3.8% during the same period (Consult Fingal, 2021). The population of Fingal also accounts for approximately 22% of the total population of County Dublin.

The number of households in Fingal grew from 47,721 in 1996 to 96, 812 in 2016; a 49% increase, although household sizes declined during this same period, from an average of 3.46 to 3 persons per household. It is largely thought that the decrease in household size in both Meath and Fingal, as well as nationally, is an indication of a declining birth rate in Ireland as well as economic progress, more generally, as more people have the ability to sustain their own households.

The Eastern and Midlands Regional Assembly's 'Regional Economic and Spatial Strategy'[xxvi] sets out the possible population projections for Meath and Fingal based on high and low scenarios for two scenario time periods as set out in Table 4.2.

Table 4.2: Population Projections in Meath and Fingal

Local Authority	2016 Population	2026 Low-High Projection	2031 Low-High Projection
Fingal	296,000	327,000 – 333,000 10-13 % increase from 2016	340,000 – 349,000 15-18 % increase from 2016
Meath	195,000	249,000 – 254,000 12 – 14% increase from 2016	259,000 – 266,500 16 – 20% increase from 2016

The existing population and communities within the Study Area present a challenge to the routing of a new UGC; the projected population increase will deepen that challenge. Notwithstanding, the increasing population in this area and in the Greater Dublin area – in addition to economic growth in Ireland – supports the requirement for the reinforcement of the transmission network.

Potential Impacts

When it comes to major infrastructure projects, adverse impacts on amenity[3] are generally considered to arise where 'nuisance' and inconvenience impacts coincide in an area or on people and places. The 'nuisance' impacts considered for the Proposed Development relate to:

- Traffic and Transport;

[3] The context within which we use amenity here is 'the pleasantness or attractiveness of a place'. The National Planning Policy Framework uses the terms 'attractive', liveable' and 'good quality of life' to describe this, whilst. the term 'amenity' is generally used in planning policies in the context of a 'desirable or useful feature or facility' e.g. children's park.

- Views (i.e. visual amenity);
- Air Quality; and
- Noise.

The impact on amenity is determined by considering whether 'in-combination' these impacts can have a greater effect on people's living conditions and communities than as individual impacts.

Amenity impacts on local communities and community facilities are discussed here; potential amenity related impacts on tourism and in some cases local businesses are discussed under the Economy topic (Section 4.4.4). Assuming no bespoke cable bridges are required, the UGC has the potential to have impacts on amenity during construction only. This is due to the nature of the infrastructure during its operational phase; there are no traffic, noise or air quality impacts during its operation. There would be some visual impacts, however without the other impacts a combined impact on amenity is not possible.

A brief summary of the individual impacts for each topic is provided here for ease of reference; for further details please see the relevant sections referenced.

- **Traffic (see Section 4.4.1)**: temporary disruption in the form of construction activities on local and regional roads as well as construction traffic using these routes as haul routes and access points to construction compounds or other construction installations;
- **Views (Visual Amenity) (see Section 4.5.4)**: temporary impacts on special or protected views / landscapes as well as personal and property views; permanent impacts would be as a result of the loss of some hedgerows and joint boxes placed along the route;
- **Air Quality (see Section 4.5.7):** temporary impacts related to the creation of dust during construction and emissions from construction traffic; and
- **Noise (see Section 4.5.6)**: temporary disruption as a result of the excavation of trenches along the existing road network; this would be a particular issue for linear communities along the local and regional road network. In addition, construction traffic may also be a potential noise issue.

The combined impact of these on amenity and the living conditions for local communities could be significant. The combination of noise, dust and disruption to travel in particular could create difficulties for communities living along the route of the Proposed Development.

The impacts have been minimised somewhat at this step of the project through the exclusion of major settlements and urban areas between Woodland and Belcamp substations and the identification of potential route corridors will take into account the presence of communities and seek to further minimise impacts by avoiding populous areas and major commuting links. For any remaining impacts, mitigation will be identified which will reduce the individual, and therefore combined, impacts. For some individual properties or communities additional measures may be required; this will be determined following detailed assessment during Step 5.

4.4.3 Human Health

Baseline

In the Census 2016, 90% of people in Meath and 88% of people Fingal described themselves as being in 'Good' or 'Very Good' health. The relatively high socio-economic status of the communities in the Study Area is a factor in this; the lower the levels of employment, income and education are associated with worsening determinants of health, in particular healthy life expectancy. According to the 2015-2017 Irish Life Tables, life expectancy in 2016 in Dublin was 80.1 years for males and 83.4 for females, whilst in the Mid-East Region it was 80.3 years for males and 84 years for females.

Potential Impacts

During construction concerns would centre around the direct 'nuisance effects' of noise, air quality, visual and traffic and indirect effects on stress and fears.

- Traffic: the disruption to daily travel patterns, potential for delays and difficulties in accessing important community facilities such as medical centres and schools, and the presence of increased numbers of HGVs on local roads increasing fear of accidents for pedestrian and other non-motorised users of the road network. These impacts can all lead to increased stress for local communities.
- Air quality: in the form of dust and emissions from plant, machinery and traffic. in the absence of mitigation and control measures, air quality could be an issue for local communities during construction.
- Noise: the excavation of trenches along the existing road network could present noise issues; this would be a particular issue for linear communities alongside the regional road network. Construction traffic would also be a potential noise issue.
- Visual: visual disturbance from construction compounds and construction activities could be an issue for local communities.

Mitigation measures will be identified during Step 5 of this project, to avoid or minimise these impacts and the subsequent potential effects on health. As with amenity, additional measures may be required in certain locations and these will be identified during Step 5.

The combined impact of these effects is considered in Section 4.4.2 Amenity; amenity impacts also have the potential to affect people's health and wellbeing.

During the operation of the planned development, there will be no traffic, noise or air quality impacts; there will be some visual impacts through the removal of some mature trees and hedgerows and these are addressed in Section 4.5.4.

There may be concerns relating to electric and magnetic fields (EMFs) associated with the operation of electricity infrastructure. Concerns regarding potential health effects of EMFs are often cited in consultations relating to overhead line (OHL) projects despite the fact that EirGrid's design standards require all transmission infrastructure to operate to existing public exposure guidelines from ICNIRP[xxvii].

Recent studies show that surveyed existing underground cables are well below the ICNIRP restriction level set to protect public health (EirGrid 2014).

4.4.4 Economy

Baseline

Local Economy

Fingal is a key administrative area within the Eastern and Midland Region of Ireland and plays a strong supporting role to the Dublin City Gateway, which is Ireland's primary economic growth centre. Fingal is the chosen location for thousands of businesses across an array of economic sectors, being home to a diverse range of employers of varying scales, from major multi-national companies, Irish small and medium-sized enterprises (SMEs) to locally based start-up businesses with few employees. Fingal is home to Dublin International Airport and also performs particularly strongly in the Information and Communication technology and the Pharmaceutical / Healthcare sectors with a number of well-known companies being situated within the Study Area, for example: IBM, PayPal, Face Book, Mylan, and Bristol Myers-Squibb.

Meath experienced rapid population during the early 2000's however this rise in population was not matched by sustainable employment opportunities within the county, resulting in the majority of its residents commuting to employment centres on a daily basis. Being located in such close proximity to large employment centres within Fingal and Dublin more widely has made it difficult to create large sources of employment within the county. As such, the economy of the county is largely based on a network of self-sufficient towns and villages. The portion of the Study Area that is situated within County Meath is predominantly rural, with agriculture being the main economic activity.

Employment and Economic Sectors

The Study Area does not precisely align with the administrative boundaries of published census data; therefore, as a proxy, statistics for the whole county of Meath and the local government area of Fingal County Council have been used to give an indication of unemployment across the two areas. Unemployment rates in Meath and Fingal were recorded as 11.2% and 10.5% respectively within the last census (CS0, 2016). D

Dublin Airport flew approximately 31.5 million passengers in 2018 and directly employs over 15,000 people, with an estimated further 6,500 jobs supported by operations at the airport. In 2019, Dublin Airport Authority (DAA) commissioned a study into the economic impact of the airport[xxviii]. The report estimates that the airport contributes 9.8 billion euro to the Irish economy and facilitates 129,700 jobs in Ireland.

The majority of commercial enterprises in the Study Area are in the south, close to the M50 and Dublin Airport. Small business parks are also found at key junctions of the M2 and M3 motorways. Sectors within the Study Area include pharmaceuticals, information technology (including data centres, Face Book offices and an IBM campus) and logistics, associated with the airport and the major transport corridors. Other important sectors include construction and quarrying, energy and horticulture; there is a significant area of industrial horticultural greenhouses north of the airport.

There are several business parks including:

- Metropoint Business Park;
- Newtown House Business Park;
- Damastown Industrial Park; and
- Bracetown Business Park.

Tourism

Dublin Airport is the biggest contributor to the tourism economy of Ireland in the Study Area; there are some hotels close to the airport, B&Bs in surrounding villages and some caravan and campsites. Despite the presence of the airport, however, there are very few tourist hot spots in the Study Area.

There are several golf clubs in the Study Area, including:

- Corrstown Golf Club;
- St. Margaret's Golf Course;
- Forrest Little Golf Club; and
- Silloge Park Golf Course.

Potential Impacts

National and Regional Economy

The biggest impact the Proposed Development will have on the economy will be to reinforce the electricity network between East Meath and North Dublin. Reinforcement of this part of the network is needed to continue to ensure the security of the network feeding the east of Meath and the north of Dublin. It will help meet the growing demand for electricity in the east of the country due to the increased economic activity in recent years while also facilitating increasing amounts of renewable electricity that is generated by windfarms in the west and south of the country and transported for use in the east.

The Climate Action Plan (2021) has a target to increase the proportion of renewable electricity to up to 80% by 2030. The Plan sets out that additional electricity generation and transmission infrastructure will be a critical enabler to achieve the renewable energy and emissions targets.

In Ireland, total electricity demand over the next ten years is forecast to grow between 19% and 50%, largely driven by new large energy users. This presents a challenge to Ireland's emissions targets and to Ireland's security of supply. Included in the targets for the electricity sector is to '*Expand and reinforce the grid through the addition of lines, substations and new technologies*'.

