Chapter 18
Material Assets: Utilities

CONTENTS

18. MATERIAL ASSETS: UTILITIES

18.1 Introduction

This chapter has assessed the potential effects on Material Assets: Utilities arising from the DART+ Coastal North project ("the Proposed Development") during the Construction and Operational Phases based on the draft Railway Order, Chapter 4 (Description of Proposed Development) and Chapter 5 (Construction Strategy).

This assessment includes an assessment of built services (including electricity, telecommunications, gas, water supply and sewer networks). The assessment examines the potential impacts during the construction, operation and maintenance of the Proposed Development.

Material Assets are defined within the Environmental Protection Agency (EPA) (2015) Draft Advice Notes for Preparing Environmental Impact Statements as '*Resources that are valued and that are intrinsic to specific places are called 'Material Assets''*.

The EPA (2022) Guidelines on the information to be contained in Environmental Impact Assessment Reports states 'Material assets can now be taken to mean built services and infrastructure'.

18.2 Legislation, Policy and Guidance

18.2.1 Legislation

The Transport (Railway Infrastructure) Act 2001 (as amended) (the 2001 Act) provides for the making of a Railway Order application by Córas Iompair Éireann (CIÉ) to An Bord Pleanála. The European Union (Railway Orders) (Environmental Impact Assessment) (Amendment) Regulations 2021 (S.I. No. 743 of 2021) gives further effect to the transposition of the EIA Directive (Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU) by amending the 2001 Act. The 2001 Act as amended (including by Statutory Instrument No. 743/2021) at section 37 requires, *inter alia*, that the application be made in writing and be accompanied by:

- A draft of the proposed Railway Order;
- A plan of the proposed railway works;
- A book of reference to a plan describing the works which indicates the identity of the owners and of the occupiers of the lands described in the Plan; and
- A report on the likely effects on the environment of the proposed railway works.

A report of the likely effects on the environment of the proposed railway works is addressed by the preparation of this Environmental Impact Assessment Report (EIAR) (previously referred to as an Environmental Impact Statement in section 39 of the 2001 Act prior to the amendments effected by S.I. No. 743/2021). As mentioned, this EIAR is based on a coordinated approach in order to facilitate An Bord Pleanála carrying out a coordinated assessment with any assessment under the Habitats Directive (Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora) or the Birds Directive (Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds).

By virtue of section 38 of the 2001 Act the development the subject matter of a Railway Order is deemed to be exempted development and the provisions of Part IV of the Planning and Development Act 2000 are disapplied where the works involved are authorised by a Railway Order.

An examination, analysis and evaluation is carried out by the Board in order to identify, describe and assess, in the light of each individual case, the direct and indirect significant effects of the proposed railway works, including significant effects derived from the vulnerability of the activity to risks of major accidents and disasters relevant to it, on: population and human health; biodiversity, with particular attention to species and habitats protected under the Habitats and Birds Directives; land, soil, water, air and climate; material assets, cultural heritage and the landscape, and the interaction between the above factors. The draft Railway Order makes specific provision for interference with apparatus which includes inter alia any substation, inspection chamber, junction box, booster station, pipe, sewer, drain, duct, tunnel, conduit, wire, cable, fibre, insulator, masts, support structures and such other thing as may be used by an undertaker for or in connection with the provision of a service to the public and an “undertaker” means any person or body with power and authority in relation to apparatus to install or relocate such apparatus or cause it to be installed or relocated.

In accordance inter alia with section 39 of the 2001 Act and the provisions of the EIA Directive, CIÉ, as the applicant for this Railway Order, has ensured that the EIAR is prepared by competent experts; contains a description of the proposed railway works comprising information on the site, design, size and other relevant features of the proposed works; contains a description of the likely significant effects of the proposed railway works on the environment; contains the data required to identify and assess the main effects which the proposed railway works are likely to have on the environment; contains a description of any features of the proposed railway works, and of any measures envisaged, to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment; contains a description of the reasonable alternatives studied by the applicant – here CIÉ – which are relevant to the proposed railway works and their specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the railway works on the environment; contains a summary in non-technical language of the above information; takes into account the available results of other relevant assessments under European Union or national legislation with a view to avoiding duplication of assessments; in addition to and by way of explanation or amplification of the specified information referred above, the EIAR contains such additional information specified in Annex IV to the EIA Directive relevant to the specific characteristics of the particular railway works, or type of railway works, proposed and to the environmental features likely to be affected and in this regard Annex IV sets out the information which is referred to in Article 5(1) of the EIA Directive. Further the EIAR includes the information that may reasonably be required for reaching a reasoned conclusion in accordance with section 42B of the 2001 Act on the significant effects of the proposed railway works on the environment, taking into account current knowledge and methods of assessment. This assessment has been undertaken in accordance with the above legislative and regulatory regime.

The key legislation and guidance are also referenced in the preparation of the EIAR as outlined in Chapter 1 (Introduction) (Sections 1.5, 1.6 and 1.7).

18.2.2 Policy

Relevant policy documents that have informed the assessment include:

- Dublin City Development Plan 2022-2028;
- Louth County Development Plan 2021-2027;
- Meath County Development Plan 2021-2027;
- Fingal County Development Plan 2023-2029; and
- National Development Plan 2021-2030.

18.2.3 Guidance

There is no specific guidance relating to the assessment of Material Assets: Utilities. The impact assessment has therefore followed the methodology and EPA guidance relating to the EIA process and preparation referred to in Chapter 1 Introduction (Section 1.7) of this EIAR:

- Guidelines on information to be contained in the Environmental Impact Assessment Report (EPA, 2022);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, (DHPLG, 2018);
- Environmental Impact Assessment of National Road Schemes - A Practical Guide, Revision 1 (NRA/TII, 2008);
- Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Environmental Impact Assessment of Projects–Guidance on Scoping (Directive 2011/92/EU as amended by 2014/52/EU) (European Commission, 2017); and
- Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Commission (EC) 1999).

18.3 Methodology

As a result of the Proposed Development, there will potentially be an impact on existing utilities along the route, such as gas, power or water pipes, drainage infrastructure, telecoms equipment, etc. Utilities are constraints during both the Design and Construction Phases. As such, their treatment in the temporary and permanent situations has been carefully considered during the development of the design of the Proposed Development.

