Chapter 3 – Alternatives

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3. ALTERNATIVES

3.1 Introduction

The requirement to consider alternatives within an EIAR is set out in Annex IV (2) of the EIA Directive (2014/52/EU) and in Schedule 6 of the Planning and Development Regulations, 2001, as amended ("the Regulation"), which state:

> *A description of the reasonable alternatives studied by the person or persons who prepared the EIAR, which are relevant to the Proposed Development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the Proposed Development on the environment.*

Schedule 6(2)(b) of the Regulations implement this requirement by requiring the following information:

> *(b) a description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the person or persons who prepared the EIAR, which are relevant to the Proposed Development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects;*

Reasonable alternatives may include project design proposals, location, size and scale, which are relevant to the Proposed Development and its specific characteristics. The regulations require that an indication of the main reasons for selecting the preferred option, including a comparison of the environmental effects to be presented in the EIAR.
The EPA's *Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022)* – states:

> *The presentation and consideration of the various reasonable alternatives investigated by the developer is an important requirement of the EIA process.*
>
> *The objective is for the developer to present a representative range of the practicable alternatives considered. The alternatives should be described with 'an indication of the main reasons for selecting the chosen option'. It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required.*

The consideration and presentation of the reasonable alternatives studied by the project design team is an important requirement of the EIA process. The reasonable alternatives examined throughout the design process are set out under the following categories follows:

- Do nothing alternative;
- Alternative Routes;
- Alternative Design;
- Alternative Construction Methods and Mitigations; and
- Alternative processes.

This chapter describes the alternatives considered for the proposed underground gas transmission pipeline to Bord na Móna's (BnM) Renewable Energy Complex at Edenderry. The focus is on alternatives identified at the outset of the project, prior to detailed EIA, including route corridor options, design/layout/process considerations, and construction method considerations. The selection narrative prioritises environmental considerations in determining the preferred option.

3.2 Methodology

Alternatives were identified and appraised through a structured, tiered route selection process consistent with good industry practice for linear infrastructure. The alternatives route were selected and studied in accordance with the requirements of I.S. 328:2021 – Gas Transmission and Pipeline Installations, specifically Section 6.2 (Route Selection), and Gas Networks Ireland's routing procedure AM/PR/088.

In line with these standards, the route corridor selection criteria considered technical feasibility and constructability and environmental considerations. A desktop review of available datasets (designated sites, hydrology and water quality, flood extents, soils and geology, groundwater vulnerability, archaeology/architecture, land use/planning) informed preliminary constraints mapping. Vantagepoint surveys and preliminary engineering constraints (e.g., crossings of roads, canals, watercourses; proximity to infrastructure; interaction with quarries/forestry) were then used to screen and refine options.

The environmental considerations associated with each route corridor (see Section 3.4 below) were assessed at a proportionate level for an Alternatives assessment, focusing on the likely nature and relative significance of potential impacts, assuming the implementation of standard mitigation measures and best practice construction controls. This proportionate level assessment approach is consistent with EPA guidance, which confirms that a detailed "mini-EIA" of each alternative is not required.

This chapter therefore describes the reasonable alternatives considered, comparing their environmental impacts, and indicating the main reasons for selecting the preferred option.

3.3 Do-Nothing Alternative

The Proposed Development is intended to facilitate the conversion of the existing Cushaling Peaker Plants located within the Edenderry Renewable Energy Complex from liquid fuel to dual fuel (natural gas and liquid fuel).

Under the do nothing alternative the new gas connection would not proceed. The energy facility at Edenderry would not be supplied as intended and could not operate as planned on natural gas. As a result, greenhouse gas (GHG) emissions associated with the combustion of liquid fuel would continue, and the opportunity to achieve a lower-carbon mode of operation through the use of natural gas would not be realised.

The primary purpose of the Proposed Development is to enable a reduction in greenhouse gas (GHG) emissions through fuel switching associated with the operation of the existing Cushaling Peaker Plant.

While the do-nothing alternative would avoid construction-phase environmental effects, it would not deliver the project's decarbonisation objectives. Accordingly, the do-nothing alternative would fail to meet the underlying need for the Proposed Development.

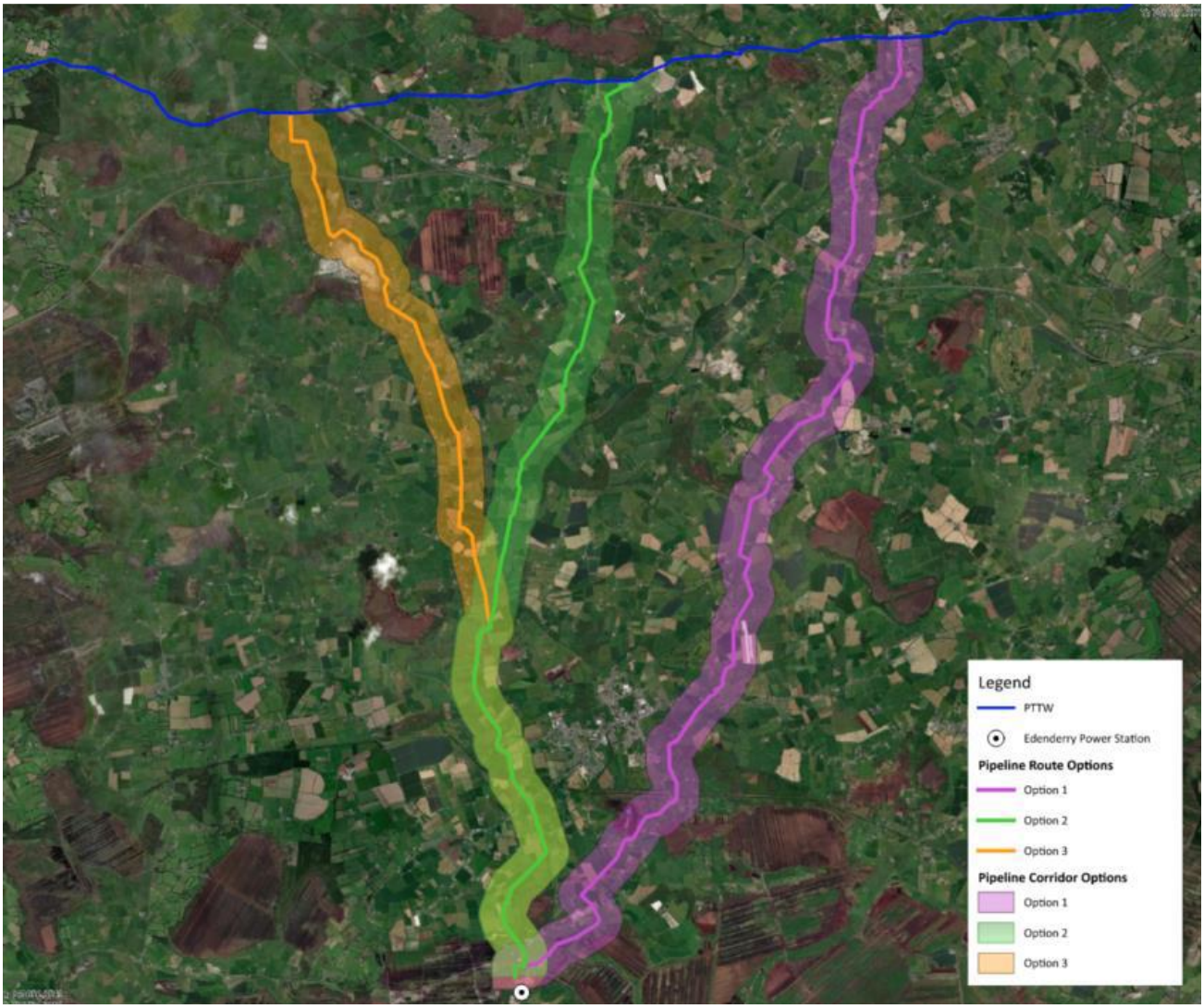
3.4 Alternative Routes – Pipeline Corridor Options