Currently, electricity power generated in the south-west of the country is mainly transported cross-country on two 400 kV (kilovolt) power lines from Moneypoint substation to the Dunstown substation and Woodland substation in the east of the country.

Potential Direct Impacts - Employment and Expenditure

Setting aside the indirect beneficial impacts the Proposed Development may have on employment, which is covered above, there is potential for benefits to employment and local expenditure during construction.

In terms of employment directly related to the construction of UGCs to Belcamp, there is currently no information on the expected make-up or size of the construction workforce that would be required, however given the envisaged nature and scale of construction as well as the likely (piecemeal) construction methodology, it is anticipated that the size and make-up of any construction workforce would be relatively small in size. Furthermore, any employment opportunities are expected to be limited given there is considered to be low unemployment within the Study Area at present. Given the nature of the project, there is not expected to be any impact on the labour market during the operational phase.

In respect of potential impacts on the regional and local expenditure during the construction, these are expected to be positive, albeit limited. This is due to the expectation that there would be limited economic activity associated with the construction workforce given its small size but also the skilled nature of such employment, which is likely to be already residing within or just outside the Study Area. Furthermore, given the nature of the Proposed Development and the specialist nature of the equipment being installed, it is likely that most of the capital expenditure would be expended outside of the study area, thereby also limiting supply-chain opportunities.

Potential Indirect Impacts – Traffic and Land use

During construction there is potential for indirect adverse impacts on the economy related to the potential impacts on Traffic and Transport; disruption to commuting corridors and supply routes could lead to adverse consequences for businesses in the Study Area. An assessment of this will be carried out in Step 5 of the project and the CTMP (see Section 4.4.1) will take account of this and there may be a requirement for bespoke measures in some locations to protect sensitive businesses.

The economic implications of any potential disruption to roads in the area of Dublin airport will be considered as part of the detailed assessment of impacts on the airport; bespoke mitigation measures will be identified to avoid or minimise disruption, in consultation with DAA.

There will be some restrictions on land use and the installation of other utilities as a result of the Proposed Development; the UGC cannot be built over, agricultural practices will be constrained although some farming practices can be maintained with a UGC, other high voltage electricity cables and potentially explosive services will not be able to be located close to the UGC. Utilities and agricultural impacts are described further in Sections 4.4.5 and 4.4.6 of this report respectively. The potential impacts on land or change of land use is an important consideration and careful consideration of proposed developments in the Study Area has already informed the shape of the Study Area and was an important factor in the decision to connect to Belcamp instead of Finglas substation. The proposed retail area to the north of Dunboyne has been excluded from the Study Area.

4.4.5 Utilities and Critical Infrastructure

Baseline

There are a number of underground utilities in the regional road network between Woodland and Belcamp, including other electricity cables; telephone and broadband cables; sewers; and public and private water supplies. This includes the East West Interconnector which connects to Woodland substation from the east, via the Red Road to the north of Batterstown. There are also two 220kV overhead lines connecting into Woodland and the proposed Kildare Meath 400 kV UGC will also connect to Woodland substation.

The public water supply is extensive in the area. The network predominately uses the road network for local residential supply. Other larger mains are located off road in agricultural land. There are no group water supplies with associated source protected areas in the Study Area.

There are three registered waste facilities in the Study Area, the most significant of which is Huntstown Inert Waste Recovery Facility in the Finglas area.

Potential Impacts

It is EirGrid's preferred approach for UGC solutions, to use the existing road network (burying cables within the roads themselves) rather than within greenfield including agricultural lands. There is a great potential to encounter pre-existing underground utilities than may otherwise be the case were an offline route to be taken. There are likely to be a number of underground utilities in the regional and local road network between Woodland and Belcamp substations, including other electricity cables, telecommunication cables, sewers, and public and private water supplies. Again, the Study Area has been designed to avoid as many of these as possible by excluding the urban and significant industrial areas of Swords and Blanchardstown. However, some constraints will remain. Of particular note, is the aviation fuel line which runs along the R139 immediately south of Belcamp substation and along Stockhole Lane to the airport.

Dublin Airport is one of the most significant elements of critical infrastructure in Ireland; there will be no direct impact on the airport infrastructure, however indirect impacts as a result of local disruption to traffic are possible and will be considered in detail at later stages of the project.

Two significant, critical infrastructure, projects are proposed within the Study Area: Metrolink and GDD. Dialogue with stakeholders associated with these projects will be carried out to ensure interactions are managed and impacts avoided or minimised.

Utilities like waste facilities will be avoided to ensure no direct impacts.

4.4.6 Agronomy and Equine

<u>Agronomy and Equine Industries</u>

Agricultural land

Agriculture is a significant in the Study Area and is the dominant land use in the north and west of the Study Area. For agricultural and agronomy purposes the quality of land is generally determined by its ability to produce agricultural produce. Therefore, free draining fertile soils have a higher agricultural quality than wet peaty types and soils such as Luvisols and Brown Earths (which occur lower in the landscape) will tend to be more productive than Podzols which occur higher in the landscape. Gley type soils (poorly drained) are less versatile and mainly suited to grassland, whereas Brown Earths may be suited to grassland and arable production. Human intervention and management (e.g. fertilisation, drainage and liming) also affects land quality from an agricultural perspective.

Agronomy

Agronomy is the science of producing and using plants in agriculture and this topic encompasses the main agricultural enterprises such as dairy, beef, sheep and arable crops along with horticulture, equine, intensive agriculture (pigs and poultry) and other enterprises such as greyhound rearing, pet farms and kennels. The sensitivity of the various farming enterprises is categorised as set out in Table 4.3. The table identifies the land use and the intensity or scale of that land use. These two factors are used to inform the sensitivity of the enterprise.

Table 4.3 Sensitivity of Agricultural Enterprises

Land Use	Intensity / scale	Sensitivity
Racehorse training farms are very high sensitivity. **Stud-farms are generally high or very high sensitivity. Intensive horticulture is generally high or very high sensitivity.** **Intensive agriculture such as pig and poultry farms are high or very high depending on the scale of production.**	High	Very high
	Medium	High
	Low	Medium
Dairy farms	High	High
	Medium	High
	Low	Medium
Non-dairy grazing livestock (including beef, sheep, non-intensive equine) and grass cropping	High	Medium
	Medium	Low – medium
	Low	Low
Tillage / arable	High	Medium
	Medium	Medium
	Low	Low
Rough grazing, bog, forestry, woodland	Low	Low or very low

Within the Study Area there is a large area of intensive horticulture, north of Dublin Airport which would be very high sensitivity. There are some stud farms in the Study Area, but no racehorse training centres; the stud farms are low intensity.

The Agricultural Census (2020) (www.cso.ie) provides numbers for crops and livestock by county however it does not split County Dublin into its administrative areas. Details for Meath and Dublin are provided in Table 4.4 and Table 4.5. It can be seen that Meath as a county has considerably greater farming than County Dublin, with over six times the number of arable farms and ten times the number of farms with livestock. This is reflected in the land use within the Study Area: that part which is in Meath is predominately agricultural; and that within Fingal (County Dublin) is predominantly industrial and commercial.

Table 4.4 Arable Farming in Counties Dublin and Meath

Type of Crop	Co. Dublin		Co Meath	
	No. Farms	Hectares	No. Farms	Hectares
Area farmed (AAU)	699	33041	4505	197366
Commonage	*	2290	*	59
Pasture	489	11002	3694	96485
Hay	160	1234	917	7434

Type of Crop	Co. Dublin		Co Meath	
	No. Farms	Hectares	No. Farms	Hectares
Grass silage	234	3201	2755	49139
Total crops fruit and horticulture	212	4856	985	11646
Total cereals	221	11021	598	28255
Rough grazing in use	100	1728	432	4408
All grassland	619	17165	4399	157466

*no data on CSO.ie for this

Table 4.5 Livestock Farming in Counties Dublin and Meath

Type of Livestock	Co. Dublin		Co. Meath	
	No. Farms	No. Livestock	No. Farms	No. Livestock
Total cattle	317	24704	3356	324363
Dairy cows	32	2960	598	67246
Other cows	206	3656	1911	35714
Other cattle	314	18088	3344	221403
Total sheep	202	35098	1093	246529
Ewes	199	19085	1003	114820
Other sheep	199	16013	1090	131709
Total pigs	0	0	61	57290
Boars	0	0	20	52
Female breeding pigs	0	0	26	5334
Other pigs: 20kg and over	0	0	43	32992
Other pigs: under 20kg	0	0	23	18912
Total poultry	75	3756	224	373319
Laying stock	67	2867	192	78588
Breeding birds	0	0	0	0
Table birds	0	0	8	207040
Other poultry	35	782	0	0

Potential Impacts

For the most part, impacts to agriculture and equine industries will be avoided as a result of EirGrid's preference to route UGCs along public highways, rather than across agricultural land. There may, however, be short sections of the route which will need to be 'off-road' and cross third party lands, including agricultural land.

Potential impacts include disruption during construction and restrictions on agricultural practices following installation and reinstatement. Permanent access will also be required, through wayleaving/easement agreements with landowners, to allow for the repair and maintenance of the cable over its lifespan.

The routing process will seek to avoid the most sensitive agricultural lands, such as the intensive horticulture area north of the airport and will minimise the lengths off-road elsewhere. Routes will be positioned close to field margins where possible to reduce potential impacts. Close dialogue with landowners is an essential part of this process and will continue throughout the remaining stages of the project.

4.5 Baseline Reporting – Environmental Factors

4.5.1 Biodiversity, Flora and Fauna

Baseline

There are no internationally designated sites within the Study Area, as these have now been excluded as part of the refinement of the Study Area from Step 3 to Step 4, as is shown in Figure 4-4.