From a design perspective, available records of all existing utilities (buried and overhead) within the Proposed Development area have been collated so that the design minimises unnecessary impact on them as well as informing the relevant utility company where any interfaces or issues have been identified.

The impact assessment has focused on where conflicts with existing utilities have been identified as part of the design process. The impact assessment process has utilised information gathered as part of the design process and includes the following:

- Identification of existing utilities and associated infrastructure;
- Identification of any future alterations and/ or expansion of existing utilities where planned;

- Identification of potential diversions and the extent of proposed services diversions (including any advance works or temporary diversions that may be required);
- Assessment of the likely impact (if any) on each element and implications for the Proposed Development and for the utility company. This has involved specific consultations by the design team with the utility companies and private operators to understand the potential impacts and determine exact requirements;
- Characterisation of the magnitude and significance of any potential impacts such as diversions, disruption of service, relocation etc;
- Identification of mitigation measures to minimise impacts; and
- Assessment of the significance of any residual effects after mitigation.

Where utility conflicts arise, potential treatments have been discussed with the utility providers. Engagement with the utility companies and private companies will continue throughout the project.

18.3.1 Study Area

There are no guidelines or criteria to define the size of the study area for the assessment of utilities, however, utility record information, consultation with utility companies and site visits with Iarnród Éireann have been undertaken to source critical utility information. The Material Assets: Utilities study area has been defined for the purpose of this assessment as the area within which there is potential for direct and indirect impact on built utility services infrastructure as a result of the Proposed Development, particularly where permanent and temporary diversions are required to facilitate the project whilst maintaining vital services to the general public and commercial bodies.

Iarnród Éireann (IÉ) owned trackside utilities and shared 3rd party utilities are discussed in Chapter 4 (Description of the Proposed Development) in Volume 2 of this EIAR.

18.3.2 Survey Methodology

18.3.2.1 Desk Surveys

From a design perspective, the first stage in the identification of utilities and infrastructure was the gathering of data in the form of utility service records from all relevant service/ utility providers. Available records of all existing utilities have been collated to establish existing utilities (buried and overhead).

The utility location and specification details are based on records obtained from the various utility providers and records provided will vary in accuracy. Relevant utility providers have been identified along the route as outlined in Table 18-1.

Table 18-1 Utility Providers

Type	Provider
Telecommunications	Vodafone
	Eir
	BT
	Enet
	Gas Networks Ireland Aurora
	Virgin Media
Watermains, Foul / Combined Sewer and Storm Water Sewer	Uisce Éireann (Irish Water)
	Dublin City Council
	Fingal County Council
	Louth County Council
	Meath County Council
Gas Mains	GNI
Electrical cables (underground and overhead)	ESB
Signals, Public Lighting	Dublin City Council
	Fingal County Council
	Louth County Council
	Meath County Council

After the initial identification stage, the design team carried out specific consultation with utility providers. The purpose of these specific consultations was to establish the nature and extent of any existing assets that each utility provider may have within the area traversed by the DART+ Coastal North Project. This early engagement established open communication with the utility providers to determine the location and details of existing utilities, the identification of high risk and/or high value utilities, assets, development and agreement of diversion proposals. The design development has considered the existing utilities and where potential services diversions are required based on these consultations with utility providers.

As part of the design process and with information received as part of the consultation with the utility providers a set of 'existing utilities' drawings (Figure 18.1 in Volume 3A) and a comprehensive set of 'utilities diversion' drawings (Figure 18.2 in Volume 3A) has been developed by the design team to inform the design of the Proposed Development. This information has informed this impact assessment.

18.3.2.2 Field Surveys

Following the gathering of utility records and initial utility provider consultations, various site visits were undertaken by the design team with utility providers and the Utilities Lead in Iarnród Éireann. These visits were conducted on bridges and roads that cross the rail corridor, as well on the tracks. All required Iarnród Éireann safety training was completed and relevant personnel were in attendance. Trackside walkovers were non-intrusive and gave the design team critical insight into the rail corridor environment while facilitating discussion with the Iarnród Éireann Utilities Lead.

Other surveys were undertaken with various utility providers on roads and bridges along the route. On site consultations allowed for the opening of manholes and chambers (conducted by the utility providers) to verify gathered records. Online consultations were conducted where site visits were not required or where access was not possible.

Intrusive surveys (such as slit trenches) will be undertaken during the detailed design stage to further verify the location and levels of gathered records along the project route.

18.3.2.3 Consultation

Consultation has been undertaken with key stakeholders to ensure that the utility information that is contained in this EIAR is accurate and that any proposed utilities actions required to be undertaken for project completion are acceptable to the utility asset owners. Site visits were undertaken when deemed necessary and where possible. Other consultation included emails and meetings, which allowed for communication channels to be established. While the detailed design stage will likely require significantly greater consultation, early engagement with these key stakeholders has ensured that design decisions that will likely impact their services can be communicated as quickly as possible. Consultation shall continue with all stakeholders throughout the project's upcoming stages.

18.3.2.4 Difficulties Encountered / Limitations

As previously stated, the design team gathered record information from utility providers who have existing assets along the route of the project. The accuracy and level of detail varies with each utility record, and they often contain erroneous or incomplete data. Incomplete records (e.g. sewer records lacking level data) have made it difficult to decide on the requirement for a diversion in certain areas and the design of such without a verification survey. While we have consulted, sought records and verified where possible, the location and detail of all the required utility diversions, further verification will be undertaken at the pre-construction stage of the Proposed Development, through pre-construction intrusive and non-intrusive survey. Notwithstanding, it is considered that the landtake requirements identified within the Railway Order application can accommodate any potential minor changes in design resulting from this verification process. Further, any such verification will not result in a greater significance of effect, than that identified herein.

18.3.3 Assessment Methodology

18.3.3.1 Parameters for Assessment

There are several activities which need to be considered in assessing whether the Proposed Development has the potential to result in significant adverse effects on existing utility infrastructure. These are outlined below for both the Construction and Operational Phases.

18.3.3.1.1 Construction Phase

- Interaction with existing utility assets such as electricity networks, gas networks, water supply networks, etc. causing a disruption of service during the Construction Phase;
- Introduction of new utility infrastructure, including protective measures to counter Electromagnetic currents, during the Construction Phase; and
- Requirement for new utility connections, such as for watermains, to ensure continuity of supply during the Construction Phase.