In accordance with the requirements of the EIA Directive and EPA Guidance, an alternatives assessment was undertaken to identify a preferred route corridor for the proposed underground gas transmission pipeline. For this linear infrastructure project, the assessment of alternative routes is undertaken at a corridor level, prior to the development of a fixed pipeline layout.

The route corridor assessment focused on identifying a corridor capable of accommodating a pipeline route to connect the existing Gas Networks Ireland (GNI) infrastructure with the proposed Ballykilleen Above Ground Installation (AGI), located within the Edenderry Renewable Energy Complex. This section describes the route corridor selection process carried out and the rationale for identifying the preferred corridor chosen to develop the Proposed Development.

The process considered a direct line between the preferred tie-in location and the proposed AGI. Constraints and obstacles were identified through a desktop review of available datasets, aerial imagery, and a vantage point survey. Based on this analysis, three potential 1 km wide Route Corridors, were established for further evaluation. These route corridors were assessed at desktop level to determine potential environmental considerations and constraints to assist in determining the suitable route corridor for the Proposed Development.

Insert 3-1 Route Corridor Options



3.4.1 Option 1 Route Corridor

3.4.1.1 Route Corridor Option Overview

The Option 1 route corridor (1 km wide) is shown in Insert 3-2 is c. 25.7 km and is the longest of the three options identified. The lands traversed by Option 1 are predominantly used for agriculture. The terrain is generally of level nature with undulations. An overview of the elevation profile for Option 1 from Google Earth shows a maximum and minimum elevations are 104 m A.O.D. and 62 m respectively.

Construction of Option 1 was estimated based on a desktop assessment to include c. 24 no. road crossings, including a crossing of the M4 motorway approximately 1.2 km west of Broadford. Trenchless construction techniques would be required to install the pipeline across the M4 motorway.

Option 1 route corridor was estimated based on a desktop assessment to involve crossing the Boyne River 3 no. times along with at least 12 other known watercourses crossings. Option 1 was the only corridor that crosses 2 no. canals, both the Royal and Grand Canal. It crosses the Royal Canal c. 1 km southeast from the Blackshade Bridge. Running parallel to the Royal Canal is an Irish Rail railway which must also be traversed. The Grand Canal is crossed by the Option 1 southeast of Edenderry town, near the Blundell Aqueduct. Trenchless construction techniques would be required to install the pipeline across both canals.

Option 1 route corridor traverses the catchment area of 3 no. county councils, Meath, Kildare and Offaly.

The route corridor includes a number of one-off residences and buildings. Sensitive receptors (schools, hospitals and nursing homes) have also been considered along the proposed route. The corridor is within c. 420 m of Clocha Rince National School and c. 450 m of Scoil na Maigoine Muire.

Option 1 is the only route corridor which routes east of Edenderry town towards the power station. Downstream of Edenderry the corridor presents potential constraints: forestry east of the town (with records of Japanese knotweed), constrained routing between bogs and residential development, and a constrained approach to the power station due to proximity to bog area, the River Cushaling, and a quarry (Jude Sheridan Ltd. Sand & Gravel).

Insert 3-2 Option 1 Route Corridor Preliminary Route Map

3.4.1.2 Environmental Considerations

Option 1 route corridor includes the River Boyne (3 no. locations), River Cushaling/Figile, the Royal Canal, and the Grand Canal. There are no lakes or transitional water bodies in the vicinity of the corridor.

The Boyne River transects the Option 1 route corridor at 3 no. locations, firstly near the tie-in location (south-north), secondly along the border of County Meath and County Kildare (west-east), and lastly along the border of County Kildare and County Offaly (east-west). The River Boyne generally flows north, then northeast, and outflows to the Northwest Irish Sea in Drogheda c. 75 km downstream. There are 9 no. named tributary watercourses of the River Boyne (Mulphedder, Glash, Cornamucklagh, Kilrainy, Garrisker, Russellswood, Killinagh, Rinaghan, and Clonkeen) located within the route corridor. The first River Boyne segment crossed received a River Waterbody WFD Status of 'good' (2016–2021) and a WFD Risk Status of 'not at risk'. The second segment crossed received a River Waterbody WFD Status of 'moderate' (2016–2021) and a WFD Risk Status of 'at risk'. The last segment crossed received a River Waterbody WFD Status of 'moderate' (2016–2021) and a WFD Risk Status of 'at risk'.