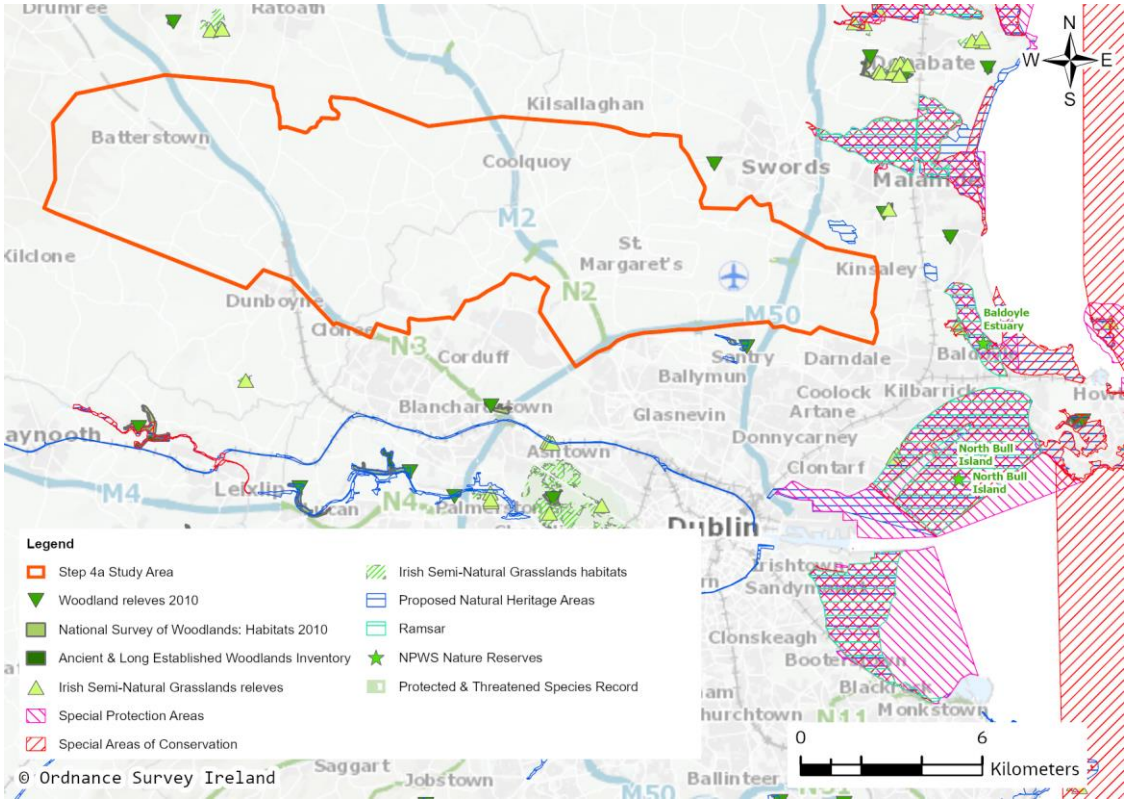

Figure 4-4 Biodiversity Assets in the Study Area

There are, however, still hydrological connections from water bodies within the Study area to designated sites on the eastern coast of Ireland, north of Dublin, namely:

- Malahide Estuary SPA and SAC;
- Baldoyle Bay SPA/ SAC;
- North Bull Island SPA;
- North Dublin Bay SAC;
- South Dublin Bay and River Tolka Estuary SPA;
- Baldoyle Bay Ramsar site;
- North Bull Island Ramsar site; and
- Broadmeadow Estuary Ramsar site.

There are no designated sites in close proximity to Woodland Substation. Baldoyle Bay SAC and SPA are the closest designated sites to Belcamp Substation and are approximately 4km to the east.

There are no Natural Heritage Area (NHA) or proposed NHA (pNHA) sites within the Study Area, but it does include the following other important sites for biodiversity:

- Biodiversity-rich trees, hedgerows and grassland verges throughout;
- Several wetland habitats which could support several Special Conservation Interest species of the SPA;
- Other designated sites co-incident with those of European sites (Malahide Estuary pNHA; Baldoyle Bay Ramsar site; North Bull Island Ramsar site; and Broadmeadow Estuary Ramsar site)

Light-bellied Brent goose is a particular feature of interest within the Study Area, particularly to the east. Dublin Bay is the most important site for Brent geese in the Republic of Ireland providing reliable access to food, water and a safe roosting location. Brent geese will preferentially use foraging sites close to their roost site if available, however, the Dublin flock are known to use the amenity grassland throughout Dublin City and farmland throughout the hinterland. The birds particularly use Dublin Bay coast and particularly North Bull Island SPA for roosting. The Study Area contains supporting feeding habitat for Brent goose in amenity grassland and sports pitches. Several records exist for Brent goose within the Study Area including around Belcamp substation and land east of the M1 Motorway.

Potential Impacts

There will be some temporary loss of hedgerows lining roads and along field margins to facilitate the construction of the UGC. EirGrid designs projects to avoid losses of mature trees due to their combined biodiversity and landscape value, but at this early stage, loss of some mature trees cannot be ruled out.These habitats also have the potential to support roosting bat species and breeding birds, and therefore these species may restrict the timing of construction activities. Potential impacts include disturbance, and temporary displacement of birds, mammals, amphibians, fish and other aquatic species from the working corridor and in close proximity to Proposed Development. It is assumed that any mature trees not directly over the UGC will be replaced.

Passing bays will be reinstated with species-rich hedge, therefore, hedgerow loss lining roads will be temporary until the replanted hedges become established. Any cable routes that are required to cross watercourses could potentially disturb or damage aquatic or riparian habitat in the construction footprint. Trenchless crossing techniques for the larger rivers would have lower likelihood of impacts but there are still risks associated with this technique. Given the hydrological connections, there is potential for downstream impacts to European Sites.

During construction there is also the potential for disturbance impacts to wintering birds at foraging and roosting sites within the Study Area. Other potential impacts include temporary habitat loss/fragmentation of foraging habitat for mammals such as badger and bat.

During operation any swathe of land excavated to accommodate the cable will be reinstated, however trees will not be replanted directly over the cable route and therefore this represents a potential permanent habitat loss and fragmentation of wildlife corridors. It may be possible to replant hedgerows directly over the cable route, and this is currently under consideration.

Nature-inclusive design will be incorporated at every available opportunity. Habitat creation opportunities will be explored at substations, in conjunction with planting for visual screening.

4.5.2 Soils and Water

Baseline Constraints and Opportunities

Geology, Soils and Groundwater

The Study Area is mainly comprised of soils containing fine loamy drift with limestones associated with the Straffan Association (including the area at Woodland substation) and the Elton Association (including the area at Belcamp substation). There are also some areas of fine loamy drift with siliceous stones to the east

and north-west of Swords. There are significant urban (manmade) areas, particularly at Dublin Airport and Swords.

The main subsoil type in this Study Area is limestone till (carboniferous), including the area at Belcamp substation. To the west, particularly around Woodland substation, the subsoils are mainly comprised of shale and sandstone till (Namurian) with an area of alluvium to the north of the substation. There are also some small pockets of limestone sands and gravels, alluvium, and bedrock at surface, particularly in the vicinity of Huntstown Quarry, and a small area of sandstone at Malahide Estuary.

There are no Geological Heritage Sites within the Study Area; Huntstown Quarry to the immediate west of the N2 National Road and Feltrim Quarry to the south of Swords are now excluded from the Study Area.

The majority of the Study Area (including Woodland Substation) is comprised of 'Locally Important Aquifer' with bedrock that is 'Moderately Productive only in Local Zones'. There are also some areas of 'Poor Aquifer' with bedrock that is 'Generally Unproductive except for Local Zones' in the south and eastern sections of the Study Area, including at Belcamp Substation. The Study Area mainly comprises low vulnerability aquifer to the west (including Woodland Substation) and smaller areas to the east (including Belcamp Substation). There is a mixture of Moderate, High and Extreme vulnerability aquifer, and Rock Near or at Surface in the central section of the Study Area.

There is one karst landform, a spring, to the south-east of the Study Area at St. Doolaghs, but this is approximately 2km to the north-east of Belcamp Substation.

There is one Public Water Scheme in the Study Area at Dunboyne which is located to the south-west.

Surface Water

The Study Area lies between the Liffey and Dublin Bay catchment 09 to the south, and catchment 08 Nanny-Delvin to the north. The following sub-catchments are present:

- 08_3 Broadmeadow_SC_010;
- 09_4 Tolka_SC_020;
- 09_10 Tolka_SC_010; and
- 09_17 Mayne_SC_010.

Woodland Substation is located within sub-catchment 09_10 Tolka_SC_010 and Belcamp Substation is located within sub catchment 09_17 Mayne_SC_010. Within the Study Area there are 15 surface water bodies present, as outlined in Table 4.6 and shown in Figure 4-5.