18.3.3.1.2 Operational Phase

- Requirement for maintenance of new utility infrastructure, such as for proposed substations;
- Power demands and supply connections to substations to ensure operation;
- Permanent alterations to existing utility services, such as for maintenance requirements; and
- Drainage alterations where existing networks do not have sufficient capacity for the additional flow rates generated.

18.3.3.2 Assessment Criteria and Significance

There are no specific criteria used for assessing the significance of the Proposed Development on existing utilities. As such, professional judgement and consultation with utility providers has determined the significance criteria used in this section.

The likely significance of impacts on existing utilities is determined based on consideration of the assumed functionality of the specific utility and the corresponding impact of its disruption. Details of criteria used in the assessment of Infrastructure and Utilities is set out in Table 18-2 below.

Table 18-2 Description of Infrastructure and Utilities Assessment Criteria

Criteria	Description
Importance	Utility infrastructure is necessary in the everyday lives of communities, and as such, its protection and continuity of supply is of paramount importance. General dependency on utilities means that any disruption of supply can have an immediate and significant impact. A utilities importance can be determined based on its strategic nature, function and capacity. These are categorised as: Transmission networks, which may be nationally or regionally important and where supply continuity can be achieved from other sources. Distribution networks, which are locally important and where supply continuity cannot be likely achieved from other sources. Local connections, which may be of local importance and where supply continuity cannot be likely achieved from other sources.
Sensitivity	Disruption in the continuity of supply at one location can have additional implications for other areas nationally, regionally and locally. Disruption of some utility assets would result in localised outages to households, while others could directly impact entire regions. As such, some disruptions carry a greater weighting on potential impacts.

The baseline rating of the existing utilities is determined by considering the importance and sensitivity of the service/supply as outlined in Table 18-3.

Table 18-3 Baseline Rating of Utilities

Rating	Criteria
High	High importance with limited potential for substitution: • EirGrid East West Interconnector; • Gas transmission/high pressure pipework/Interconnector 1 and 2; • Drinking water and foul/combined sewer trunk mains (greater than or equal to 600mm diameter); • Surface water sewers greater than 300mm diameter; • High voltage distribution cables, both underground and overhead; • Fibre telecommunications; and • Waterways.
Medium	Medium importance with limited potential for substitution: • Gas distribution network; • Arterial drinking water mains and foul/combined sewer mains (less than 600mm diameter); • Surface water sewers less than 300mm diameter; and • Medium and low voltage transmission cables, both underground and overhead.
Low	Low importance, potential for substitution: • Local water and foul connections.
Negligible	Low importance, potential for substitution: • Domestic service connections.

The criteria for defining magnitude in this assessment is outlined in Table 18-4. These are based on the EPA assessment criteria (EPA, 2022). The magnitude of impact for utilities has been considered in terms of the duration of service interruption that would likely occur, service provider notification and level of service reinstatement.

Table 18-4 Magnitude of Impact Criteria on Material Assets - Utilities

Impact Magnitude	Criteria
Very High	Disruption of service for more than one week. Relevant stakeholders were notified at short notice or not at all. The level of service provided by the impacted utilities is not reinstated.
High	Disruption of service for less than one week. Relevant stakeholders were notified at short notice. The level of service provided by the impacted utilities is reinstated.
Medium	Disruption of service for up to two days. Relevant stakeholders were notified. The level of service provided by the impacted utilities is reinstated or improved.
Low	Disruption of service for several hours. Relevant stakeholders were notified. The level of service provided by the impacted utilities is reinstated or improved.
Negligible	No disruption to service, such as the removal of redundant assets.

Table 18-5 outlines the matrix established for assessing the significance of the effect utility disruptions would have. The ranges in significance are defined using the categories defined in the EPA Guidelines, 2022.

Table 18-5 Significance of Effect Assessment Matrix

Magnitude of Impact	Baseline Rating			
	Low	**Medium**	**High**	**Very High**
Negligible	Imperceptible	Not Significant	Not Significant	Not Significant
Low	Not Significant	Slight	Slight	Moderate
Medium	Slight	Moderate	Moderate	Significant
High	Moderate	Significant	Significant	Very Significant
Very High	Significant	Very Significant	Profound	Profound

18.4 Receiving Environment

The Proposed Development has been divided into five distinct geographic zones along the length of the corridor (Zones A to E) as outlined in Chapter 4 (Description of the Proposed Development) and is summarised below. The Proposed Development is described from south to north along the railway corridor.

- Zone A – North of Connolly Station to south of Howth Junction & Donaghmede Station;
- Zone B – South of Howth Junction & Donaghmede Station to north of Malahide Viaduct;
- Zone C – North of Malahide Viaduct to south of Gormanston Station;
- Zone D – South of Gormanston Station to County Meath/County Louth border; and
- Zone E – Drogheda MacBride Station and surrounds;

For the purposes of describing the existing utilities and built services infrastructure, the receiving environment has been described with reference to these five geographic areas. Utilities by their nature may extend across geographic zones. Utilities relevant to this Proposed Development with the potential to extend across zones include trackside ducting and cable routes running parallel to the tracks. Given their nature, these are considered as project wide aspects i.e. not contained within one single geographic zone. All other conflicts are contained within an individual zone.

Utilities infrastructure is necessary to ensure that power (electricity / gas), water and amenity services, such as telecommunications and wastewater collection, are provided to communities in a reliable consistent manner. Due to a community's dependency on such services, any disruption to a utility supply can have a negative impact. The description of the receiving environment has focused on where interfaces with existing utilities and the Proposed Development have been identified.

The utilities that extent across the existing rail corridor along the Proposed Development route are generally concentrated around road bridges and train stations. There are also several utilities that cross underneath the railway tracks or run parallel to the tracks, such as Uisce Éireann pipes (including both water supply and wastewater) and electricity cables. In respect of overhead cables which cross the railway line, the critical issue is the required clearance for rail electrification and any electrical interference that may occur.

Further details of the diversions required and the utilities affected by the Proposed Development are provided in Appendix A18.1 (Details of Utility Conflicts and Diversions) in Volume 4 of this EIAR. This chapter and the supporting Appendix A18.1 should be read in conjunction with Figures 18.1 (Existing Utilities) and 18.2 (Proposed Utilities Diversion) in Volume 3A of this EIAR. Further information on the Construction Phase works is presented in Chapter 5 (Construction Strategy) in Volume 2 of this EIAR.