The first crossing of the River Boyne is a designated Natura 2000 site: the River Boyne and River Blackwater Special Area of Conservation (SAC) (002299), and River Boyne and River Blackwater Special Protection Area (SPA) (004232). The River Boyne and River Blackwater SPA (004232) comprises the River Boyne from the Royal Canal to the M1 motorway bridge west of Drogheda, and includes several of its tributaries. This River Boyne and River Blackwater SAC (002299) covers a similar area and continues on to the Boyne Estuary. The River Boyne is also a designated Salmonid River. The objective of this designation type is the maintenance of water quality for salmon and trout freshwater species. There is a direct hydrological interaction along the corridor to the River Boyne, including the River Boyne SAC/SPA. The River Boyne and the designated site located therein are of national and international importance.

Near to the Edenderry Renewable Energy Complex and within the route corridor is the River Cushaling/Figile. There are 4 no. named tributary watercourses of the River Cushaling/Figile (Ballyleakin, Shean, Cloncanon, and Ballkilleen) located within the corridor. The River Cushaling/Figile flows south and joins the River Barrow near the town of Monasterevin. The River Barrow continues south and outflows to the Eastern Celtic Sea at Waterford Harbour. The River Cushaling/Figile segment within the corridor received a River Waterbody WFD Status of 'moderate' (2016–2021) and a WFD Risk Status of 'at risk'.

The route corridor passes through the Royal Canal, to the northeast of Longwood village. The Royal Canal and its immediate banks and towpath are designated as a pNHA. The route also passes through the Grand Canal near the Blundell Aqueduct, to the east of Edenderry Town. Similar to the Royal Canal, the Grand Canal is hydrologically isolated from local watercourses, and its immediate banks and towpath are designated as a pNHA.

Option 1 route corridor also includes minor unmapped watercourses, agricultural drainage ditches or sheugh.

Ballina Bog pNHA is 1.2 km to the east, and Carbury Bog NHA is 2 km to the east of the Option 1 corridor at the closest point; there is no hydrological pathway to these designated sites.

Within the Option 1 route corridor, there are no geological heritage sites or Karst landforms. The WFD Quality Status from 2016–2021 indicates that the groundwater body quality status within and surrounding the corridor is classified as 'good.' The groundwater vulnerability rating within the corridor is mostly high, with small areas of low and extreme vulnerability. Groundwater resources in the area include locally important gravel aquifers, locally important aquifers (bedrock moderately productive only in local zones), and bedrock that is generally moderately productive. The corridor features a mix of high, moderate, and low subsoil permeability. The Quaternary geology of the area consists of a mixture of alluvium, urban areas, till derived from limestones, sediments, cut-over raised peat, and lacustrine sediments. Additionally, there are multiple groundwater springs and wells located within and surrounding the corridor. The corridor

passes through the Edenderry inner and outer public water supply (PWS) source protection area, and the Ballykilleen group water scheme (GWS) zone of contribution. As construction requires only shallow excavation (pipeline to be installed at minimum 1.2 m depth of cover), significant impacts on these source protection and zone of contribution areas are unlikely.

The route corridor contains 9 no. Sites and Monuments Record (SMR) recorded sites of archaeological importance. There are 5 no. sites located within or adjacent to the corridor that include a SMR Zone of Notification. Townlands are one of the oldest forms of land division in Ireland. The route corridor traverses 38 no. townlands. The boundaries of townlands often correlate with natural features such as watercourses, hills, and hedgerows, and they also often include historical demarcations. The risk of encountering unrecorded archaeological features increases in areas where routes traverse greenfield, and most significantly, in greenfield areas on or adjacent to townland boundaries. The River Boyne and immediate surrounds have high archaeological potential, therefore excavations within proximity to the river are likely to encounter unrecorded archaeological features.

There is 1 no. recorded architectural site as listed in the National Inventory of Archaeological Heritage (NIAH); Blundell Aqueduct in which the structure and historic curtilage should be avoided to ensure there are no direct or indirect impacts on these built heritage assets.

Data from Ireland's Catchment Flood Risk Assessment and Management (CFRAM) and National Indicative Fluvial Maps (NIFM) indicate that Option 1 route corridor traverses flood extents for a combined distance of c. 8 km along the route.

There are 2 no. wind farms adjacent to Edenderry Power Station. Cloncreen Wind Farm (existing) is located to the west of the power station and Cushaling Wind Farm (under construction) is located to the east. Option 1 routes in close proximity to the Cushaling Wind Farm turbines. Edenderry 38 kV substation is located within the corridor. Option 1 parallels a 400kV Overhead Line (OHL) for a run of approx. 4.4 km at an average distance of 400 m. Other OHL's in the area run/cross perpendicular to Option 1. Option 1 also parallels a 110kV Underground Cable for a run of approx. 0.35 km at an average distance of 80 m before entering the proposed AGI.

There are a number of protected views under the Meath County Development Plan 2021-2027 (Meath CDP) within proximity of Option 1 corridor, including 'R161 at Royal Canal' (Hill of Down) which is located to the west of the corridor (protected views east and west), 'Blackshard Bridge' located to the west of the corridor (protected views south east and north west), and 'Stoneyford Bridge' which crosses the River Boyne (protected views north), also located within the corridor.

The Meath CDP defines the area within their jurisdiction as the South West Lowland Landscape Character Area (LCA). Meath County Landscape Character Assessment notes that this LCA has a "Medium to low potential capacity to accommodate underground services provided such development is located to avoid adverse visual impacts and important archaeological features." The Meath CDP zone of the corridor is Rural Area, with the objective 'To protect and promote in a balanced way, the development of agriculture, forestry and rural-related enterprise, biodiversity, the rural landscape, and the built and cultural heritage'.

The Kildare County Development Plan 2023 – 2029 (Kildare CDP) identifies the area of Option 1 as the North Western Lowlands; this area has a Low Sensitivity which is defined as areas with the capacity to generally accommodate a wide range of uses without significant adverse effects on the appearance or character of the area.

Offaly County Development Plan 2021-2027 (Offaly CDP) designated the area as Rural Areas under strong urban influence. Offaly CDP defines the area of the corridor as predominantly within low sensitivity areas, with moderate-high sensitivity areas and high amenity areas near to the Grand Canal. There are no key scenic views or prospects under the Offaly CDP near Option 1.

