Chapter 2 – Description of the Proposed Development

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2. DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 Introduction

This Environmental Impact Assessment Report (EIAR) has been prepared in respect of the Proposed Development, which comprises the construction, commissioning, and operation of the c. 23.65-kilometre (km) GNI 143 Ballykilleen Pipeline and all ancillary and associated temporary works. The proposed GNI 143 Ballykilleen Pipeline is designed to connect the existing BGE77 pipeline (also known as Pipeline to the West (PTTW)) to the Edenderry Renewable Energy Complex.

As outlined in Chapter 1 (Introduction), the Proposed Development is subject to an application to the Commission for Regulation of Utilities (CRU) under Section 39A of the Gas Act 1976 (as amended), and to An Coimisiún Pleanála (ACP) under Section 182C(1) of the Planning and Development Act 2000, as amended.

This chapter of the Environmental Impact Assessment Report (EIAR) presents a description of the Proposed Development comprising of information on the development, design, size and other relevant features of the Proposed Development. The scope of this chapter aligns with the relevant legislation and guidance which comprises the following:

- EIA Directive (2011/92/EU), as amended by the 2014 EIA Directive (2014/52/EU) (herein referred to as the EIA Directive)
- European Commission 'Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report' (2017)
- EPA 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (2022) (herein referred to the as the EPA EIA Report Guidelines 2022).

This chapter summarises the existing site, the Proposed Development and the existence of the project as set out within the EPA EIA Report Guidelines 2022. This guidance advises that description of the existence of the project should define all aspects of the proposed lifecycle of the facility, including:

- Description of Construction;
- Description of Commissioning;
- Operation of the Project;
- Changes to the Project; and
- Description of Other Related Development(s).

This chapter has been informed by the detailed project design and summarises the relevant aspects of the Proposed Development and its lifecycle as they relate to this EIAR. This description is not exhaustive, and as such the EIAR should be read in conjunction with full application package including the outline Construction Methodology (Appendix 2.1) prepared by Fingleton White, the outline Construction Environmental Management Plan (Appendix 2.2) prepared by AWN, and planning drawings prepared by Fingleton White.

The description of the Proposed Development is described in terms of those environmental topics that will form the basis of the impact assessment process and the characteristics of the Proposed Development and potential effects. The technical assessments in this EIAR have been conducted using this description, and the full application package as a guide to the details of the development under consideration.

This chapter is supported by figures contained in Volume 4 of this EIAR. While selected figures may be reproduced within the chapter for ease of reference, the full size and quality of those figures are provided in Volume 4. Annotated mark ups, diagrams and photographic records are excluded, as these are provided for illustrative or contextual purposes only and are not replicated at full presentation quality.

The relevant Volume 4 figures to this chapter include:

- Figure 2-1 Site Location Overview
- Figure 2-2 to Figure 2.7 Site Location Plan (Sheet 1 of 6) to (Sheet 6 of 6)
- Figure 2-8 Site Location – Temporary Construction Compound 03 and 04

2.2 Description of the Existing Development Site

The lands within the redline boundary (the "Proposed Development Site") covers an area of approximately 243.4 hectares (ha) and encompasses all lands required for the construction and operation of the pipeline, including the Kilwarden Offtake Installation, the Ballykilleen AGI, temporary construction compounds, line-pipe storage areas, and all associated ancillary works.

The Proposed Development Site comprises the c. 23.65 km linear route of the underground GNI 143 Ballykilleen Pipeline and its temporary working areas.

The Proposed Development site is as shown in Figure 2-1. Further details on the specific characteristics of the site are provided in the subsequent sections of this EIAR.

Given the linear nature of the development, the pipeline has been divided into six sections solely for the purposes of describing the Proposed Development within this EIAR. These sections have been defined on a practical basis, using intervals and identifiable landmark features or crossings along the route. The segmentation does not reflect any environmental or construction rationale, it provides a structure for presenting information of the Proposed Development. Where relevant, this framework also assists in focusing the environmental assessment on specific localised elements of the route. The six sections, defined by key crossing points and chainages along the proposed alignment, are outlined in Table 2-1.