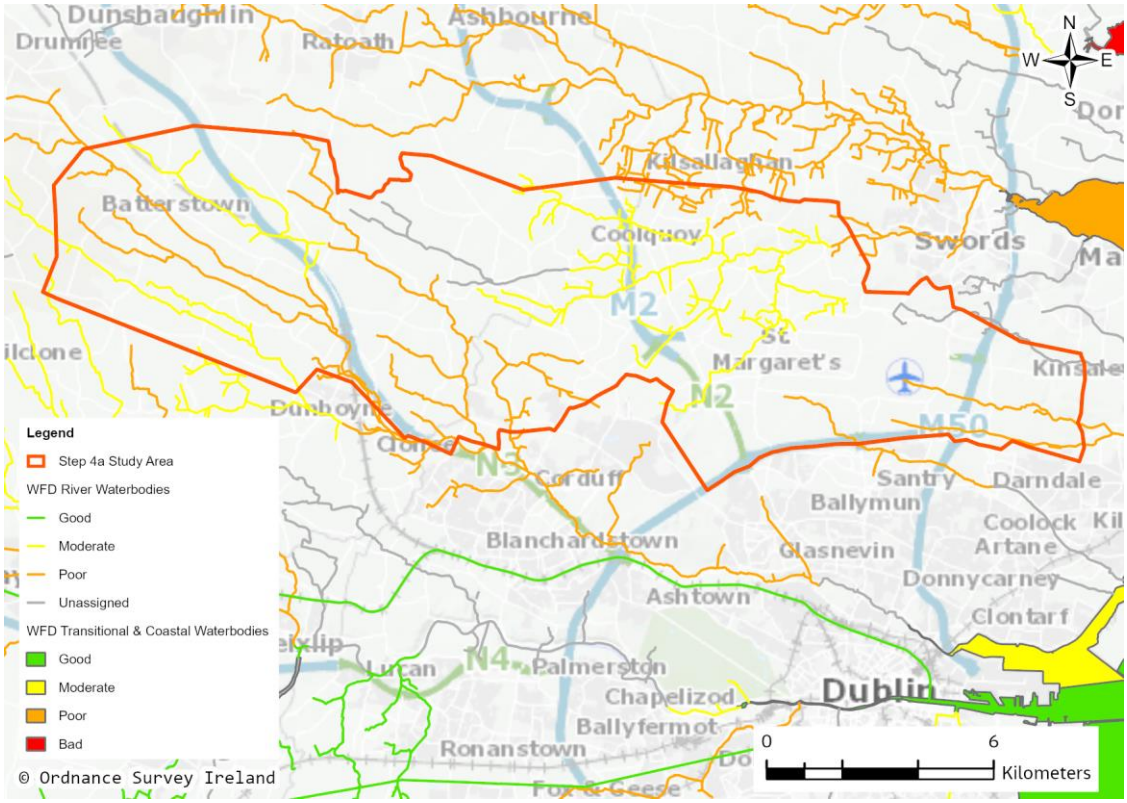

Figure 4-5 Surface Water Bodies in the Study Area

Table 4.6 Surface Water bodies in the Study Area

Sub-Catchment	Surface Waterbody	WFD Waterbody Status	At Risk Status	Key Pressures	Connectivity and Proximity to Designated Site
08_3 Broadmeadow_SC_010	Broadmeadow_030	Poor	At Risk	• Domestic wastewater • Agriculture • Hydromorphology	Approx. 11km from Malahide Estuary SAC and SPA
08_3 Broadmeadow_SC_010	Ward_010	Moderate	Review (likely At Risk given pressures identified)	• Agriculture • Domestic wastewater • Hydromorphology	Approx. 13.5km from Malahide Estuary SAC and SPA
08_3 Broadmeadow_SC_010	Ward_020	Moderate	At Risk	• Agriculture • Urban wastewater • Hydromorphology	Approx. 11km from Malahide Estuary SAC and SPA
08_3 Broadmeadow_SC_010	Ward_030	Moderate	Not at Risk	• Urban wastewater • Anthropogenic pressures from golf course • Hydromorphology	Approx. 6km from Malahide Estuary SAC and SPA
08_3 Broadmeadow_SC_010	Ward_040	Poor	At Risk	• Urban runoff • Hydromorphology • Urban wastewater	Approx. 0.2km from Malahide Estuary SAC and SPA

Sub-Catchment	Surface Waterbody	WFD Waterbody Status	At Risk Status	Key Pressures	Connectivity and Proximity to Designated Site
09_10 Tolka_SC_010	Tolka_010	Moderate	At Risk	• Agriculture • Domestic wastewater	Approx. 22.6km from South Dublin and River Tolka Estuary SPA
09_10 Tolka_SC_010	Dunboyne Stream_010	Moderate	At Risk	• Agriculture • Domestic wastewater	Approx. 18km from South Dublin and River Tolka Estuary SPA
09_10 Tolka_SC_010	Tolka_020	Poor	At Risk	• Agriculture	Approx. 17km from South Dublin and River Tolka Estuary SPA
09_10 Tolka_SC_010	Pinkeen_010	Poor	At Risk	• Agriculture • Domestic wastewater	Approx. 15.5km from South Dublin and River Tolka Estuary SPA
09_10 Tolka_SC_010	Powerstown Dublin_010	Poor	At Risk	• Agriculture	Approx. 14km from South Dublin and River Tolka Estuary SPA
09_10 Tolka_SC_010	Tolka_030	Poor	At Risk	• Industry	Approx. 12.5 km from South Dublin and River Tolka Estuary SPA
09_17 Mayne_SC_10	Mayne_010	Poor	At Risk	• Urban runoff	Flows directly into Baldoyle Bay, SPA and SAC.
09_17 Mayne_SC_10	Santry_010	Poor	At Risk	• Urban wastewater • Urban runoff • Industry	Approx. 5km from North Bull Island
09_17 Mayne_SC_10	Gaybrook_010	Poor	N/A	• N/A	Flows directly into Malahide Estuary SAC and SPA.
09_17 Mayne_SC_10	Sluice_010	Poor	At Risk	• Anthropogenic pressures	Flows directly into Baldoyle Bay, SPA and SAC.

All of the water bodies eventually flow from west to east discharging into Malahide Estuary, Mayne Estuary, Broadmeadow Estuary and Tolka Estuary. It is important to note the current pressures that surface water bodies in the Study Area are under.

The WFD status of the water bodies vary from Moderate to Poor, with ten waterbodies of Poor status and five of Moderate status. Of these 15 surface waterbodies, 12 are at risk of not meeting their WFD objectives. The main significant pressures are agricultural sources, urban wastewater, domestic wastewater and hydromorphology as a result of extensive modifications from flood alleviation works.

Similarly, the receiving waterbodies vary from Moderate to Poor WFD status:

- Malahide Bay Coastal Waterbody (IE_EA_060_0000) Moderate;
- Mayne Estuary Transitional Waterbody (IE_EA_080_0100) Moderate;
- Broadmeadow Water Transitional Waterbody (IE_EA_060_0100) Poor; and

Tolka Estuary Transitional Waterbody (IE_EA_090_0200) Moderate.No waterbodies within the Study Area are designated as SACs. However, all are hydrologically connected to SACs and/or SPAs. The distance from the downstream extent of each waterbody to the nearest designated site is provided in Table 4.6. Four water bodies are within the 2km downstream limit identified in the UK's (England) Environment Agency and Planning Inspectorate English planning guidance on WFD Assessment (used in the absence of Irish guidance) (Planning Inspectorate 2017) for scoping a Protected Area. The remaining waterbodies are located greater than approximately 5km.

Flood Risk

Fluvial flooding is a potential issue in some areas of the Study Area. Rivers at risk of flooding (10% Annual Exceedance Probability (AEP) or High Probability) include the Sluice_010, Ward_040, Gaybrook_010, Santry_010, Ward_030, Ward_010, Pinkeen_010, Tolka_010,Dunboyne Stream_010, and Broadmeadow_030. There are some small pockets of areas at risk of pluvial flooding spread widely across the Study Area, as is shown in Figure 4-6.

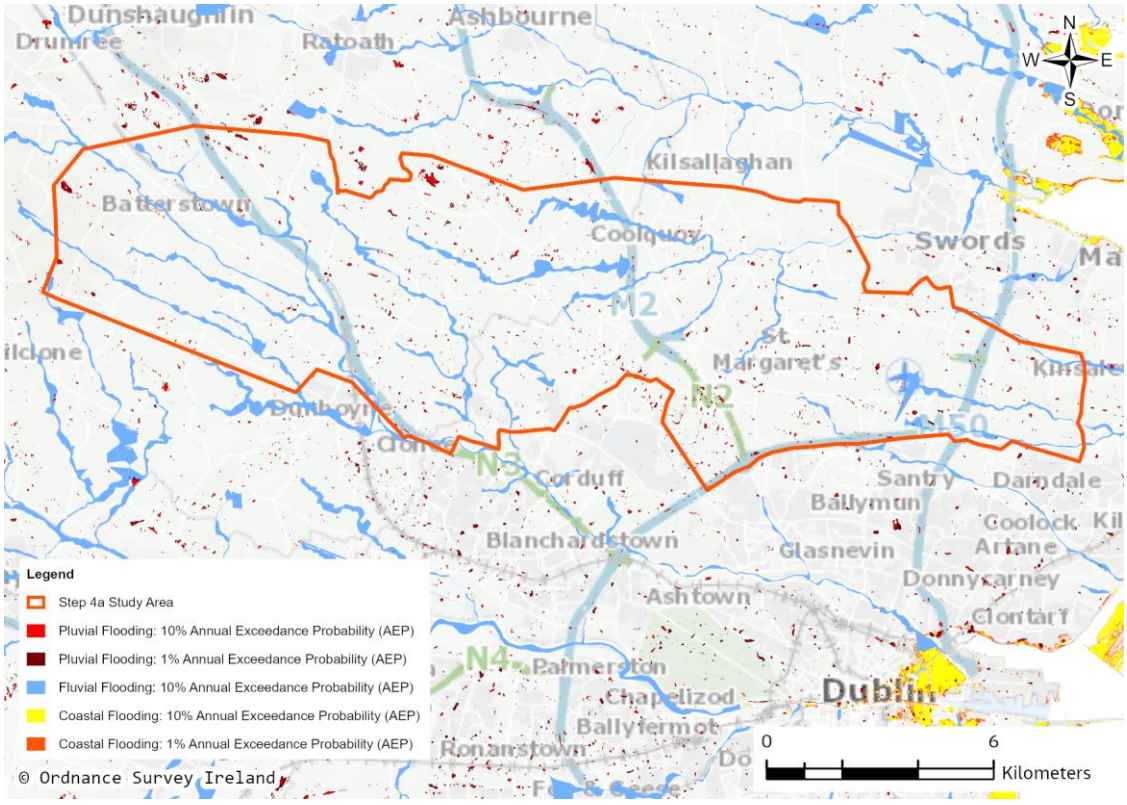

Figure 4-6 Flood Risk

There is no indication of historic fluvial or pluvial flooding at the Woodland Substation and its immediate surrounding area. The Tolka_020 which is approximately 500m to 1km from Woodland Substation is at risk

of flooding (10% AEP or High Probability). There is some indication of pluvial flooding (10% AEP or High Probability and 1% AEP or Medium Probability) to the west of Woodland Substation (approximately 500m).