3.4.2 Option 2 Route Corridor (Preferred Option)

3.4.2.1 Route Corridor Option Overview

The Option 2 route corridor (1 km wide) is shown in Insert 3-3 is approximately 22.0 km and is the shortest of the options. It ties into the existing pipeline in the townland of Kilwarden just south of Mount Hevey Bog.

The lands traversed by Option 2 route corridor are predominantly used for agriculture. The terrain is generally of level nature with undulations. An overview of the elevation profile for Option 2 route corridor from Google Earthshows a maximum and minimum elevations for Option 2 are 89 m A.O.D. and 64 m respectively.

Construction of Option 2 route corridor was estimated based on a desktop assessment to include 18 no. road crossings, including a crossing of the M4 motorway approximately 700 m east of Taggarts Airstrip.

Option 2 route corridor was estimated based on a desktop assessment to involve 8 no. watercourses and 2 no. named rivers, the Kilwarden River and the Yellow River, both of which are tributaries to the River Boyne. Common to all options identified, Option 2 route corridor crosses the Grand Canal. The crossing of the Grand Canal is west of Edenderry town, c. 200 m west of the Rathmore Bridge. Trenchless construction techniques would be required to install the pipeline across the canal.

Hinch Quarry Castlejordan is in close proximity to Option 2 however remains outside the corridor.

Option 2 route corridor traverses the area of 2 no. county councils, Meath and Offaly.

The corridor includes a number of one-off residences and buildings and dependent on the pipeline route may require the use of heavy walled pipe at these locations during construction.

Sensitive receptors (schools, hospitals and nursing homes) have also been considered along the proposed route corridor. The corridor is within c. 600 m of both Gaelscoil Eadan Doire and Scoil Bhride Primary School Edenderry.

Insert 3-3 Option 2 Route Corridor Preliminary Route Map

3.4.2.2 Environmental Consideration

The Option 2 route corridor crosses the Kilwarden River (EPA name Kinnegad 07), Yellow River, and the Grand Canal Main Line. There are no lakes or transitional water bodies in the vicinity of the corridor.

The Kilwarden River transects Option 2 (west-east) and flows east, where it confluences with the Clonard River that ultimately flows to the River Boyne. There are 2 no. named tributary watercourses of the Kilwarden River (Correllstown, Aghamore) located within the corridor. The Kilwarden River at this segment received a River Waterbody WFD Status of 'moderate' (2016-2021) and a WFD Risk Status of 'at risk'. At the confluence of the Kinnegad/Clonard River and River Boyne, the River Boyne received a River Waterbody WFD Status of 'moderate (2016-2021) and a WFD Risk Status of 'at risk'.

The Yellow River transects Option 2 route corridor (west-east) and flows east, where it confluences with the River Boyne within the corridor. The Yellow River at this segment received a River Waterbody WFD Status of 'good' (2016-2021) and a WFD Risk Status of 'not at risk'. At the confluence of the Yellow River and River Boyne, the River Boyne received a River Waterbody WFD Status of 'good' (2016-2021) and a WFD Risk Status of 'not at risk'.

The River Boyne is located to the east of the Option 2 route corridor and falls within corridor for a distance of c. 4 km. The River Boyne flows north, then north east, and outflows to the Northwest Irish Sea in Drogheda c. 75 km downstream. There are 12 no. named tributary watercourses of the River Boyne (Aghnahillagh, Knockersally/Colehill, Park, Ballynakil, Castlejordan, Rahin, Grange, Roosk, Mountwilson, Kinnafad, Rogerstown (and the Yellow River)) located within the corridor.

Near to the Edenderry Renewable Energy Complex and within the route corridor is the River Cushaling/Figile. There are 4 no. named tributary watercourses of the River Cushaling/Figile (Ballkilleen, Kuilcumber, Ballyleakin, Rathgreendan) located within the corridor. The River Figile flows south and joins the River Barrow near the town of Monasterevin. The River Barrow continues south and outflows to the Eastern Celtic Sea at Waterford Harbour. The River Cushaling/Figile segment within the corridor received a River Waterbody WFD Status of 'moderate' (2016-2021) and a WFD Risk Status of 'at risk'.

The Option 2 route corridor passes through the Grand Canal Main Line near Rathmore Bridge, to the east of Edenderry Town. Grand Canal Main Line (Boyne) is hydrologically isolated from local drainage and river networks. The Grand Canal and its immediate banks and towpath are designated as a pNHA.

Downstream from Royal Canal the River Boyne is a designated Natura 2000 site: The River Boyne and River Blackwater Special Area of Conservation (SAC) (002299), and the River Boyne and River Blackwater Special Protection Area (SPA) (004232). The River Boyne and River Blackwater SPA comprises the River Boyne from the Royal Canal to the M1 motorway bridge west of Drogheda and includes several of its tributaries. This River Boyne and River Blackwater SAC covers a similar area and continues to the Boyne Estuary. The River Boyne is also a designated Salmonid River. The objective of this designation type is the maintenance of water quality for salmon and trout freshwater species.

There is a hydrological pathway to the River Boyne from Option 2 route corridor via the Kilwarden River, Yellow River and its tributaries. The River Boyne and the designated site located therein are of national and international importance.

Option 2 route corridor also includes minor unmapped watercourses, agricultural drainage ditches or sheugh.

The Black Castle Bog NHA (000570) is situated approximately 8 km north-west of Edenderry town, and 220 m west of the corridor at the closest point. The site comprises a raised bog that includes both areas of high bog and cutover bog. It is envisioned that potential impacts to the Black Castle Bog NHA can be avoided with adequate separation distances.

The Mount Hevey Bog SAC (002342), and Mount Hevey Bog NHA (001584) are located c. 20 m north of the Proposed Development site boundary at the Kilwarden Offtake location. The Mount Hevey Bog site comprises a raised bog that includes both areas of high bog and cutover bog. The construction and operation (design) of a gas pipeline is not proposed to be within raised bog itself.