In addition to the linear pipeline route, the Proposed Development includes a range of temporary construction infrastructure within the overall red line boundary. This comprises five Temporary Construction Compounds, a series of temporary laydown areas (Type A and Type B), temporary construction access points, and a temporary construction haul road or 'running track' extending along the pipeline route. Temporary Construction Compounds 01, 02 and 05 are located on or directly adjoining the linear pipeline route. Temporary Construction Compound 03, located near Edenderry town, and Temporary Construction Compound 04, located in the townland of Esker More, Co. Offaly, are located off the linear route but remain within the red line boundary of the Proposed Development. These temporary works facilitate the delivery, storage, and management of materials during construction and will be removed following completion of the works (see Section 2.4.4).

Table 2-1 Structured Sections to describe the Proposed Development

Pipeline Section	Start Point (m)	End Point (m)	Length (m)
Pipeline Section 1: Kilwarden Offtake Installation to the L40181 Road (RDX05)	0	3,931	3,931
Pipeline Section 2: L40181 Road (RDX05) to the L4091 (RDX09)	3,931	7,441	3,510
Pipeline Section 3: L4091 Road (RDX09) to the Yellow River (RVX02)	7,441	11,669	4,228
Pipeline Section 4: Yellow River (RVX02) to the R441 (RDX12)	11,669	15,348	3,679
Pipeline Section 5: R441 (RDX12) to the L5003 (RDX15)	15,348	19,494	4,146
Pipeline Section 6: L5003 (RDX15) to the Ballykilleen AGI	19,494	23,650	4,156
GNI 143 Ballykilleen Pipeline	0	23,650	23,650

Figure 2-1 Site Location Overview

2.2.1 Existing Land Use and Site Context

The Proposed Development commences in County Meath, approximately 4 km east of Kinnegad and c. 1 km east of the Meath–Westmeath County boundary, in an agricultural field located c. 20 m south of Mount Hevey Bog Special Area of Conservation (SAC; Site Code 002342), and to the north of the R161. From this point, the pipeline routes southwards across rural farmland, crossing the M4 Motorway and remaining west of the River Boyne, which forms part of the Meath–Kildare County boundary in this area. As the route progresses into County Offaly, it passes to the west of Edenderry town (c. 1 km east at its closest point) before crossing the Grand Canal and continuing south to terminate within the Edenderry Renewable Energy Complex, c. 5 km south of Edenderry town.

Across its length, the route requires 17 road crossings (including the M4, and local and regional roads), 2 river crossings (the Kilwarden River and the Yellow River), and 30 watercourse crossings (including the Grand Canal). For this assessment, rivers are defined as larger, naturally occurring channels with continuous flow, while watercourses refer to smaller features—such as streams or drains which may have intermittent or seasonal flow. The Grand Canal is classified as a watercourse due to its artificial, engineered nature.

The landscape within the Proposed Development Site is predominantly rural, comprising irregular agricultural fields used for grazing and cropping and bounded by traditional hedgerows characteristic of Counties Meath and Offaly. The lands are largely undeveloped, with no residential dwellings or permanent buildings located within site. Existing infrastructure intersected along the pipeline route includes regional and local roads, agricultural access tracks, drainage ditches, the M4 Motorway, and the Grand Canal. Residential dwellings occur in the wider area but primarily as dispersed one-off houses along local roads, with no urban centres directly adjoining the site.

At the southern end of the route, the receiving environment transitions from agricultural to industrial lands associated with the Edenderry Renewable Energy Complex, an established energy-generation facility. The proposed Ballykilleen AGI is located within this industrial area. The nearest external industrial operation is Kilsaran Clonard Quarry, approximately 2.8 km east.

Temporary Construction Compounds 01, 02 and 05 are located on or directly adjoining the linear pipeline route. are located on existing agricultural land. Temporary Construction Compound 03 (located to the east of the route near Edenderry town) and Temporary Construction Compound 04 (located in Killeenmore to the west of the Edenderry Renewable Energy Complex) include areas of existing hardcore or stone surfacing. The temporary laydown areas (Type A and Type B) are sited at road verge, road crossings within existing agricultural land.