There is no indication of historic fluvial or pluvial flooding at the Belcamp Substation. However, the Mayne_010 which is located to the immediate south of the Belcamp substation (approximately 150m) is at risk of flooding (10% AEP or High Probability). There is also some indication of pluvial flooding (10% AEP or High Probability and 1% AEP or Medium Probability) to the north of Belcamp Substation (approximately 200m to 500m).

Potential Impacts

Geology, soils and groundwater

Potential impacts on geology, soils and groundwater would be confined to during construction only. Impacts would occur in areas where the UGC may cross third-party land due to physical constraints.

There would be no anticipated impacts during operation.

Surface water

Potential impacts on surface water would be confined to during construction only. During construction, potential impacts on surface water would include:

- Silty water runoff: surface water and dewatered groundwater containing high loads of suspended solids from construction activities. This includes the stripping of topsoil during site preparation, the dewatering of excavations and the storage of excavated material;
- Runoff being contaminated by a spillage or leakage of oils and fuels stored on site or direct from construction machinery; In the event of a spillage, there is a high likelihood of groundwater contamination. the slopes created by overbridging may increase the likelihood of surface water pollution from a spill;
- Change in the natural hydrological regime due to an increase in discharge as a result of dewatering. This may include changes to surrounding groundwater flow, or contaminated soil from previous land uses being disturbed causing pollutants such as heavy metals to enter ground and surface waters;
- Discharges of contaminated water from tunnelling and or excavations;
- High alkalinity run-off as a result of concrete works; and
- Potential for disrupting local drainage systems due to diversions required to accommodate the construction works.

Given the high number of water bodies in the Study Area, there will be a number of watercourse crossings. Where possible, these will be in roads and use existing bridges, but where that isn't possible the watercourses will be crossed using open-cut or trenchless techniques. The exact nature of the crossing technique will be determined at later stages of the project. Potential impacts from open-cut crossings include damage to the riparian zone, the potential for silty water and contaminated surface water to reach water bodies via the cable trench acting as a conduit, and significant disturbance to the bed of the watercourse. With trenchless techniques cable bridges may impact on the riparian zone but otherwise would leave the water body undisturbed. Drilling under a water body using techniques such as Horizontal Directional Drilling (HDD) are generally less impactful than open cut crossings. Although it is most likely at drill entry and exit points, there is the potential for drilling mud to 'break out' and enter the water body. Geotechnical surveys are undertaken to understand the soil and geology to decide where to drill, and what kind of drilling mix is most likely to keep the 'bore' hole sealed. Careful monitoring of the drilling equipment and pressure reduces the risk of this occurring and 'stopping the job' minimises any impacts that could occur. HDD contractors are prepared for such break outs, and will carry out an Environmental Response Plan to plug leaks, contain and put barriers in place to stop drilling fluid entering rivers, and if necessary use special vacuums to remove contaminated soil and water.

A surface water management plan will be prepared to ensure control measures are in place to avoid or minimise these impacts.

Flood risk

Potential impacts on flooding will be confined during construction only. Installation of a UGC has the potential to disrupt surface water flows and provide a conduit to direct water to areas where flood risk may be increased. Several crossings of rivers and streams are required during construction increasing the risk of flooding to and silty water runoff.

The stockpiling of excavated material alongside a trench may also act as a 'bund' and cause either localised pooling of surface waters on land or a diversion into rivers and streams with insufficient capacity to receive it, which has the potential to cause localised flooding.

There will be no impacts on flood risk during operation.

4.5.3 Material Assets - Planning Policy and Land-Use

Baseline

Planning Policy

Meath County Development Plan (2021-2027)

The north west of the Study Area, including the Woodland sub-station itself, is located within County Meath. The principle for development for the Proposed Development is supported within the Meath CDP, which asserts that the sustainable future socio- economic growth of the County is dependent on ensuring high-quality, reliable service provision, including the upgrading and enhancement of existing networks and the strengthening the national grid.

The CDP also identifies a range of policies that specifically support the delivery of electricity conveyance and supply development within the county, as set out in Table 4.7.

Table 4.7: Relevant Meath CDP Policies

Policies	
INF POL 46	To support and facilitate the development of enhanced electricity and gas supplies, and associated networks, to serve the existing and future needs of the County and to facilitate new transmission infrastructure projects that may be brought forward during the lifetime of the plan including the delivery and integration, including linkages of renewable energy proposals to the electricity transmission grid in a sustainable and timely manner.
INF POL 47	To co-operate and liaise with statutory and other energy providers in relation to power generation in order to ensure adequate power capacity for the existing and future business and enterprise needs of the County.
INF POL 48	To ensure that energy transmission infrastructure follows best practice with regard to siting, design and least environmental impact in the interest of landscape protection.
INF POL 50	To require that the location of local energy services such as electricity, be undergrounded, where appropriate.
INF POL 51	To seek to avoid the sterilisation of lands proximate to key public transport corridors such as rail, when future energy transmission routes/pipelines are being designed and provided.
INF POL 52	To seek to generally avoid the location of overhead lines in Natura 2000 sites unless it can be proven that they will not affect the integrity of the site in view of its conservation objectives i.e. by carrying out an appropriate assessment in accordance with Article 6(3) of the E.U. Habitats Directive.

The Plan also sets out an objective relating to the transmission network, which is to:

- INF OBJ 50- To seek the delivery of the necessary integration of transmission network requirements to facilitate linkages of renewable energy proposals to the electricity transmission grid in a sustainable and timely manner.

An additional factor to take into consideration in terms of routing is Public Safety Zonings located within the Study Area relating to Dublin Airport and its flight paths. DM Objective 111 states:

- DM OBJ 111- Development should be restricted which would give rise to conflicts with aircraft movements on environmental or safety grounds on lands in the vicinity of Dublin Airport and on the main flight paths serving Dublin Airport.

Fingal County Development Plan (2017-2023)

The Study Area also incorporates parts of Fingal. The Fingal Development Plan (FDP) supports the principle of development for the Proposed Development, stating that the Council will work in partnership with service providers to facilitate the required enhancement and upgrading of existing infrastructure and networks.

The FDP sets out a number of objectives relevant to the Study Area, as set out in Table 4.8.

Table 4.8: Relevant FDP planning objectives

Policies	
Objective EN22	Facilitate energy infrastructure provision at suitable locations, so as to provide for the further physical and economic development of Fingal.
Objective DMS139	Seek the placing underground of all electricity, telephone and TV cables in urban areas. It is the intention of the Council to co-operate with other agencies as appropriate, and to use its Development Management powers in the implementation of this policy.
Objective DA13	Promote appropriate land use patterns in the vicinity of the flight paths serving the Airport, having regard to the precautionary principle, based on existing and anticipated environmental and safety impacts of aircraft movements.
Objective DA15	Take into account relevant publications issued by the Irish Aviation Authority in respect of the operations of and development in and around Dublin Airport.
Objective DA16	Continue to take account of the advice of the Irish Aviation Authority with regard to the effects of any development proposals on the safety of aircraft or the safe and efficient navigation thereof.

Draft Fingal County Development Plan (2023 - 2029)

The Draft FDP covering 2023 – 2029 was published in February 2022 and is envisaged to be adopted in February 2023 and in effect six weeks later. The Plan advises developing well-serviced and well-connected communities is a key focus for development within Fingal. It places greater emphasis on opportunities to reduce use of natural resources, incorporating energy efficiency into design and construction, and on climate change mitigation and adaptation.

The Draft FDP sets out a number of objectives relevant to the Study Area, as set out in Table 4.9. Those in relation to the Dublin Airport are similar to the adopted plan but there is additional focus on the need to support the development of new energy systems and transmission grids necessary for renewables.

Table 4.9: Relevant Draft FDP planning objectives

Policies	
Strategic Objective 10	Protect, enhance and ensure the sustainable use of Fingal's key infrastructure, including water supplies and wastewater treatment facilities, energy supply including renewables, broadband and transportation.
Objective DAO18 – Safety	Promote appropriate land use patterns in the vicinity of the flight paths serving the Airport, having regard to the precautionary principle, based on existing and anticipated environmental and safety impacts of aircraft movements.
Objective DAO20	Take into account relevant publications issued by the Irish Aviation Authority in respect of the operations of and development in and around Dublin Airport.
Objective DAO21	Continue to take account of the advice of the Irish Aviation Authority with regard to the effects of any development proposals on the safety of aircraft or the safe and efficient navigation thereof.
Policy IUP27 – Energy Networks and ICT Infrastructure	Facilitate and promote the development of energy networks and ICT infrastructure where necessary to facilitate sustainable growth and economic development and support the provision of critical energy utilities and the transition to alternative, renewable, decarbonised, and decentralised energy sources, technologies, and infrastructure.

Policies	
Policy IUP29 – Enhancement And Upgrading Of Existing Infrastructure And Networks	Work in partnership with existing service providers to facilitate required enhancement and upgrading of existing infrastructure and networks and support the development of new energy systems and transmission grids, which will be necessary for a more distributed, renewables-focused energy generation system, harnessing both the considerable on-shore and off-shore potential from energy sources such as wind, wave, and solar energy.
Policy IUP30 – Enhancement and Upgrading Of Existing Infrastructure And Networks	Support EirGrid's Grid Development Strategy – Your Grid, Your Tomorrow (2017), Implementation Plan 2017–2022 and Transmission Development Plan (TDP) 2016 and any subsequent plans prepared during the lifetime of this Plan, to provide for the safe, secure, and reliable supply of electricity.
Objective IUO44 – Energy Utilities	Support the development of enhanced electricity and gas supplies, and associated transmission and distribution networks, to serve the existing and future needs of the County, and to facilitate new transmission infrastructure projects and technologies.
Objective IUO45 – Undergrounding of Utility Infrastructure	Require that the location of local utility services such as electricity, telephone and television cables be located underground wherever possible, and to promote the undergrounding of existing overhead cables and associated equipment, where possible, in the interests of visual amenity and improved public realm.

As with County Meath, factors to take into consideration in terms of routing are the Public Safety Zones located within the Study Area relating to Dublin Airport and its flight paths, ensuring early consultation with the relevant authorities to manage potential interactions between the Proposed Development and the airport safety zones.