There are no geological heritage sites located within the route corridor. A Karst spring is situated along the border of the corridor. The WFD Quality Status from 2016-2021 indicates that the groundwater body quality status within and surrounding the corridor is classified as 'good.' The groundwater vulnerability rating within the route corridor is mostly high, with small areas of low vulnerability and 3 no. areas of extreme vulnerability. Groundwater resources in the corridor include a locally important gravel aquifer and a locally important aquifer (bedrock moderately productive only in local zones). The route corridor features predominantly high and moderate subsoil permeability. The Quaternary geology consists primarily of a mixture of alluvium, urban areas, till derived from limestones, sediments, cut-over raised peat, and lacustrine sediments, with 1 no. area of bedrock outcrop or subcrop. Additionally, there are multiple groundwater springs and wells located within and surrounding the corridor.

The route corridor contains 19 no. Sites and Monuments Record (SMR) sites of archaeological importance. There are 7 no. sites located within or adjacent to the corridor that include a SMR Zone of Notification (SMRS reference ME046-007----, OF011-007----, OF011-024----, OF011-025----, OF011-035001-, OF019-003----, and the Monasteroris Friary OF011-009001- through OF011-009007-, OF011-010001- through OF011-010003-, OF011-011----, OF012-001----, OF011-008----). It should be noted that the SMR shows the approximate location of the record and is not indicative of its geographic extent.

The route corridor includes the Zone of Notification(s) associated with the lands around the Monasteroris Friary. Historical monasteries often feature burial grounds used during their operational period and frequently even after they ceased functioning. Unlike contemporary graveyards, these burial grounds typically lacked clearly defined boundaries.

The route corridor traverses 35 no. townlands. The risk of encountering archaeological features increases significantly in areas where routes traverse greenfield, and most significantly, in greenfield areas on or adjacent to townland boundaries.

The River Boyne is located to the east of the Option 2 route corridor reference pipeline route and within the corridor for a distance of c. 4 km (150-250m from the reference route). The River Boyne and immediate surrounds has high archaeological potential and excavations within proximity to the river is likely to encounter unrecorded archaeological features.

There are 4 no. recorded architectural sites as listed in the National Inventory of Archaeological Heritage (NIAH); Harristown House, Jonestown House, Monasteroris House, and Rathmore Bridge in proximity to the route corridor.

Option 2 route corridor traverses flood extents for a combined distance of c. 6 km along the route (CFRAM/NIFM).

There are 2 no. wind farms adjacent to Edenderry Power Station. Option 2 routes in close proximity to the existing Cloncreen Wind Farm turbines. Option 2 parallels 2 no. 110kV Overhead Lines. The first 110kV OHL parallels for a run of approx. 3.2 km at an average distance of 500 m. The second 110kV OHL parallels for a run of approx. 3.3 km at an average distance of 1500 m. Other OHL's in the area run/cross perpendicular to Option 2. Common to all options, Option 2 pipeline also parallels a 110kV Underground Cable for a run of approx. 0.35 km at an average distance of 80 m before entering the proposed AGI.

The closest protected view under the Meath CDP within proximity of Option 2 corridor is the 'R161 at Royal Canal' (Hill of Down) which is located to the north east of the corridor. The Meath CDP defines the area within their jurisdiction as the South West Lowland LCA, as discussed for Option 1. The Meath CDP zone of the corridor is Rural Area discussed for Option 1

The Meath CDP defines the area within their jurisdiction as the South West Lowland Landscape Character Area (LCA). Meath County Landscape Character Assessment notes that this LCA has a "Medium to low potential capacity to accommodate underground services provided such development is located to avoid adverse visual impacts and important archaeological features." The Meath CDP zone of the corridor is Rural Area, with the objective 'To protect and promote in a balanced way, the development of agriculture, forestry and rural-related enterprise, biodiversity, the rural landscape, and the built and cultural heritage'.

Offaly County Development Plan 2021-2027 (Offaly CDP) designated the area as a Rural Areas under strong urban influence. Offaly CDP defines the area of the corridor as predominantly within low sensitivity areas, with moderate-high sensitivity areas and high amenity areas near to the Grand Canal, and Black Castle Bog. As with Option 1 and 3, there are no key scenic views or prospects under the Offaly CDP near Option 2 route corridor.

3.4.3 Option 3 Route Corridor

3.4.3.1 Route Corridor Option Overview

The Option 3 route corridor (1 km wide) is shown in Insert 3-4 is c. 22.1 km and is slightly longer than Option 2. Option 3 route corridor ties into the existing BGE/77 pipeline in the townland of Griffinstown c. 920 m southwest of Griffinstown Church.

The lands traversed by Option 3 route corridor are predominantly used for agriculture. The terrain is generally of level nature with undulations. The maximum and minimum elevations for Option 3 are 90 m A.O.D. and 66 m respectively as per Google Earth.

Construction of the pipeline in this corridor was estimated based on a desktop assessment to include 24 no. road crossings. This includes a crossing of the M6 motorway approximately 1.4 km north of Breedon Cement Group. There is suitable access on both sides of the M6 at this location for construction. Trenchless construction techniques would be required to install the pipeline across the M6 motorway.

Option 3 route corridor was estimated based on a desktop assessment to involve the crossing of 9 no. watercourses and 2 no. named rivers, the Kinnegad River and the Yellow River, both of which are tributaries to the River Boyne. Common to all options identified, Option 3 crosses the Grand Canal. The crossing of the Grand Canal is at the same location as Option 2, west of Edenderry town and c. 200 m west of the Rathmore Bridge.

Breedon Cement Quarry is within the Option 3 route corridor. The entrance and main access road into the quarry consists of an underpass of the L8021. This entrance road has high volumes of heavy good vehicles and the quarry operations would be interrupted by the construction of the pipeline at this location. Hinch Quarry Castlejordan is in close proximity to Option 2 however remains outside the corridor.

There is also another smaller scale quarry located within Option 3 route corridor just north of the proposed Yellow River crossing, Hinch Quarry Castlejordan.

Option 3 route corridor traverses the catchment area of 3 no. county councils, Westmeath, Meath and Offaly.