2.2.2 Existing Site Utilities

Existing underground utilities and service connections are primarily associated with public roads intersecting the route of the Proposed Development. In these locations, underground services typically include water mains, telecommunications infrastructure and electricity ducts. Within the predominantly greenfield and agricultural sections of the Proposed Development Site, no public mains water, wastewater, or stormwater networks are present.

A number of existing overhead electricity lines intersect or run adjacent to the Proposed Development. In total, the pipeline route intersects with approximately 20 places with overhead electricity lines, comprising a combination of medium-voltage and low-voltage infrastructure. In addition, sections of the pipeline alignment run parallel to overhead electricity lines for limited distances.

The Edenderry Renewable Energy Complex comprises established industrial infrastructure and includes its own dedicated underground stormwater drainage network. Surface water runoff from the complex is attenuated on site prior to discharge to the Figile River in accordance with existing drainage arrangements, stormwater discharges are controlled under EPA Licence P0482-04.

2.2.3 Existing Development Site and Risk of Major Accident / Disasters

2.2.3.1 Control of Major Accident Hazards involving Dangerous Substances and Seveso Establishments

The Chemical Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S.I. 209 of 2015) or 'COMAH' regulations define the "consultation distance" as a distance or area relating to an establishment, within which there are potentially significant consequences for human health or the environment from a major accident at the establishment, including potentially significant consequences for developments such as residential areas, buildings and areas of public use, recreational areas and major transport routes.

Establishments are either lower tier establishments or upper-tier COMAH sites with above threshold quantities of dangerous substances present, and to which the provisions of the COMAH regulations apply. The Proposed Development does not meet or exceeds the thresholds for either lower or upper tier. The Health and Safety Authority (HSA) list of Notified Seveso Establishments has been reviewed to identify if the Proposed Development falls within the consultation distance of any nearby Seveso Establishments.

The closest Notified Seveso Establishments to the Proposed Development is the Lower Tier establishment Castlelost FlexGen Ltd. facility, located c. 15 km west of the Proposed Development site.

The Proposed Development is not within the consultation distance of the Castlelost FlexGen Ltd. site, and therefore due to the separation distance there is no interaction with the Proposed Development at this location.

2.2.3.2 Flash fire, Jet fire, Vapour Cloud Explosion following natural gas release at the gas pipeline

A flash fire can occur following a loss of containment of natural gas from the gas transmission pipeline, which results in a flame which passes through the mixture at less than sonic velocity such that explosion overpressures are negligible. A flash fire may be caused by releases at high or low pressure into an open, unconfined area which contacts an active source of ignition.

A jet fire can occur following a loss of containment of natural gas from the gas transmission pipeline, via a source such as a leak or failure of flanged pipework joints, pipework or another asset which contacts an active source of ignition.

A vapour cloud explosion (VCE) may occur from the loss of containment of natural gas, which does not ignite immediately and may form a cloud of flammable material, depending on the conditions of the release. If this cloud contacts an active source of ignition, a VCE can result and generate potentially harmful overpressures.

The Health and Safety Authority's (HSA) Guidance on technical land-use planning advice (HSA, 2023) document provides guidance on developments with the potential to cause major accidents. Table 2-2 details the potential scenario's following gas transmission pipeline rupture and their calculated likelihoods based on the c. 23.65 km long, 300 mm nominal bore (NB) steel underground gas transmission pipeline, multiplied by HSA rupture risk frequency (1×10^{-8} / m for underground pipeline with a diameter > 150mm).

Table 2-2 Potential major accident scenarios for natural gas pipeline rupture and their associated likelihoods

Potential Major Accident following Pipeline Rupture	Frequency (/ year)	Description
Jet fire / fireball	2.36×10^{-5}	Very unlikely

Flash fire	8.48×10^{-5}	Very unlikely
Vapour Cloud Explosion	1.27×10^{-4}	Unlikely

Table 2-3 below provides a qualitative description of the frequency range following relevant guidance provided by Centre for Chemical Process Safety (CCPS) (2009), Guidelines for Developing Quantitative Safety Risk Criteria, AIChemE, New York. The frequency for each of the potential major accident scenarios in Table 2-2 above are considered to be Very Unlikely.