18.4.1 Zone A - North of Connolly Station to south of Howth Junction & Donaghmede Station

Zone A encompasses the area from the start of the Proposed Development, just north of Connolly Station to just the south of Howth Junction & Donaghmede Station and includes Fairview Depot. This zone falls within the Dublin City Council administrative boundary, bordering Fingal County Council to the north. The rail corridor contains many existing utilities, as would be expected in a heavily urbanised region of Dublin. These include telecommunications, electricity, gas, sewer and watermain infrastructure.

18.4.1.1 Telecommunications

Vodafone, EIR, Virgin Media, Gas Networks Ireland, Enet and BT were identified as having existing telecommunication assets in this zone. BT telecommunications ducts run adjacent to the track throughout the length of the zone.

Vodafone was identified as having an existing telecommunication asset at the Raheny Station. Of the remaining telecommunication utility providers, track crossings were found to occur 28 no. of times for their respective services. No conflicts or diversion requirements with the existing telecommunication assets have been identified.

18.4.1.2 Electricity

Existing electricity infrastructure has been identified in the zone, including high voltage (HV) transmission lines, as well as medium voltage (MV) and low voltage (LV) distribution lines. Crossings were typically, but not exclusively, found to occur at bridge crossings of the railway tracks. In total, 30 no. crossings were identified with the tracks and the existing electricity infrastructure. These are comprised of 27 no. underground crossings of HV, MV and LV assets, as well as three overhead crossings of LV assets. No conflicts or diversion requirements with the existing electricity infrastructure assets have been identified in this zone.

18.4.1.3 Gas

Gas Networks Ireland has a number of existing high pressure (HP), medium pressure (MP) and low pressure (LP) gas mains which cross or come within close proximity of the railway tracks in this zone. These notably include a 300mm 19 bar HP gas main which passes below the tracks south-west of Fairview DART Depot. There are 15 no. other crossings with gas main infrastructure relating to MP and LP gas mains of varying sizes. A 90mm 25 mbar gas main which runs for approximately 70m parallel to the tracks by Redmond's Court is not impacted by the Proposed Development. No conflicts or diversion requirements with the existing gas infrastructure assets have been identified in this zone.

18.4.1.4 Sewer and Watermains

Uisce Éireann assets are located in this zone including distribution watermains and trunk, gravity and pumped foul sewers. In total, 13 no. watermain crossings of the tracks have been noted based on record data. A 225mm watermain is in close proximity along the north side of the tracks for approximately 3km. 14 no. foul sewer crossings have been noted beneath the tracks. These range in diameter from 225mm to 750mm and feature both gravity and pumped sewers. Stormwater sewers have also been noted as being present, crossing the railway tracks in 11 no. locations and ranging in size from 225mm to 1850mm. A 700mm stormwater sewer was identified in close proximity to the northern side of the tracks, running adjacent to the tracks for approximately 1.05km. No conflicts or diversion requirements with the existing sewer and watermain infrastructure assets have been identified in this zone.

18.4.2 Zone B – South of Howth Junction & Donaghmede Station to north of Malahide Viaduct

The rail corridor in Zone B extends from Howth Junction & Donaghmede Station to the north of Malahide Viaduct (including the user worked level crossing (XB001) south of Donabate) and the whole of Howth Branch. The rail corridor for both sets of tracks contains a large number of existing utilities. These include telecommunications, electricity, gas, sewer and watermain infrastructure. This zone falls wholly within the Fingal County Council administrative boundary, bordering Dublin City Council to the south.

18.4.2.1 Telecommunications

Telecommunications infrastructure interacts with the railway tracks in both the northern and easterly directions within this zone. To the east, Virgin Media ducts cross the tracks along the Baldoyle Road. No other telecommunication infrastructure has been noted between Howth Junction and Donaghmede Station and Howth Station. No conflicts or diversion requirements with the existing telecommunication infrastructure assets have been identified in this section of the area.

To the north, the previously identified BT ducts running parallel to the tracks from Zone A continue through Zone B in close proximity to the tracks. These ducts are believed to cross the tracks in four locations. Virgin Media, Eir and ESB telecom ducts cross the tracks at a further 18 no. locations, however these are predominantly confined to existing bridges (Figures 18.1 in Volume 3A). Crossing the Malahide Estuary, both Eir and BT ducts run parallel to the tracks in the confined section. One Vodafone tower was identified as an existing telecommunication asset located at Malahide Station.

North of Malahide Station, a turnback is to be constructed on a widened embankment between the Strand Road underbridge (UBB29) and the Malahide Viaduct (UBB30). This will require the construction of a new modular reinforced earth wall and earthworks slope on the west side of the existing embankment and adjacent (to the east of) the proposed Broadmeadow Way Greenway. Provision has also been made to accommodate any proposed telecommunications ducts for the greenway which may need to be relocated, within this area, if required.

18.4.2.2 Electricity

Existing electricity infrastructure has been identified in the zone, including HV transmission lines, as well as MV and LV distribution lines. To the east, the tracks pass over 15 no. underground LV, MV and 38kV HV assets between Howth Junction and Donaghmede Station and Howth Station. A single LV overhead crossing is also present at Howth Station, as is a single 38kV HV overhead crossing south of Baldoyle Industrial Estate. East of Baldoyle Industrial Estate, 38kV HV cables run adjacent to the tracks on the northern side for approximately 1.1km before crossing the tracks to the south. At the interface with the Baldoyle Road, LV cables have been routed below the tracks. These cables return to running overhead to the north and south of the tracks. At this interface, MV cables join the tracks to run parallel on the northern side for approximately 350m before crossing to the south. An additional, approximate 250m of MV cables run parallel to the northern side of the tracks along Burrow Road. Despite the significant amount of existing electricity infrastructure present, no conflicts or diversion requirements have been identified in the area. East of Howth Junction & Donaghmede Station two MV and one 38kV HV cables cross below the tracks.

To the north of Howth Junction, 15 no. MV, LV and 38kV HV asset crossings occur below the tracks, with one LV overhead crossing also present. The routing of overground cables below the tracks has already occurred in a number of locations previously, limiting the number of interventions required as part of these works. Unlike to the east, electricity infrastructure is set further back away from the track extents when running parallel.

One conflict with the existing electricity infrastructure has been established. To resolve this conflict, works would include the diversion of cable and chambers to more suitable locations. Diversion of MV (UG-PDV15) cable and chambers is required to accommodate Clongriffin station signalling building at the south of Clongriffin station.