Sensitive receptors (schools, hospitals and nursing homes) have also been considered along the proposed route corridor. The route corridor is within c. 600 m of Castlejordan Central National School, Gaelscoil Eadan Doire and Scoil Bhride Primary School Edenderry

The corridor routes south from the tie-in location passing Kinnegad town c. 1.7 km west. After Breedon Cement Quarry Option 3 routes southeast, c. 500 m from Ballinabrackey village. The village of Castlejordan falls within the corridor. Option 3 continues south before following the same route as Option 2. As with Option 2, Option 3 routes west of Edenderry and avoids the extent of Edenderry local area plan.

Insert 3-4 Option 3 Route Corridor Preliminary Route Map

3.4.3.2 Environmental Consideration

Option 3 route corridor crosses the Kinnegad River, Yellow River, and the Grand Canal Main Line. There are no lakes or transitional water bodies in the direct vicinity of the corridor.

The Kinnegad River flows east from the route corridor, and confluences with the Kilwarden River / Clonard River that ultimately flows to the River Boyne. There are 4 no. named tributary watercourses of the Kinnegad River (Coolcahan, Griffinstown, Baltiger, and Killaskillen) located within the corridor. The Kinnegad River at this segment received a River Waterbody WFD Status of 'poor' (2016-2021) and a WFD Risk Status of 'under review'. At the confluence of the Kinnegad River and River Boyne, the River Boyne received a River Waterbody WFD Status of 'moderate' (2016-2021) and a WFD Risk Status of 'at risk'.

The Yellow River flows east from the route corridor and confluences with the River Boyne. There are 5 no. named tributary watercourses of the Yellow River (Castle Jordan, Clongall, Lewellensland, Toornafolla, Gortnahorna) located within the route corridor. The Yellow River received a River Waterbody WFD Status of 'good' (2016-2021) and a WFD Risk Status of 'not at risk'. At the confluence of the Yellow River and River Boyne, the River Boyne received a River Waterbody WFD Status of 'good' (2016-2021) and a WFD Risk Status of 'not at risk'.

The River Boyne is located to the east of the route corridor, there are 4 no. named tributary watercourses of the River Boyne (Roosk, Mountwilson, Kinnafad, and Rogerstown) located within the corridor.

At the Black Castle Bog NHA (000570), Option 3 route corridor aligns with Option 2 for the remainder of the route to the Edenderry Renewable Energy Complex. Near to the Edenderry Renewable Energy Complex

and within the route corridor is the River Cushaling/Figile, as discussed for Option 2. The corridor passes through the Grand Canal Main Line near Rathmore Bridge, to the east of Edenderry Town.

As discussed for Option 1 and 2 the River Boyne downstream from the Royal Canal is a designated Natura 2000 site: the River Boyne and River Blackwater Special Area of Conservation (SAC) (002299), and River Boyne and River Blackwater Special Protection Area (SPA) (004232).

There is a hydrological pathway from Option 3 via the Kinnegad River, Yellow River and its tributaries to the River Boyne. The River Boyne outfalls at the Northwest Irish Sea c. 75 km downstream.

Option 3 route corridor also includes minor unmapped watercourses, agricultural drainage ditches or sheugh.

The Black Castle Bog NHA (000570) is situated approximately 8 km north-west of Edenderry town, and 220 m west of the route corridor at the closest point. The site comprises a raised bog that includes both areas of high bog and cutover bog. It is envisioned that potential impacts to the Black Castle Bog NHA could be avoided with adequate separation distances.

There are no geological heritage sites located within the route corridor. A Karst spring is situated along the border of the corridor. The WFD Quality Status from 2016-2021 indicates that the groundwater body quality status within and surrounding the corridor is classified as 'good.' The groundwater vulnerability rating shows mostly high vulnerability, with selected areas of extreme vulnerability, rock, and low vulnerability. Groundwater resources present within the route corridor include a locally important gravel aquifer and a locally important aquifer (bedrock moderately productive only in local zones). The corridor features predominantly high and moderate subsoil permeability. The Quaternary geology is primarily a mixture of alluvium, urban areas, till derived from limestones, sediments cut over raised peat, and lacustrine sediments. There are no groundwater wells and springs located within the corridor; the closest are approximately 500 m away to the west of the corridor.

The Option 3 route corridor contains 19 no. Sites and Monuments Record (SMR) sites of archaeological importance. There are 8 no. sites located within or adjacent to the corridor that include a SMR Zone of Notification (SMRS reference ME046-099----, ME046-015----, OF011-007----, OF011-024----, OF011-025----, OF011-035001-, OF019-003----, and the Monasteroris Friary OF011-009001- through OF011-009007-, OF011-010001- through OF011-010003-, OF011-011----, OF012-001----, OF011-008----). It should be noted that the SMR shows the approximate location of the record and is not indicative of its geographic extent.

As with Option 2, Option 3 route corridor includes the Zone of Notification associated with the lands around the Monasteroris Friary. The corridor traverses 35 no. townlands. The risk of encountering archaeological features increases significantly in areas where routes traverse greenfield, and most significantly, in greenfield areas on or adjacent to townland boundaries.

There are 5 no. recorded architectural sites as listed in the National Inventory of Archaeological Heritage (NIAH); Beech Lawn House, Roosk House, Jonestown House, Monasteroris House, and Rathmore Bridge, in which the structure and historic curtilage should be avoided to ensure there are no direct or indirect impacts on these built heritage assets

Option 3 route corridor traverses flood extents for a combined distance of c. 3 km along the route.

There is a pinch point within the corridor between the Breedon Cement Quarry, existing 220 kV overhead HV lines and Rossan Bog. The only feasible route at this location is between the quarry and the existing 220 kV cables. As outlined, there are 2 no. wind farms adjacent to Edenderry Power Station. Similar to Option 2, Option 3 routes in close proximity to the existing Cloncreen Wind Farm turbines. Option 3 parallels 1 no. 220kV Overhead Line and 2 no. 110kV lines. The 220kV OHL parallels for a run of approx. 7.5 km at an average distance of 350 m (varying from 150-1500 m in sections). The first 110kV OHL

parallels for a run of approx. 11.8 km at an average distance of 700 m (varying from 150-1800 m). The second 110kV OHL parallels for a run of approx. 11.0 km at an average distance of 400 m (varying from 150-1200 m). Other OHL's in the area run/cross perpendicular to Option 3. Common to all options, Option 3 also parallels a 110kV Underground Cable for a run of approx. 0.35 km at an average distance of 80 m before entering the proposed AGI.