Table 2-3 Qualitative description of potential major accident scenario'

Frequency Category	Description	Frequency Range (/year)	Description
1	Extremely unlikely	$< 1 \times 10^{-6}$	Similar event has not yet occurred in industry and would be a remote possibility
2	Very unlikely	1×10^{-6} to 1×10^{-5}	Similar event has not yet occurred in our industry
3		1×10^{-5} to 1×10^{-4}	Similar event has occurred somewhere in our industry
4	Unlikely	1×10^{-4} to 1×10^{-3}	Similar event has occurred somewhere within our company
5		1×10^{-3} to 0.01	Similar event likely to occur within lifetime of 10 similar facilities
6	Possible	0.01 to 0.1	Likely to occur once or twice in the lifetime of the facility
7		0.1 to 1	Likely to occur several times in the lifetime of the facility
8	Probable	> 1	Common occurrence (at least annually) at the facility

2.2.3.3 Landslides, Seismic Activity and Volcanic Activity

In general, risk of landslides in Ireland is considered to be low, as the country is not located in a region with high seismic activity or large mountain ranges. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff landslides and falls lead to recession of the cliffs. Landslides have occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities. The landslide susceptibility map (Geological Survey of Ireland (GSI) spatial map viewer) identifies areas which are subject to landslides and is measured from low to high. The landslide susceptibility map considers the location of landslides and what causes them (slope, soil type and the impact of the flow of water). Based on the GSI spatial map viewer, the Landslide Susceptibility classified as 'Low' to 'Inferred low' for the majority of the Proposed Development Site, with the exception of a minor localised zone located at Chainage c. 11,400 – 11,500m along the pipeline which has been classified as 'Moderately Low'. See EIAR Chapter 5 for further details.

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics, Dublin Institute for Advanced Studies, has been recording seismic events in Ireland since 1978 (www.dias.ie). This network consists of several seismometers that are located throughout Ireland. Seismic activity and earthquake risk in Ireland are generally considered to be low. This is because Ireland is located on the western edge of the Eurasian Plate, which is a tectonic plate that is not known for its seismic activity. However, earthquakes can still occur in Ireland, although they are typically small and have little impact. There is a very low risk of seismic activity to the Proposed Development Site.

There are no active volcanoes in Ireland so there is no risk from volcanic activity.

2.2.3.4 Flood Risk / Sea Level Rise

A Flood Risk Assessment has been undertaken by JBA Consulting in accordance with the Planning System and Flood Risk Management Guidelines for Planning Authorities (DoEHLG & OPW, 2009). On the basis of this assessment:

- A review of historical flood records, including OPW *floodinfo.ie* data and internet searches, indicates that while flooding has occurred within the wider Edenderry area, no historical flood events have been recorded along the pipeline route.
- Predictive flood mapping from the CFRAM and National Indicative Fluvial Mapping (NIFM) datasets identifies potential fluvial flood extents associated with the River Boyne and certain tributaries. CFRAM mapping confirms Flood Zones A and B along sections of the River Boyne, while smaller watercourses crossed by the pipeline are represented by the NIFM mapping.
- To refine the understanding of flood risk, a 1D–2D hydraulic model was developed for the River Boyne, Figile River, Kilwarden River and selected tributaries.
- The majority of the Proposed Development is located within Flood Zone C, where the probability of flooding is low.
- Localised sections of the pipeline intersect Flood Zones A and B, primarily at crossings of the Yellow River and a tributary of the River Boyne.
- The Ballykilleen AGI and all construction compounds are located within Flood Zone C.
- Pluvial flooding risk is considered negligible due to the absence of significant surface depressions, with limited localised susceptibility near existing floodplains.
- Groundwater flooding has been historically recorded in low-lying floodplain areas but does not directly affect the pipeline route outside these locations.
- Coastal flooding is not relevant given the inland location of the site.