Settlement Strategy

The aim of the Meath CDP and Fingal DP in relation to their settlement strategies is to "provide a coherent planning framework for the development of the county, founded on a well-developed urban structure supporting diverse rural areas protecting the rural environment and delivering on a more sustainable living-working environment".

Settlement hierarchies are set out by each local authority in Ireland to underpin decisions regarding the location and scale of new developments such as housing, employment creation and social and physical infrastructure provision. This is designed so that investment in infrastructure is focused on locations that are the most environmentally robust and provide the best economic return. The settlement hierarchy for Meath and Fingal are outlined in Table 4.10.

Table 4.10 Meath CDP Settlement Hierarchy

Designation	Settlement
Large Growth Town I	Navan, Drogheda Environs
Large Growth Town II	Dunboyne, Maynooth Environs
Moderate Sustainable Growth Towns	Ashbourne, Kells, Trim, Kilcock Environs, Dunshaughlin
Small Towns	Athboy, Bettystown/Laytown/Morington East, Duleek, Enfield, Oldcastle, Ratoath, Stamullen
Villages	Ballivor, Carlanstown, Carnaross, Clonard, Clonee, Crossakiel, Donore, Drumconrath, Gibbstown, Gormonston, Julianstown, Kentstown, Kilbride, Kildalkey, Kilmainhamwood, Kilmessan, Longwood, Mornington/Donacarney, Moynalty, Nobber, Rathcairn, Rathmolyon, Slane, Summerhill

Table 4.11 Fingal CDP Settlement Hierarchy

Designation	Settlement
Metropolitan Consolidation Towns	Swords, Blanchardstown
Consolidation Areas Within Gateway	Baldoyle, Castleknock, Clonsilla, Howth, Baskin, Mulhuddart Village, Portmarnock, Sutton, Santry (including Ballymun), Balgriffin & Belcamp, Charlestown & Meakstown
Large Growth Town II	Balbriggan
Moderate Sustainable Growth Towns	Lusk, Rush, Skerries, Donabate, Malahide
Other Hinterland Towns / Villages	Balrothery, Loughshinny
Small Towns	Portrane
Villages	Coolquay, Kinsealy, Rivermeade, Rowlestown, Ballyboghil, Naul, Balscadden, Oldtown, Garristown, Ballymadun

The feasibility studies in Step 3 identified significant constraints for underground cables in densely populated areas such as Blanchardstown and Swords. These areas have now been excluded from the study area and there are now no major towns in the Study Area. There are a number of smaller villages and linear settlements with populations below 1,000. In addition to residential populations, these settlements host community facilities such as schools, churches, parks and recreational areas; employment areas; and retail areas.

Land-Use

Corine 2018 data, shown in Figure 4-7, clearly shows the differences in land use across the Study Area.

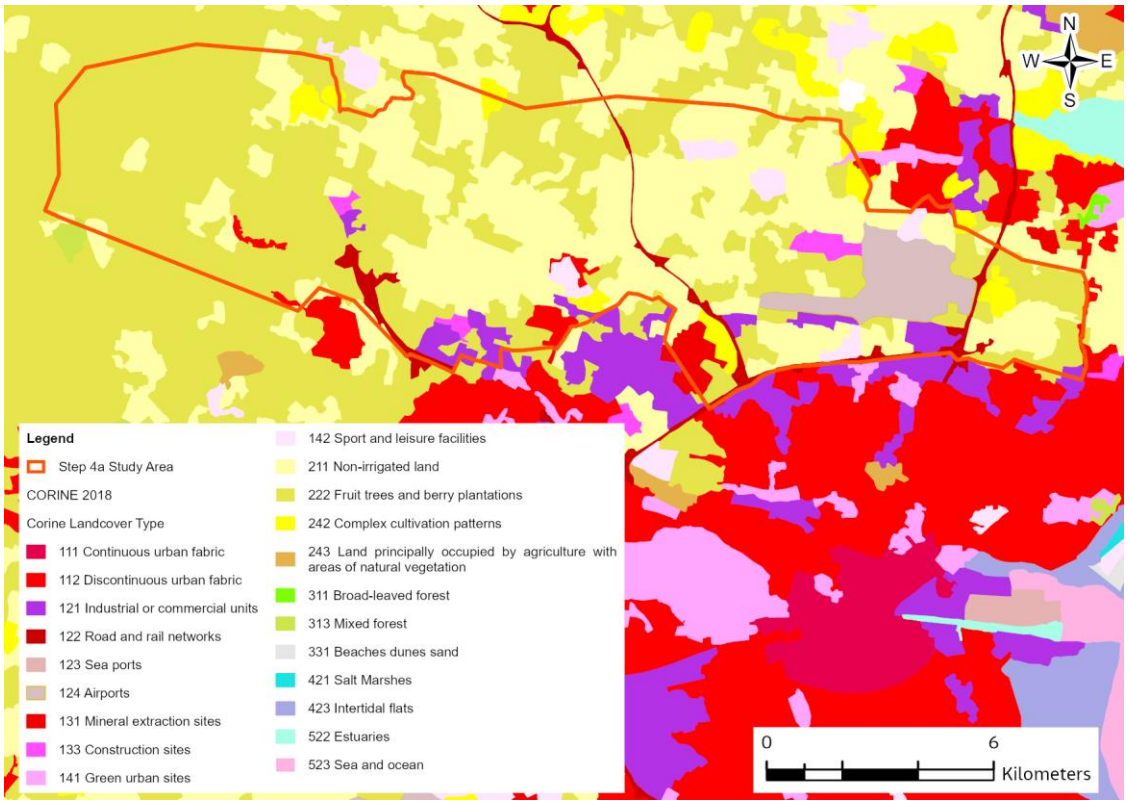

Figure 4-7 Corine 2018 Land Use in the Study Area

The north and west of the Study Area is agricultural land, industrial and residential land is to the south and the airport is shown between the M1 and M2 corridors. As has been described in other sections, the urban fabric has been largely avoided through the design of the Study Area.

There are no areas identified as peat, despite peatlands and wetlands being the second most widespread land cover type in Ireland, covering almost one-fifth (20.6%) of the country. Forest cover in Ireland is the lowest of all European countries, with national land cover of 11%. There are no clearly identified areas of forestry within the Study Area, although many of the roads are lined with mature trees.

Land use is also determined by the zonings identified for each settlement within the Development Plans of each County. The zonings and the potential impacts will be further refined when the emerging route corridor has been confirmed.

Potential Impacts

There would be temporary impacts on the regional road network during construction; however full reinstatement of all roads upon installation will ensure these are not permanent effects. At the connection into Woodland, it is likely that the cable will have to be installed across third party land. This will require a significant temporary land take during construction, but limited during operation, although a permanent wayleave and some restriction of agricultural practices above the Proposed Development is likely. Given the potential for traffic disruption and existing buried services in the roads leading to Belcamp substation, including the aviation fuel line, it is possible that access to the substation will also be across third party lands. Proposed developments north of the existing substation will constrain any off-road routes in this area, however with early and open dialogue with landowners and other developers it is possible a route can be identified, with similar impacts as those identified for Woodland substation.

There will be temporary disruption to the road network; the use of regional roads reduces this risk as any routes chosen will be ones large enough for the swathe to be within one carriageway only, however carriageway closures could be for a prolonged period of time. There may also be a requirement for the Proposed Development to be installed in third party lands aside from the connection into Woodland Substation; the same type of impacts would occur during construction and operation.

4.5.4 Landscape and Visual

Baseline

Landscape Character Areas (LCAs) in the Study Area are shown in Figure 4-8.

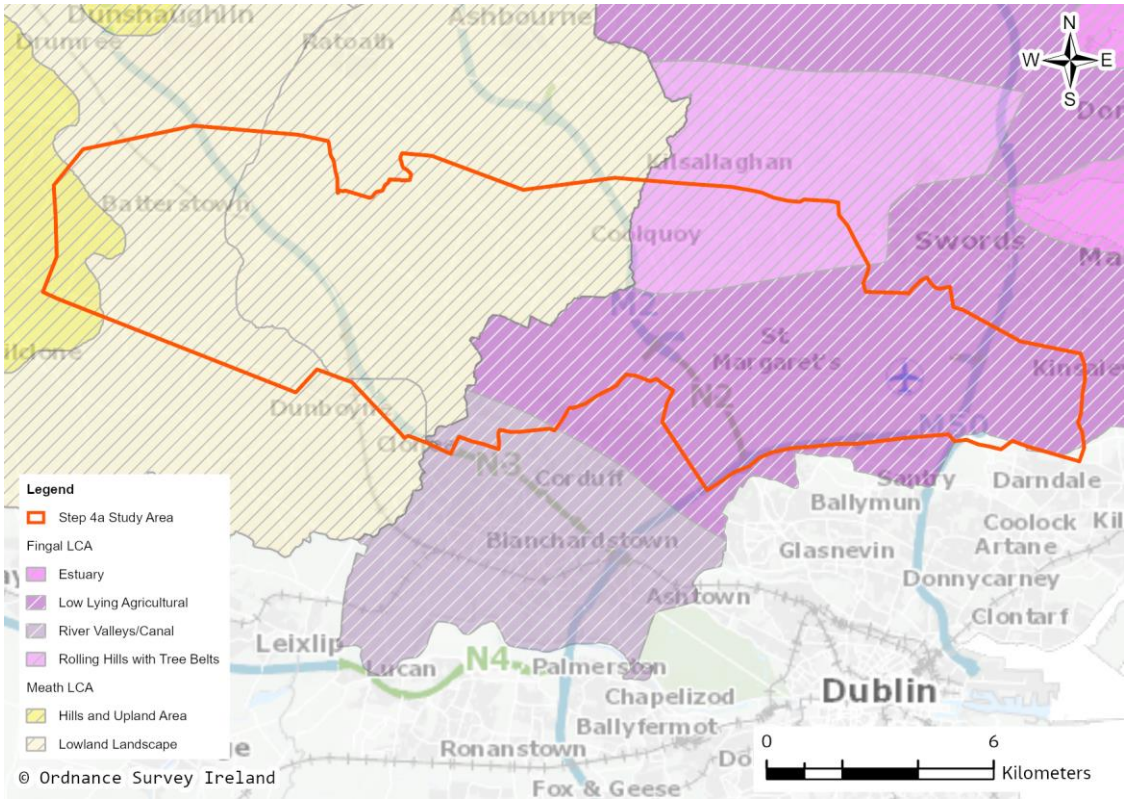

Figure 4-8 Landscape Character Areas

The majority of the western half of the Study Area is located in Lowlands, including the South East Lowlands LCA at Woodland and surrounds and the Ward Lowlands LCA to the east of Woodland. The Tara Skryne Hills LCA lies to the immediate south-west of Woodland. The landscape of the South East Lowlands LCA is dominated by small fields, bounded by mature hedgerows, with clusters of woodland. The north-eastern section of the Study Area comprises Rolling Hills with Tree Belts LCA, and the majority of the southern section of the Study Area comprises Low Lying Agricultural LCA (including at Belcamp substation), with a smaller section of River Valleys/ Canal LCA to the south-west.