Option 3 route corridor is distant from the protected views under the Meath CDP. The Meath CDP defines the area within their jurisdiction as the South West Lowland LCA as discussed for Option 1.

Westmeath County Development Plan 2021-2027 (Westmeath CDP) defines the area as 'Lough Ennell and South Eastern Corridor' Landscape Character Area (LCA). Lough Ennell is situated to the western side of this Landscape Character Area (LCA) and is designated as an Area of High Amenity. The corridor is in the eastern area of this LCA distant from Lough Ennell. There is no specific Land Zoning under the Westmeath CDP. There are no key scenic views or prospects under the Westmeath CDP near Option 3.

Offaly County Development Plan 2021-2027 (Offaly CDP) designated the area as a Rural Areas under strong urban influence. Offaly CDP defines the area of the corridor as predominantly within low sensitivity areas, with moderate-high sensitivity and high amenity areas near to the Grand Canal, and Black Castle Bog. As with Option 1 and 2, there are no key scenic views or prospects under the Offaly CDP near Option 3.

3.4.4 Final Pipeline Route Selection

3.4.4.1 Consultation on Route Corridor Options

The project team engaged with local authorities to discuss three potential route options for the proposed pipeline: County Meath, County Kildare, and County Offaly. These meetings served to introduce the project concept and inform the ongoing routing study. Any recommendations or feedback provided by the authorities have been incorporated into considerations outlined above.

In addition public engagement was undertaken with potentially affected landowners to inform them of the proposed development and the route corridor options under consideration. Two public meetings were held to initiate dialogue with landowners who may be affected by the proposed pipeline. The first on Tuesday, the 9th of April 2024 at Kinnegad GAA Club, and the second on Wednesday, the 10th of April 2024 at Edenderry GAA Club. The purpose of this meeting was to initiate dialogue with landowners who may be affected by the proposed pipeline project. The session focused on outlining the general scope of the pipeline, including its intended connection to the existing Bord Na Mona Power Station.

Attendees were provided with an overview of the project objectives, anticipated timelines, and potential impacts, while also being given the opportunity to ask questions and share initial feedback. The aim of this public engagement was to build relationships with potential landowners by providing transparency and collaboration at an early stage of project development. Feedback received during this engagement informed the ongoing route development process where feasible.

3.4.4.2 Preferred Route Corridor Selection

The project team evaluated the feasibility and relative merits of the three route corridor options identified as part of the alternatives assessment. Table 3.1 below summarises the comparative evaluation of the corridor options using environmental criteria relevant to route selection for a transmission pipeline.

The alternatives assessment considered route corridors rather than fixed pipeline alignments. These corridors represented broad areas of search within which a pipeline could potentially be routed and were assessed at a high-level in order to compare environmental constraints and identify a preferred corridor capable of accommodating a viable route.

Following completion of the corridor level assessment, Route Corridor Option 2 was identified as the preferred option to be taken forward. Option 2 was chosen as the preferred route corridor because it avoided direct crossings of the River Boyne (SAC/SPA), had (based on desktop assessment) the shortest overall length (although it is acknowledged that this increased during the design process to 23.65km following a detailed routing analysis which included liaising with landowners and avoidance of ecologically sensitive receptors) and the least number of road crossings, and avoided several highly constrained areas (including canals/rail combinations, forestry sections and quarry).

While both Options 2 and 3 avoid direct crossings of the River Boyne SAC/SPA and are broadly similar in overall length, Option 2 presents a less constrained routing environment. Option 3 traverses areas of increased infrastructure constraints, including proximity to and interaction with quarry operations (Breedon Cement Quarry and Hinch Quarry Castlejordan) and, overhead lines (increased likelihood of HV interference), road crossings, which would introduce additional constructability challenges, operational interface risks and potential disruption to construction works.

These constraints are largely avoided by Option 2, which offered greater flexibility for detailed route refinement and reduces the need for complex temporary works. While Option 2 requires consideration of hydrological sensitivities, these are considered manageable through route refinement, method selection and standard mitigation measures, and are preferable to the land-use and constructability constraints associated with Option 3.

Table 3.1 Summary of route preference for each environmental factor

Environmental Factor	Option 1	Option 2	Option 3
Population and Human Health			
Land, Soils, and Geology			
Water (Hydrogeology and Hydrology)			
Biodiversity and Areas of Conservation			
Air Quality and Climate			
Noise and Vibration			
Landscape and Visual Impact			
Cultural Heritage and Archaeology			
Material Assets			

Less Preferred (relatively greater potential environmental impact)	Neutral (relatively neutral potential environmental impact)	More Preferred (relatively lessor potential environmental impact)

3.4.4.3 Planning Design

Following the identification of Route Corridor Option 2 as the preferred corridor, this option was progressed beyond the corridor-level assessment stage to detailed route development and design. During this phase, the initial 1 km-wide route corridor was progressively refined through further technical and environmental assessment to define a 100 m-wide route planning corridor, within which the pipeline alignment was identified.

This refinement process was informed by further desk based assessment, site walkovers, ecological surveys, ground investigation data, detailed engineering design, and engagement with landowners. The objective of the planning design process was to refine the route to develop a technically feasible development that minimised environmental impact while remaining within the preferred route corridor.

As part of the detailed planning design process, localised adjustments were made to the alignment to respond to site specific constraints, refine crossing locations, and reduce environmental and constructability risks. As a result, the number and location of road, river, watercourse crossings, archaeological sites, and townlands traversed by the Proposed Development differ in detail from those identified during the corridor level assessment set out in the Alternatives assessment. These changes reflect the progression from a route corridor evaluation to a fixed pipeline route, rather than any change in the preferred route corridor itself.

The refinement of the alignment has also resulted in a final pipeline length of approximately 23.5 km, which is slightly greater than the indicative length assessed for Route Option 2 at corridor level. This increase reflects minor local realignments introduced to accommodate environmental sensitivities, archaeological constraints, landowner considerations, and engineering requirements.

The outcome of this planning design process is the Proposed Development for which consent is now sought. While refined at a local scale, the Proposed Development remains substantially consistent with Route Option 2 as identified in this alternatives assessment.