2.2.4 Industrial Emissions Licenced Facilities

According to the EPA (2023) there are 5 no. Industrial Emissions (IE) and Waste facilities within a 2 km radius of the overall development site:

- Bord na Móna (BnM) Cushaling Peaker Plant located within Edenderry Power Limited site (EPA Ref: P0482-04). The Proposed Development terminates at this Site.
- Rosderra Irish Meats Group Unlimited Company (EPA Ref: P0180-02)
- Rosderra Farms Unlimited Company (EPA Ref: P0681-01)
- Clonbulloge Ash Repository (EPA Ref: W0049-02)
- Breedon Cement Ireland Limited (EPA Ref: P0487-07)

While a number of EPA-licensed IE/IPPC facilities are located within the wider area, the Proposed Development comprises an underground gas transmission pipeline, the Kilwarden Offtake Installation, and Ballykilleen AGI on the Edenderry Power Limited site with no on-site combustion or emissions. As such, there is no direct operational interaction with these facilities and no pathway for significant environmental effects.

The presence of these IE Licenced sites in the wider vicinity of the Proposed Development site is relevant in terms of contextual land use. Aside from the direct connection to the Edenderry Power Limited site (P0482-04), the Proposed Development does not alter the emissions profile or licensing requirements of other licenced sites listed above or otherwise. Overall, the risk of significant cumulative or interactive effects between the Proposed Development and surrounding IE-licensed facilities is considered to be low.

The purpose of the Proposed Development is to provide the licenced site at the Edenderry Power Limited (P0482-04) with a natural gas supply which will facilitate the conversion of the existing Cushaling Peaker Plant on the site from their current single-fuel operation (liquid fuel) to dual-fuel operation, with natural gas as the primary fuel and liquid fuel retained as backup.

2.2.5 County Development Plans

2.2.5.1 Offaly County Council Development Plan

The *Offaly County Development Plan 2021 - 2027* zoning designations have been reviewed. For further information on zoning designations please see the Planning Report prepared by JSA Planning (2026). As per the Planning Report, the portion of the Proposed Development site located within the jurisdiction of Offaly County Council runs through agricultural land with no zoning designation.

As part of the Edenderry Local Area Plan 2023 – 2029 the *Edenderry Municipal District – Local Transport Plan* has been prepared to illustrate potential future transport development in and around the town of Edenderry. A potential route for a future "Inner / Outer relief route" located to the west of Edenderry is illustrated on this plan. A short section of the Proposed Development (Pipeline Section 5, see Section 2.3.1 below) coincides with this this relief route corridor. The shared corridor is less than 1 km in length located just north and south of the Grand Canal, between Chainage c. 17550 – 18500.

While there is currently there is no formal planning undertaken or confirmed alignment to allow for the development of this relief route, however to ensure that the Proposed Development is compatible with this potential future development, heavy wall pipe will be used where a potential interaction could arise ensuring compatibility with this future development.

Section 2.9 of this chapter considers the potential for cumulative effects arising from the Proposed Development. While the potential relief route has a plan-level designation there is no detailed proposals, and is not currently within the planning system. The potential interaction with the Proposed Development was considered at a high level only during the design process. A assessment of cumulative effects in respect of the relief route would be undertaken, should this project proceed, as part of that project's own Environmental Impact Assessment process.

2.2.5.2 Meath County Council Development Plan

The *Meath County Development Plan 2021 - 2027* zoning designations have been reviewed. For further information on zoning designations please see the Planning Report prepared by JSA Planning (2026). As per the Planning Report, the portion of the Proposed Development site located within the jurisdiction of Meath County Council runs through an area designated as 'Rural Area – RA'. The aim of this designation is '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. Of note, 'Utility Structures' are a permitted use under this designation.

2.3 Characteristics of the Proposed Development

2.3.1 Proposed Underground Gas Transmission Pipeline ('GNI 143 Ballykilleen Pipeline')

The GNI 143 Ballykilleen Pipeline comprises the establishment of a new underground gas transmission pipeline to supply natural gas to the Bord na Móna (BnM) Cushaling Peaker Plant. Once constructed, the underground transmission pipeline will be owned and operated by Gas Networks Ireland (GNI).