North of Malahide Station, realignment works are proposed to introduce a turnback on the west side of the existing railway track. This will require the construction of a new modular reinforced earth wall and earthworks slope on the west side of the existing embankment and adjacent (to the east of) the proposed Broadmeadow Way greenway. Provision has also been made to accommodate any proposed ESB ducts for the greenway which may need to be relocated, within this area, if required.

18.4.2.3 Gas

Gas Networks Ireland has a number of existing HP, MP and LP gas mains which cross or come within close proximity of the railway tracks in this zone. Between Howth Junction and Donaghmede Station and Howth Station, six track crossings of gas main infrastructure occur. These relate to MP and LP gas mains of various diameters. No HP gas main is noted to be close to the tracks.

A 315mm 25 mbar LP gas main runs parallel to the tracks to the south for approximately 600m, south of Baldoyle Industrial Estate. No conflicts or diversion requirements with the existing gas infrastructure assets have been identified in this area.

To the north, five track crossings of gas main infrastructure occur. As with east of the station, these relate only to MP and LP gas mains of varying sizes. No conflicts or diversion requirements with the existing gas infrastructure assets have been identified in this area.

18.4.2.4 Sewer and Watermains

Uisce Éireann assets have been identified in this zone including distribution watermains and trunk, gravity and pumped foul / combined sewers. To the east, 11 no. watermain crossings with the tracks have been noted based on record data. Nine foul sewer crossings have also been noted beneath the tracks. These range in diameter from 225mm to 1500mm and are comprised of gravity sewers. A 1500mm foul sewer runs adjacent to the tracks for approximately 800mm south of Burrow Road. Stormwater sewers are also present, crossing the railway tracks in 5 no. locations and ranging in size from 225mm to 1350mm. No conflicts or diversion requirements with the existing sewer and watermain infrastructure assets have been identified in this area.

To the north, 10 no. watermain crossings with the tracks have been noted based on record data. Seven foul sewer crossings have also been noted beneath the tracks. These range in diameter from 150mm to 1500mm and feature both gravity and pumped sewers. Stormwater sewers are also present, crossing the railway tracks in two locations and ranging in size from 1130mm to 1350mm.

The intervention forming part of the Proposed Development at Clongriffin will see the introduction of a new passing loop. An existing 225mm foul sewer (UDV8) and 225mm surface water drain (UDV9) located along the eastern side of the tracks will require diversion to facilitate these works. Existing drainage connecting to the surface water infrastructure will likely also require relocation.

As described above, north of Malahide Station, a turnback is proposed to the west of the existing railway track. This will require the construction of a new modular reinforced earth wall and earthworks slope on the west side of the existing embankment and adjacent (to the east of) the proposed Broadmeadow Way greenway. Protection of the existing surface water outfall pipe to the Malahide Estuary may be required during the construction of the retaining wall.

18.4.3 Zone C – North of Malahide Viaduct to south of Gormanston Station

This zone contains the area south of Donabate Station, north of Malahide Viaduct to the south of Gormanston Station, encompassing Donabate, Rush & Lusk, Skerries and Balbriggan Stations. The rail corridor contains a large number of existing utilities including telecommunications, electricity, gas, sewer and watermain infrastructure. This area is notable for the large number of overhead electricity infrastructure diversions required. The zone falls wholly within the Fingal County Council administrative boundary, bordering Meath County Council to the north.

18.4.3.1 Telecommunications

Vodafone, Eir, Virgin Media, Enet and BT were identified as having existing telecommunication assets in this zone. BT telecommunications ducts run adjacent to the track throughout the length of the zone. Of the remaining telecommunication utility providers, track crossings were found to occur 22 no. times for their respective services.

Four telecom diversions have been identified (UG-UDV1, UG-UDV2, UG-UDV3 and UG-UDV4), which relate to Eir infrastructure crossing the tracks. UG-UDV1 utilises the existing Eir infrastructure on the east side of the tracks by extending ducts to Donabate Station from Main Street, eliminating the need to cross the tracks. The remaining diversions cross the tracks below ground at existing bridges. One Vodafone tower was identified as having an existing telecommunication asset at Skerries Station. Details of the diversions required are outlined in the utilities diversion drawings in Figures 18.2 in Volume 3A of this EIAR.

18.4.3.2 Electricity

Existing electricity infrastructure has been identified in the zone, comprised of both ESB and EirGrid services. This includes HV transmission lines, MV and LV distribution lines operated by ESB and the east-west interconnector operated by EirGrid. There was a total of 27 no. crossings identified with the tracks and the existing ESB electricity infrastructure. These are comprised of 10 no. underground crossings of MV and LV assets, as well as 17 no. overhead crossings of HV, MV & LV assets.

Additionally, there are nine instances where overhead MV and LV assets run parallel to the tracks in this zone, for an approximate combined total length of 2.5km. The 500MW HV east-west interconnector crosses the tracks south of Rush and Lusk Station, which is notable for its national strategic importance.

Several conflicts with the existing electricity infrastructure have been established. To resolve these conflicts, works would include the diversion of cables and poles to more suitable locations. In some locations this will require horizontal directional drilling where utilities are to cross under the tracks. These Under Track Crossings are referred to as a UTX. Diversions for HV, MV and LV assets are required in this zone. Where feasible, diversions have been designed to limit the extent of intervention necessary at the track interface, primarily using existing bridges/underpasses and existing electricity infrastructure already present on the opposite side of the track crossing. Five overground diversions (OH-DV2, OH-DV3, OH-DV4, OH-DV5, and OH-DV6) are proposed, comprised of MV and LV assets. All these diversions are proposed at points of existing bridges/underpasses, and new supply points from MV to LV assets to limit the impact of works.

Five underground diversions for MV assets (UG-DV2, UG-DV3, UG-DV5, UG-DV6 and UG-DV7), capable of being conducted via standard means, are also proposed. All five are also proposed at points of existing bridges/underpasses.

Horizontal directional drilling is required for seven diversions (UTX5, UTX6, UTX7, UTX8, UTX8, UTX9, and UTX10) in this zone. This includes six MV assets and one 38kV HV asset. Additionally, two diversions (UG-DV4 and UG-DV8), are proposed that would not require track crossings. These are to be underground and relate to LV cables that can be utilised by expanding the existing electricity infrastructure already present at the opposite side of the tracks. Details of the diversions required are outlined in the utilities diversion drawings in Figures 18.2 in Volume 3A of this EIAR.