3.5 Alternative Design

The proposed underground transmission gas pipeline design is based on requirements stipulated by the GNI. Therefore, from an alternative 'design' point of view, the flexibility to select an alternative underground transmission gas pipeline design is not available to the Applicant.

Pipeline design parameters (diameter, wall thickness, grade, design factor and proximity distances) are governed by national standards and operator specifications for integration into the transmission network. Within these constraints, route-level refinements remain possible at detailed design to increase separations from receptors, special crossings (road, river, watercourse crossings), and minimise temporary works footprint. Process alternatives are limited given the requirement to integrate with existing transmission system operations, safety and integrity management standards.

3.6 Alternative Construction Methods and Mitigation Strategies

Two principal construction approaches were considered in developing the route alternatives and special crossings strategy: open-cut trenching and trenchless techniques (e.g., auger bore or horizontal directional drilling). Open-cut is generally suitable where environmental sensitivity is low and where watercourse spans are minor or dry. For environmentally sensitive crossings, the Grand Canal and the Kilwarden River and Yellow River, trenchless techniques are the chosen mitigation method to avoid direct in-channel works, protect channel integrity and banks, and reduce the potential for sediment release and hydrological connectivity during construction. All works have been defined in Chapter 2, see Section 2.4.2.

The method selection is supported by standard construction-phase controls, including pollution prevention and spill response, silt management, timing of works to avoid sensitive ecological periods where practicable, reinstatement of drainage to pre-works condition, and archaeological monitoring where required. The adoption of trenchless methods at sensitive crossings is a key embedded mitigation, compatible with the preferred Option 2 corridor.

As part of the route selection and design development process, the design team commissioned a suitably qualified ecologist (Altemar) to undertake bat and badger surveys within the Proposed Development site and adjacent lands. The bat surveys were undertaken between December 2024 and July 2025 to both identify trees along the route with potential roost features (this was informed by an Arboricultural Impact Assessment prepared by Arbtech and included as Appendix 11.2 of Chapter 11 of this EIAR), and carry out emergent / re-entry surveys. The badger surveys (along with other mammal surveys) were undertaken between October 2024 and Spring 2026, to locate any active badger setts within or immediately adjacent

to the Proposed Development site. For further information on ecological surveys, see Chapter 7 (Biodiversity) of this EIAR.

The findings of these surveys informed an iterative design process, whereby the pipeline alignment was refined to avoid, where practicable, areas of identified ecological sensitivity. In particular, the route was adjusted to avoid direct impacts on identified bat roosts and to maintain appropriate distances from identified badger setts. This approach represents mitigation by avoidance, which is the primary and most effective tier of the mitigation hierarchy.

By incorporating ecological constraints at the early design stage, the need for more intrusive construction-phase mitigation measures, licensing requirements or disturbance to legally protected species has been reduced or eliminated. This embedded mitigation significantly reduces the likelihood of impacts on bat roosts and badger breeding or resting places, and contributes to minimising disturbance and residual ecological effects associated with the Proposed Development.

For each aspect of the environment, each EIA Report specialist has considered the existing environment, likely impacts of the Proposed Development and proposed feasible mitigation measures to address the most significant potential impacts using measures appropriate to the environmental setting of the Proposed Development.

In deciding on the most suitable mitigation measure the specialist has considered relevant guidance and legislation. In each case, a comparison of environmental effects was made, and the specialist has reviewed the possible mitigation measures available and considered the use of the mitigation in terms of the likely residual impact on the environment. The four established strategies for mitigation of effects have been considered: avoidance, prevention, reduction and offsetting (not required in this development). Mitigation measures have also been considered based on the effect on quality, duration of impact, probability and significance of effects.

The selected mitigation measures are set out in each of the EIA Report Chapters.

3.7 Alternative Processes

This section typically examines the project processes in relation to likely emissions to air and water, likely generation of waste and likely effect on traffic to determine the process that is least likely to impact on these parameters.

The underground transmission gas pipeline will become an integral part of the national transmission network which is currently operated by GNI. As such the underground transmission gas pipeline must meet GNI's specifications to ensure it meets the requirements of the national infrastructure and can provide a reliable gas supply to the Edenderry Renewable Energy Complex. Therefore, from an alternative 'process design' point of view, the flexibility to select alternative processes for integrating into the current national gas network is not available.

As appropriate, alternative processes are considered on an ongoing basis by GNI as a part of each of their operations based on many factors including technical feasibility, environmental impact, efficiency, security, reliability and cost.

3.8 Conclusions On Alternatives

This chapter has presented an assessment of the reasonable alternatives considered by the Applicant for the Proposed Development, in accordance with the requirements of the EIA Directive, the Planning and Development Regulations, and EPA guidance. The consideration of alternatives is proportionate to the nature of the project and focused on those aspects where alternatives are available, namely route selection, construction methods and mitigation measures.

For a linear infrastructure projects, the primary alternatives assessment related to the identification and evaluation of route corridor options, rather than fixed alignments. The corridor-level route selection process was undertaken to identify a preferred pipeline corridor capable of accommodating a route while minimising environmental constraints and technical challenges. Three route corridor options were identified and assessed.

Based on this comparative assessment, Route Corridor Option 2 was identified as the preferred corridor. Following corridor selection, Route Corridor Option 2 was progressed to detailed route development and engineering design. This process involved refining the 1 km corridor into a pipeline route. This refinement resulted in localised changes to the alignment, through the development of a broad corridor concept to a detailed and deliverable route.

In terms of design and process alternatives, the design of the underground transmission gas pipeline is governed by statutory safety requirements and GNI operational standards, which limit flexibility in relation to pipe diameter, operating pressure and system integration.

The adoption of trenchless construction techniques at environmentally sensitive crossings represents a key embedded mitigation measure that has materially informed the overall acceptability of the Proposed Development.

The Proposed Development derived from Route Corridor Option 2 represents the most appropriate solution to meet the identified need for a gas supply connection to the Edenderry Renewable Energy Complex.

3.9 References

- Directive 2014/52/EU amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.
- Environmental Protection Agency (2022). Guidelines on the information to be contained in Environmental Impact Assessment Reports.
- Planning and Development Regulations 2001 (as amended).
- I.S. 328:2021 Gas Transmission and Pipeline Installations.