The Meath CDP has assigned the South East Lowlands as Very High Value and Moderate Sensitivity, Tara Skyrne as Exceptional Value and High Sensitivity, the Royal Canal as High Value and Moderate Sensitivity, and the Ward Lowlands as Low Value and High Sensitivity. The FDP has assigned Low Lying Agricultural LCAs as Modest Value and Low Sensitivity, Rolling Hills LCAs as Modest Value and Medium Sensitivity, and the River Valleys/Canal LCA as High Value and High Sensitivity. These landscapes can absorb a certain amount of development once the scale and forms are kept simple and surrounded by adequate screen boundaries and appropriate landscaping to reduce impact on the rural character of the surrounding roads. Particular parts of high sensitivity areas have a low capacity to absorb new development.

There are a number of clusters of residential properties and larger settlements across the Study Area: Batterstown is closest to the east of Woodland substation; Dunboyne, Mulhuddart / Clonee and Blanchardstown are along the south west boundary of the Study Area; St. Margaret's is to the west of Dublin Airport. At Woodland substation, the nearest sensitive receptors are individual residential properties to the south and east, approximately 1km to 2km in distance, respectively. At Belcamp substation, the nearest residential properties are to the south of the substation, across the R139 Regional Road. There are also hotels approximately 1km to the west of the Belcamp substation.

There are no designated scenic routes or protected views in the Study Area.

Potential Impacts

There would be some, but limited, impacts on landscape and views during construction of the Proposed Development from temporary machinery and compounds. However, the use of the regional road network without requirement for third party land for most of the route and the use of appropriate screening by fencing means the impacts would not be significant for the majority of the route.

There may be the potential for routing across third party land for the Woodland and Belcamp substation connections and this would result in the loss of some hedgerows and mature trees. These effects could be permanent as it is current EirGrid and ESB policy to not plant such vegetation over cables, although the potential to replant hedgerows is under consideration.

During operation, the Proposed Development itself would have limited impacts on landscape and visual, once reinstatement is completed. There would likely be joint boxes along the route which would affect both but these effects are not expected to be significant.

4.5.5 Cultural Heritage (Archaeological and Architectural Heritage)

Baseline

Cultural heritage assets in the Study Area are shown in Figure 4-9. There are a number of National Monuments and protected structures across the Study Area. There are also pockets of sites recorded in the National Inventory of Architectural Heritage to the east of the Study Area.

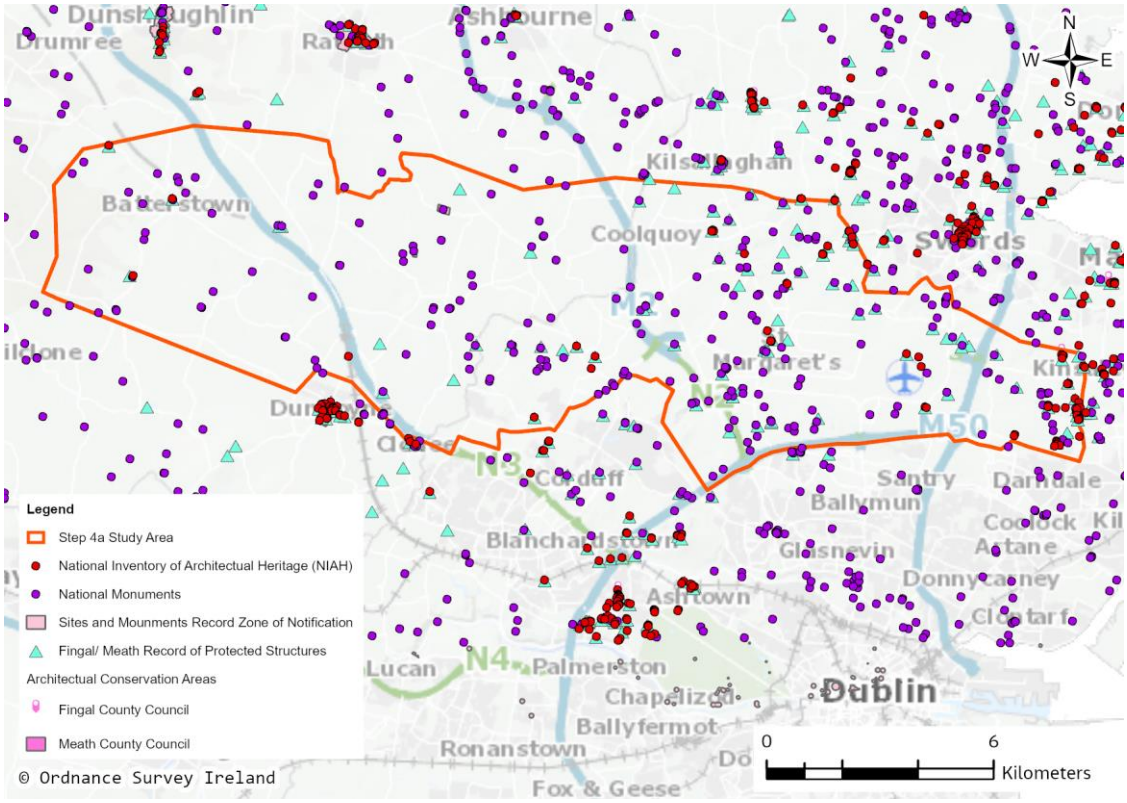

Figure 4-9 Cultural Heritage Assets

There are several NIAH sites within the Study Area, including at Batterstown, Hollystown, Buzzardstown, Corristown, Rathbeale, immediately south-west of Belcamp substation (approximately 105m) and one directly to the west of Belcamp substation, a detached three-bay, two-storey house which was damaged by fire. Of particular note, however, is Belcamp Hall, east of Belcamp substation. It was built by Edward Newenham and includes a monument to US President George Washington (the Washington Monument), with

whom Newenham was in regular contact. The hall and grounds fell into disrepair in more recent years and significant fire damage occurred in July 2016 destroying the roof and causing major further damage to historic features. It is now owned by Gannon Homes who are in the process of developing the estate for housing. The hall was reputed to be haunted by George Washington.

Meath and Fingal Records of Protected Structures sites are identified throughout the Study Area. There is a small cluster to the north of Batterstown / east of Woodland substation, and larger clusters between the M2 and N2 corridors, to the north of Mulhuddart / Corduff and between the N2 corridor and the M1 corridor, most notably around the settlement of Swords. There is also a smaller cluster to the north-east of the Belcamp substation in the vicinity of St. Doolaghs.

National Monuments are relatively evenly and widely distributed throughout the Study Area. There is a small cluster to the north of Batterstown / east of Woodland substation, and larger clusters between the M2 and N2 corridors, to the north of Mulhuddart / Corduff and between the N2 National Road corridor and the M1 Motorway corridor, notably around St. Margaret's, Kilsallaghan and Swords;

There are Archaeological Resources and Areas of Archaeological Potential (AAP) widely distributed across the Study Area. There are no recorded AAPs at Woodland or Belcamp substations. There is a cluster of AAPs to the north of Belcamp substation.

Potential Impacts

In terms of potential impacts during the construction phase, relating to construction there is potential to disrupt heritage assets, especially unknown archaeological assets due to the extent of ground disturbance required for a construction working width, the excavation of trenches, and permanent access roads if required. If HDD is undertaken in the absence of archaeological monitoring and mitigation , sub-surface archaeological remains could be damaged or destroyed. If HDD is used, it is likely to be where there are significant physical constraints, such as roads, railways or waterways.

Further investigation and surveys would be required to determine the exact nature of the cultural heritage assets in the Study Area.

4.5.6 Noise and Vibration

Baseline

Under S.I. No. 140/2006 – Environmental Noise Regulations 2006, county councils are designated as the responsible parties for the preparation of Noise Action Plans for the management and control of road, rail, major industrial and aircraft noise sources. Fingal County Council have developed a Noise Action Plan for Fingal County Council 2019 - 2023 and a separate Noise Action Plan for Dublin Airport 2019 - 2023. Meath County Council have also developed a County Meath Noise Action Plan 2019.

Noise pollution is considered to have a greater impact at certain locations and certain building types are considered to be more sensitive than others (i.e. residential properties, schools, hospitals and residential care facilities). The main sources of noise in the Study Area include the M3 Motorway / N3 National Road and the M2 Motorway / N2 National Road to the east of Woodland substation, the M50 Motorway to the south of the Study Area, the M1 Motorway to the west of Belcamp substation, and Dublin Airport, for which flight paths pass over the Study Area. Dublin Airport is approximately 3.3km to the north-west of Belcamp substation.

At Woodland substation, the nearest sensitive receptors are residential properties to the south and east, approximately 1km to 2km in distance, respectively. As this area is more rural in nature, it would be more susceptible to noise impacts. There is no current noise monitoring in the vicinity of Woodland substation. The nearest modelled location is at the M2 Motorway approximately 3km to the north-east. At Belcamp substation, the nearest residential properties are to the south of the substation, across the R139 Regional Road. There are also hotels approximately 1km to the west of the Belcamp substation. The area is dominated

by aircraft noise as the Belcamp substation is in the flight path of Dublin Airport, and noise from the R139 Regional Road to the immediate south of the substation. The noise levels experienced at the Belcamp substation due to the nearby road networks (notably the M1 and Motorway and the R139 Regional Road) is 55-59dB during the daytime and the noise experienced due to aircraft flying overhead is also 55-59dB during the daytime.