Additionally, there are 13 no. instances where overhead MV and LV assets run parallel to the tracks and diversions are required in this zone. While two of these are rectified as UG-PDV7 part of the UTX7 and OH-PDV1 part of OH-DV4 diversions, the remaining diversions of parallel cables equate to a total length of approximately 4km. One diversion, located in Balbriggan UG-PDV10, is noted to be very significant due to the extent of works required. The diversion would require the existing LV overhead cable to be undergrounded for approximately 1.3km, in an urban location where a significant number of other utilities are already present. Of the remaining diversions, six OH-PDV2, OH-PDV3, OH-PDV4, OH-PDV5, OH-PDV6, and OH-PDV9 are located in predominantly rural areas between towns, with four others UG-PDV8, UG-PDV11, UG-PDV12, and UG-PDV13 proposed in urban areas.

18.4.3.3 Gas

Gas Networks Ireland has a number of existing HP, MP and LP gas mains which cross or come within close proximity of the railway tracks in this zone. Between the Malahide Estuary and the Gormanston Viaduct (UBB65), six track crossings of gas main infrastructure occur. These relate to MP and LP gas mains of various diameters and notably a single 750mm 75 bar HP transmission gas main located north of Rush and Lusk Station. A 63mm 4 bar MP gas main runs parallel to the track south of the Rogerstown Estuary for approximately 475m. Despite this, no conflicts or diversion requirements with the existing gas infrastructure assets have been identified in this area.

18.4.3.4 Sewer and Watermains

Uisce Éireann assets are located in this zone including distribution watermains and gravity and pumped foul sewers. 14 no. watermain crossings with the tracks have been noted based on record data. 13 no. foul sewer crossings have also been noted beneath the tracks. These range in diameter from 150mm to 675mm and are comprised of gravity and pumped sewers. Notably, a 525mm foul sewer runs parallel to the tracks in close proximity for approximately 400m, north of Balbriggan Station. Stormwater sewers are also present, crossing the railway tracks in six locations and ranging in size from 300mm to 1500mm. No conflicts or diversion requirements with the existing sewer and watermain infrastructure assets have been identified in this area.

18.4.4 Zone D - South of Gormanston Station to Louth/Meath border

This zone encompasses the area between Gormanston Station and the Louth/Meath border, including Gormanston and Laytown Stations. The rail corridor contains a large number of existing utilities including telecommunications, electricity, gas, sewer and watermain infrastructure.

The track alignment in this zone generally passes through rural agricultural land, with existing stations generally positioned to the edge of urban areas. This zone falls wholly within the Meath County Council administrative boundary, bordering Fingal to the south and Louth to the north.

18.4.4.1 Telecommunications

Vodafone, Eir, Virgin Media, and BT were identified as having existing telecommunication assets in this zone. As per Zones A, B and C, BT cables run adjacent to the tracks throughout the length of the zone, crossing them on two occasions. Virgin Media ducts are present adjacent to the tracks for approximately 50m while crossing Colpe Road. Four track crossings with Eir ducts occur in this zone, all of which occur at bridge crossings.

One telecom diversion has been identified (UG-UDV7), Eir infrastructure crossing the tracks overhead and occur at Gormanston Station Roadbridge (OBB66). Details of the diversion required are outlined in the utility diversion drawings in Figures 18.2 in Volume 3A of this EIAR.

18.4.4.2 Electricity

Existing electricity infrastructure has been identified in the zone, comprised of MV and LV distribution lines operated by ESB. There was a total of nine crossings identified with the tracks and the existing ESB electricity infrastructure. These are comprised of one underground crossing of MV cables, as well as eight overhead crossings of MV and LV assets. No HV transmission lines interact with the tracks through this zone. There is one instance where an overhead LV asset runs parallel to the tracks in this zone, for an approximate length of 200m.

A number of conflicts with the existing electricity infrastructure have been established. These include conflicts with both the MV and LV cables present. One overground diversion (OH-DV1) is necessary for an existing MV asset. This would occur at an existing bridge over the tracks. One standard underground diversion (UG-DV1) of an MV asset would also be required, and would again occur at an existing underpass, along Pilltown Road.

Diversions utilising horizontal directional drilling would also be required in this zone, due to the location of existing electrical infrastructure. This would be a requirement for four diversions (UTX2, UTX3, UTX4and UTX11), impacting MV and LV assets. The diversions for UTX4 would occur at the same location for low and medium voltage utilities, north-west of Laytown Station, to limit the impact of construction works. Details of the diversions required are outlined in the utility diversion drawings in Figure 18.2 in Volume 3A of this EIAR.

Additionally, there is one instance where overhead LV assets run parallel to the tracks and diversions are required in this zone. These are located south of Gormanston Station and north of the Gormanston Viaduct (UBB65). The diversions are proposed to be rectified as OH-PDV14 part of the OH-DV2 works already proposed.

18.4.4.3 Gas

Gas Networks Ireland has existing HP and MP gas mains which cross or come within proximity of the railway tracks. In this zone, five track crossings of gas main infrastructure occur. These relate to three MP gas mains and two HP gas mains. Notably, this includes a 750mm 145 bar HP gas main north of Gormanston Station. No conflicts or diversion requirements with the existing gas infrastructure assets have been identified in this area.

18.4.4.4 Sewer and Watermains

Uisce Éireann assets are located in this zone including distribution watermains and gravity foul sewers. Six watermain crossings with the tracks have been identified based on record data, with an additional single lateral line crossing, which stems away from the main distribution lines. One foul sewer crossing has also been noted beneath the tracks, which relates to a 375mm sewer located at the Laytown Viaduct. A single foul lateral line is also crossed. No stormwater sewers interact with the tracks in this zone. No conflicts or diversion requirements with the existing sewer and watermain infrastructure assets have been identified in this area.

18.4.5 Zone E – Drogheda MacBride Station and surrounds

Zone E encompasses Drogheda MacBride Station and surrounds, extending from the County Louth/Meath border to the end of the Proposed Development. The rail corridor contains many existing utilities including telecommunications, electricity, gas, sewer and watermain infrastructure. The zone can be characterised as having three areas. These are north of Drogheda MacBride Station, east of the station and south-west of the station, where existing tracks are already present. This zone falls within the Louth County Council administrative boundary, bordering County Meath to the south.