Potential Impacts

Potential noise and vibration impacts are separated into construction phase (i.e. temporary) and operational phase (i.e. permanent) impacts. The majority of the impacts are expected to occur during the construction phase.

Noise and vibration from construction plant associated with the Proposed Development is likely to arise from various activities including:

- Vegetation removal;
- Topsoil stripping;
- Breaking of hard surfaces;
- Pipe stringing;
- Pipe welding;
- Excavation;
- Pipe laying;
- Backfill;
- Compaction;
- Reinstatement;
- Vehicles using access routes to work sites; and
- Upgrading/extending the substations.

The equipment associated with the above works could include dumpers, tracked excavators, hydraulic breakers, telescopic handlers, lorries, dozers, cranes, compressors, and generators.

For the majority of the Proposed Development, the underground cables are expected to be installed using 'Open Cut' techniques. Where 'Open Cut' works are undertaken adjacent to the existing road network, there is a relatively low potential for temporary impacts due to construction noise. This is due to the relatively high levels of local environmental noise that are typically experienced adjacent to roads. For the south and east of the Study Area, existing noise sources such as the motorways and Dublin Airport mean it is unlikely the cable installation would have a significant impact. Also, as the works are expected to progress in sections, noise levels at any particular receptor would only be elevated for a relatively short period of time. However, where 'Open cut' works are undertaken in relatively quiet areas close to sensitive receptors there is the potential for temporary impacts due to construction noise.

There is greater potential for noise impacts at sensitive receptors where construction activities would occur over a longer period, e.g. at trenchless crossings. It is recognised that certain construction activities at certain trenchless crossings could be required to take place outside of normal working hours, which would increase the likelihood of noise effects occurring. In addition, certain potential trenchless crossing techniques that may be employed (e.g. Horizontal Directional Drilling (HDD)) also have the potential to cause vibration effects at nearby receptors.

The movement of vehicular traffic for site access by construction workers, as well as the delivery of materials and equipment has the potential to cause localised temporary increases in traffic noise.

Current noise levels experienced in Belcamp from major road networks and Dublin Airport means impacts will be kept to a minimum.

In operation, UGCs are not considered a noise source because soil covering the cables acts as an insulator preventing any significant noise emission above the ground. Therefore, operational noise impacts are not expected as a result of the underground cabling element of the Proposed Development.

4.5.7 Air Quality

Baseline

Baseline air pollutant concentrations are likely to vary within the Study Area due to the difference in emissions between the rural and urban environment, however, the air quality index for health across the Study Area is Good. The Study Area is located within two Air Quality Zones: Zone D, Rural Ireland and Zone A, Dublin Conurbation.

There are air quality sensitive receptors throughout the Study Area, the majority of which are residential, although there are other types of sensitive receptors including:

- Schools
- Golf Clubs;
- Places of worship; and
- Other amenity areas.

The majority of the Study Area is located within the Dublin Conurbation (Zone A) air quality zone with Rural Ireland (Zone D) located in the west of the Study Area.

The Study Area comprises of three types of air quality regions; Rural east, Small towns (Ratoath/Donaghmore/Dunboyne) and Dublin City. Rural east and small town regions lie in the west of the Study Area, with a small section in the north towards Swords. Dublin City region lies in the east and south, surrounding the Dublin City Airport. Dublin Airport D25 is the only monitoring site in the area, located in the east, north-west of Belcamp Substation.

Potential Impacts

Construction of the Proposed Development could have the following potential impacts on air quality:

- Dust emissions generated by construction activities – a temporary impact;
- Emissions of pollutants to air from construction plant and machinery – a temporary impact; and
- Emissions of pollutants from construction related road vehicles travelling on the local road network – a temporary impact.

There are no significant sources of air quality or dust effects associated with the operation of the Proposed Development.

Construction activities associated with the Proposed Development have the potential to generate fugitive dust emissions. These may give rise to annoyance due to the soiling of surfaces, risk of health effects due to the increase in exposure to fine particulates such as PM_{10} and $PM_{2.5}$ and damage to vegetation and ecosystems (where very high levels of dust soiling occur).

The main construction activities associated with the Proposed Development that could generate dust include earthworks, trench excavation for the installation of the pipeline and temporary material storage and

handling. Dust may also be generated by vehicle movements on haul routes predominantly within the construction areas.

Any potential impact associated with dust during construction will be controlled and managed by a selection of appropriate good practice mitigation measures.

The type and numbers of construction plant and machinery would vary over the construction period of the Proposed Development. However, construction plant and machinery would be in operation at any one location for only a relatively short duration. There would also only be a relatively low number and size of plant and machinery items operating during construction simultaneously. Therefore, the potential effect on local air quality at human receptors, and ecological receptors in the vicinity of the construction works is not likely to be significant.

Engine exhaust emissions from heavy duty vehicles (HDVs) and light duty vehicles (LDVs) travelling on the local road network which are associated with construction of the Proposed Development have the potential to affect local air quality.

The number of daily LDVs and HDVs associated with construction traffic are not expected to exceed the thresholds for requiring assessment and are unlikely to have a significant effect on air quality.

4.5.8 Climate Change

Baseline

The Status of Ireland's Climate 2020 was published in August 2021 (EPA) and sets out the current status of emissions of greenhouse gases and aerosols and changes in rainfall, air temperature, sea levels, ocean acidity and sea surface temperatures. Ireland's Climate Action Plan 2021 (Government of Ireland November 2021) sets out a roadmap to halve greenhouse gas emissions by 2030 and reach net zero no later than 2050.

Greenhouse Gas Emissions Trends

- Greenhouse gas emissions have been on an increasing trajectory since pre-Industrial levels and have risen more sharply since the last status update of Ireland's climate in 2012;
- Overall electricity emissions reduced by a third between 2005 and 2018, underpinned by the growth of generation from renewables and higher efficiency from conventional generation; and
- The share of electricity from renewable energy increased almost five fold between 2005 and 2018, from 7.2% to 33.7%.

Climate Trends

- Rainfall was 6% higher in the period 1989 to 2018 compared to the 30-year period 1961 to 1990. The decade 2006 to 2015 was the wettest on record;
- Annual average air temperature has risen by approximately 0.9C over the last 120 years. Fifteen of the top 20 warmest years on record have occurred since 1990;
- Sea level around Ireland has risen by approximately 2-3mm per year since the early 1990s;
- Ocean acidity has increased by 0.05pH units between 1991 and 2013;
- Sea surface temperature has risen 0.15C per decade between 1990 and 2020.;
- River flows have increased across most of the country however there is also an increase in potentially drought conditions, especially in the east;
- There has been an increase in forest extent of 30% between 1990 and 2018 and a decrease in wetland areas, including peatlands; and

- The total volume of trees and hence carbon sequestration has increased by 38% between 2006 and 2017.

These changes are acknowledged to be as a result of cumulative emissions of Greenhouse Gases from anthropogenic sources causing global mean surface warming.

The Climate Action Plan has a target to increase the proportion of renewable electricity to up to 80% by 2030. The Plan sets out that additional electricity generation and transmission infrastructure will be a critical enabler to achieve the renewable energy and emissions targets.

In Ireland, total electricity demand over the next ten years is forecast to grow between 19% and 50%, largely driven by new large energy users, many of which are data centres. This presents a challenge to Ireland's emissions targets and to Ireland's security of supply. Included in the targets for the electricity sector is to '*Expand and reinforce the grid through the addition of lines, substations and new technologies*'.

Potential Impacts

The most significant impact the Proposed Development will have on Climate change will be to facilitate the connection of new renewable energy facilities such as wind farms and solar farms. As noted in Section 4.4.4 Economy, the Climate Action Plan (2021) has a target to increase the proportion of renewable electricity to up to 80% by 2030. The Plan sets out that additional electricity generation and transmission infrastructure will be a critical enabler to achieve the renewable energy and emissions targets.

In Ireland, total electricity demand over the next ten years is forecast to grow between 19% and 50%, largely driven by new large energy users. This presents a challenge to Ireland's emissions targets and to Ireland's security of supply. Included in the targets for the electricity sector is to '*Expand and reinforce the grid through the addition of lines, substations and new technologies*'.

In terms of more direct impacts for the UGC, consideration is given to:

- Climate resilience: new infrastructure is a long-term investment and will need to remain operational over many decades, in the face of a changing climate; and
- Material use/ embodied carbon.

<u>Climate Resilience</u>

In terms of climate resilience, consideration has been given to the vulnerability of a UGC to potential impacts of climate change such as:

- Flooding; and
- Earth movement or subsidence caused by flooding or drought.

UGCs are potentially vulnerable to earth movement and subsidence, as they are buried underground. UGCs are less vulnerable to flooding, winds and storms and subsequent transmission losses. Flooding is only considered a potential impact in terms of accessibility to UGCs for repairs, if required.

The shortest UGC from Woodland to Belcamp would be a straight line between the two and would be approximately 25km. It would not be possible to achieve this route given the existing constraints. It could be up to 43km long. Overall, there is a Low risk in terms of climate resilience as UGCs will be buried underground.

<u>Materials Use</u>

The UGC requires a single trench, approximately 2m wide, and three cables laid within concrete. The trenches are typically 1.5m deep, of which approximately 0.5m would be concrete, the remainder backfilled with material taken from the trench initially, wherever possible.

Taking an average potential cable route at approximately 32-40km, the UGC would require almost 100-120km of insulated cables. With a diameter including insulation of 128mm, this equates to approximately 1300- 1500m^3 of cable material and approximately 100,000- 120,000m^3 of concrete. Whilst this would amount to a relatively small proportion of the total carbon budget for Ireland, any increase in carbon emissions has the potential to contribute to climate change.

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