18.4.5.1 Telecommunications

BT were identified as having existing telecommunication assets in this zone. As per the preceding zones, BT cables run adjacent to the tracks throughout the length of the zone, crossing them on three occasions. Vodafone infrastructure is believed to be present around the Drogheda area, but confirmation of precise location data is required. Eir ducts are present in the existing car park of the station. Diversion of this existing infrastructure (UG-UDV5) is required to facilitate the proposed new platform. This would be possible through multiple underground diversions. BT cables present adjacent to the tracks do not require any diversions. For details, please refer to Chapter 4 (Description of the Proposed Development). A Vodafone tower was identified as an existing telecommunication asset located at Drogheda MacBride Station. Details of the diversions required are outlined in the utilities diversion drawings in Figures 18.2 in Volume 3A of this EIAR.

18.4.5.2 Electricity

Existing electricity infrastructure has been identified in the zone, comprised of HV transmission lines and MV and LV distribution lines operated by ESB. A total of 18 no. locations were identified where existing ESB electricity infrastructure is crossing the tracks. These are comprised of eight underground crossings of MV and LV assets, as well as ten overhead crossings of HV, MV and LV assets. The two HV overhead crossings occur to the east of Drogheda MacBride Station, with both crossings relating to 38kV infrastructure.

Conflicts with the existing electricity infrastructure have been established, relating to two 38kV HV and one MV overhead assets. Two diversions are required (UTX1 and UTX1), which would see both 38kV HV overhead assets and the MV asset diverted under the tracks using horizontal directional drilling. These diversions would occur at the same location, east of Drogheda MacBride Station, thus limiting the construction works extent. Details of the diversions required are outlined in the utilities diversion drawings in Figure 18.2 in Volume 3A of this EIAR.

There are no instances identified where parallel cables run in close proximity to the Proposed Development in this zone. As such, no interventions for these ESB assets are considered necessary.

18.4.5.3 Gas

Gas Networks Ireland has existing HP and MP gas mains which cross or come within close proximity of the railway tracks. In this zone, six track crossings of gas main infrastructure occur, with an additional crossing of a gas service line at the station. The non-service line crossings relate to 4 bar MP gas mains of varying diameters. No conflicts or diversion requirements with the existing gas infrastructure assets have been identified in this area.

18.4.5.4 Sewer and Watermains

Uisce Éireann assets are located in this zone including distribution watermains and gravity foul sewers. Nine watermain crossings with the tracks have been noted based on record data, with five of these occurring beneath the Boyne Viaduct. On the foul sewer network, 13 no. crossings have been identified with pipes ranging from 225mm to 1350mm. Eight crossings of surface water sewers have been identified, ranging in size from 225mm to 1050mm. Only three of these are in areas where the tracks are not in an already elevated position. No conflicts or diversion requirements with the existing sewer and watermain infrastructure assets have been identified in this area.

18.4.6 Baseline Scenario

The EIA Directive stipulates that a baseline scenario shall be established that details the current state of the environment and the likely consequences of inaction should a Proposed Development not proceed. This baseline scenario can then act as the point of comparison for the consequences, if any, of the Proposed Development proceeding. As such, the baseline scenario is often referred to as the “Do Nothing” scenario.

Details of the current utility infrastructure has been captured on a zone-by-zone basis and is included in Section 18.4 of this report. Should the project not proceed, there would not be any direct or indirect impact to the utilities present in the area of works. Under this scenario, all utilities would be assumed to continue to operate as they currently are, with any modifications to the existing likely due to localised developments or improvement/maintenance works by the utility owners.

18.5 Description of Potential Impacts

The construction and implementation of a significant rail project such as the Proposed Development will have impacts on operational utilities intersecting the project’s route in the absence of any remedial or reductive measures.

Consequential direct and indirect impacts as a result of the project's construction have the potential to cause disruptions to the operation of commercial properties, residential dwellings and the day-to-day activities of the general public. For durations of enabling works please refer to Chapter 5 (Construction Strategy). Potential impacts are listed below;

- Interruption to primary and health critical public utility services such as access to fresh drinking water, heating, electrical power and foul waste management services;
- Obstruction to communication assets such as fibre optic and telephone networks;
- Impacts on the safety of the general public and utility provider personnel, especially during works on high-pressure gas mains and high voltage electrical cables;
- Disruption to rail services;
- Disruption to general public traffic movements; and
- Damage to utility assets during works.

18.5.1 Potential Construction Impacts

Enabling works on utilities must be undertaken prior to any other works to maintain connections, or at least minimise downtimes, to public and private customers. Construction, excavation, and relocation of services will disrupt utility infrastructure including in particular both overhead (OH) and underground (UG) electricity and telecoms cables, and UG watermains. In total, 45 no. conflicts were identified between the Proposed Development and existing utility assets.

The main categories of conflict between the Proposed Development and existing utilities included:

- Insufficient vertical clearance with OHLE clearance requirements;
- Insufficient vertical clearance from track lowering and widening works; and
- Proximity to proposed construction of retaining walls.

The purpose of this chapter is to identify and assess the likely significant effects of the works on utility infrastructure. This is based on the criteria of assessment outlined in Section 18.3, specifically with regard to the magnitude of impact and baseline rating applied to the utility asset. A summary of the impact assessment results is presented in Table 18-6.

The assessment has identified a number of utilities that potentially have a significant impact during the Construction Phase in the absence of mitigation. These include the following list of utility works:

- UTX 1 (chainage 51+560);
- UTX1 (chainage 51+710);
- UTX 3 (chainage 45+200);
- UTX 4 (chainage 44+390);
- UTX 4 (chainage 44+080);
- UTX 5 (chainage 33+840);
- UTX 6 (chainage 34+120);
- UTX 8 (chainage 27+460);
- UTX 8 (chainage 27+042);
- UTX 9 (chainage 23+772);
- OH-DV4 (chainage 24+035);
- OH-DV5 (chainage 22+888);
- UG-DV3 (chainage 19+331);

- UG-DV4 (chainage 35+845);
- UTX 10 (chainage 25+626);
- OH-PDV2 (chainage 24+440 to 25+030);
- OH-PDV4 (chainage 25+780 to 26+100);
- OH-PDV5 (chainage 26+200 to 26+680); and
- UG-PDV10 (chainage 34+670 to 35+860) – note the potential impact on this diversion is very significant.

Note - the design of certain diversions grouped similar utilities to cross at the one location, limiting the impact on the receiving environment. For example, the LV and MV cable crossings, reference number UTX4, located in Corballis are both designed to be part of the same horizontal directional drilling diversion at the same location. While each diversion when examined in isolation may have a high magnitude of impact, the benefits of limiting under track construction to a single location will minimise our impacts and this has been noted in the assessment.

Further details of the diversions which are required, and the utilities affected by the Proposed Development are provided in Appendix A18.1 (Details of Utility Conflicts and Diversions) in Volume 4 of this EIAR.

Table 18-6 Summary of Potential Construction Impacts

Magnitude of Impact	No. of Utilities	% of Total No. of Utilities
Very High	1	2.0
High	18	36.0
Medium	20	40.0
Low	11	22.0
Significance of Effects	**No. of Utilities**	**% of Total No. of Utilities**
Profound	0	0
Very Significant	1	2.0
Significant	18	36.0
Moderate	20	40.0
Slight	11	22.0
Not Significant	0	0
Imperceptible	0	0

18.5.2 Potential Operational Impacts

The implementation of the Proposed Development will have impacts on the surrounding environment after the Construction Phase and during the Operational Phase. Substations providing power to the OHLE will need to be maintained to ensure the new DART and Connolly to Drogheda/Belfast line remains operational.

Any major utility infrastructure implemented in the reconfiguration of utilities to enable the Proposed Development will require periodical maintenance, such as foul pumping stations.

Any overhead assets (such as electrical cables) relocated underground for the Proposed Development will require different procedures by the utility provider in order to be maintained. No significant effects are predicted in the Operational Phase.

18.6 Mitigation Measures

This section describes the mitigation measures which are proposed to ameliorate, remediate or reduce the likely significant impacts from the Proposed Development on Material Assets: Utilities.

18.6.1 Construction Phase

A Construction Environmental Management Plan (CEMP) has been prepared and is included in Appendix A5.1 in Volume 4 of this EIAR.

Appendix A5.1 (CEMP) sets out the Contractor's overall environmental management and administration of the construction project. It will be further developed by the Contractor during the pre-Construction Phase. The mitigation measures will be implemented by the appointed Main Contractor(s). These include the best practice measures as outlined below:

- Agreements have been put in place with various utility providers in order to maintain connections, or at least minimise downtimes, to public and private entities during the construction of the Proposed Development. These agreements include the provision of temporary diversions which will enable providers to reroute their service during non-peak periods to maintain connections to customers;
- All existing services will be located by the appointed contractor and confirmed with relevant utility providers using service records, GPR surveys and slit trenches to ensure that their position accurately identified before excavation works commence;
- Where works are required in and around known utility infrastructure, precautions will be implemented by the appointed contractor to protect the infrastructure from damage, in accordance with best practice methodologies in line with the requirements of the utility companies whose assets are present in the area, where practicable;
- Where diversions, or modifications, are required to utility infrastructure, service interruptions and disturbance to the surrounding residential, commercial and/or community property may be unavoidable. Where this is the case, it will be planned in advance by the appointed contractor. Required service interruptions will generally not be continuous for full days at a time. Prior to works commencing, advance notification will be given to all impacted properties (including vulnerable customers). This notification will include information on when interruptions and works are scheduled to occur and the duration of such interruption. Any required works will be carefully planned by the appointed contractor to ensure that the duration of interruptions is minimised in so far as is practicable;
- Safety procedures will be put in place to minimise the risk to utility provider personnel and the general public during works on services. Protection measures during construction will include warning signs and markings indicating the location of utility infrastructure, safe digging techniques in the vicinity of known utilities, and in certain circumstances where possible, isolation of the section of infrastructure during works in the immediate vicinity;
- Traffic management plans will be implemented to minimise the effect of utility diversion works for commuters; and

- Collaboration with each utility provider will ensure safe practise when working on services and will minimise the time required for such works.

18.6.2 Operational Phase

The successful operation of the new DART line relies on the efficient functioning of various substations and utility infrastructure. Maintenance of these crucial components is essential to ensure uninterrupted power supply to the OHLE. The Operational Phase highlights key considerations for the maintenance and accessibility of substations, the importance of ground-level location for ease of equipment installation, periodic maintenance requirements for utility infrastructure, and the need for specialized procedures to maintain underground overhead assets. By addressing these factors, both Iarnród Éireann and ESB Networks can uphold the operational integrity of the DART line while ensuring collaborative efforts with utility providers for effective maintenance and upkeep:

- Substations providing power to the OHLE will need to be maintained to ensure the new DART line remains operational. The substations will be required to have unimpeded vehicular access 24 hours per day from the public road network for maintenance staff from both Iarnród Éireann and ESB Networks;
- The substations must be located at ground level in order to facilitate the installation or replacement of heavy electrical equipment; the immediate area around the substation should be level;
- Any major utility infrastructure implemented in the reconfiguration of utilities to enable the Proposed Development will require periodical maintenance; and
- Any overhead assets (such as electrical cables) relocated underground for the Proposed Development will require different procedures by the utility provider in order to be maintained. Collaboration with each utility provider will ensure their maintenance requirements have been considered and that the appropriate wayleaves have been put in place.

18.7 Residual Effects

If the mitigation measures described in Section 18.6 are implemented, the residual effects of the Proposed Development are considered to be neutral.

All impacted utilities will be reinstated in accordance with current standards and specifications for the relevant utility (as specified by the utility owner). In the case of older utilities, this means that the replacement section will be constructed with modern materials and there will be an associated degree of improvement.

18.8 Cumulative Effects

The cumulative assessment of relevant plans and projects is undertaken separately in Chapter 26 (Cumulative Effects) in Volume 2 of this EIAR.

18.9 References

Department of Housing, Planning and Local Government (DHPLG) (2018). *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*.

Environmental Protection Agency (EPA). (2022). Guidelines of the Information to be contained in Environmental Impact Assessment Reports.

European Commission (EC) (1999). *Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions.*

European Commission (EC) (2017). *Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU*.

Transport Infrastructure Ireland (TII) (formerly National Roads Authority) (2008). *Environmental Impact Assessment of National Road Schemes – A Practical Guide.*