The pipeline will commence at a hot-tap tie-in with the existing 750 mm NB BGE77 Pipeline to the West (PTTW), where a live 'hot tap' connection will be established. From this point, the pipeline will extend southwards (underground) before terminating at the proposed Ballykilleen AGI located within the Edenderry Renewable Energy Complex.

The proposed pipeline consists of 300 mm nominal bore (NB) steel pipe, designed and constructed in accordance with ISO 3183 and GIS/DAT-6:2019. It will be installed at a nominal minimum depth of 1.2 m below ground level and surrounded on all sides by approved CL.503 bedding and surround material. The

trench will then be reinstated using selected backfill and restored to existing ground condition. At locations where the pipeline crosses rivers, watercourses, roads, or existing services, the pipe will be installed at greater depth as required to ensure adequate clearance beneath the riverbed, roadway, or service duct.

The Proposed Development site extends to a maximum width of up to 100 m in limited locations. During the construction phase, the physical footprint required for the Proposed Development is substantially smaller, comprising a temporary working width of approximately 30 m along linear sections of the pipeline, increasing to approximately 40 m × 45 m at road and watercourse crossings. As a result, a substantial proportion of the lands within the Proposed Development Site will remain unaffected by construction works.

In parallel with the pipeline installation, ancillary ducting system (2 no. 32/24mm fibre ducts) will be laid within the same trench alongside the gas pipeline to facilitate future telecommunications and fibre-optic services within the same application route corridor.

A detailed description of the pipeline alignment, including specific locations and distances referenced by chainage, is provided in Sections 2.3.1.1 to 2.3.1.6 below.

2.3.1.1 Pipeline Section 1: Kilwarden Offtake Installation to L40181 Road (RDX05)

Pipeline Section 1 is located between the Kilwarden Offtake Installation (0 m) and L40181 road crossing (RDX05); and is c. 3.931 km in length. The route section and ancillary works is summarised in Table 2-4, and shown in Figure 2-2. Pipeline Section 1 is located within the townlands of Kilwarden, Aghnagilla, Ardnamullen and Ticrohan, County Meath.

Table 2-4 Pipeline Section 1: Route Description

Approximate Chainage	Description of Location	Pipeline length (m)
Chainage 000 Tie-in point to existing BGE77	The proposed GNI 143 Ballykilleen Pipeline will connect to the designated tie-in point of the BGE77 within the townland of Kilwarden, County Meath. A Temporary Working Area is to be located at the Kilwarden Offtake Installation to facilitate construction.	N/A
Chainage 000 to 842	The pipeline will be routed west, then south-west across agricultural lands crossing existing hedgerows/treelines.	c. 842 m
Chainage 842 to 858 R161 Road Crossing (RDX01)	The pipeline will cross south across the R161 regional road.	c. 16 m
Chainage 858 to 1094	The pipeline will be routed south across agricultural lands crossing three hedgerows/treelines.	c. 236 m
Chainage 1094 to 1366 Kilwarden River Crossing (RVX01)	The pipeline will cross south across the Kilwarden River. The pipeline will be installed using trenchless crossing methods. The Kilwarden River marks the townland boundary between Kilwarden and Aghnagilla.	c. 272 m
Chainage 1366 to 1899	The pipeline will be routed south, southwest, then south following existing parallel to existing field boundaries.	c. 533 m
Chainage 1899 to 1902 Unnamed watercourse crossing (WCX01)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 3 m
Chainage 1902 to 2456	The pipeline will be routed south across agricultural lands crossing existing hedgerows/treelines.	c. 554 m

Chainage 2456 to 2521 R148 Road Crossing (RDX02) and L80217 Road Crossing (RDX03)	The pipeline crosses south perpendicular to the R148 and L80217 Roads. This crossing stretch passes the townland boundary between Aghnagilla and Ardnamullen. This is expected to be a single combined trenchless crossing of both roads. In addition to the pipeline, at this location the route includes an access point to the Temporary Construction Compound 02 via the L80217 (Ardnamullen Road).	c. 65 m
Chainage 2521 to 2919	The pipeline will be routed south across agricultural lands crossing existing hedgerows/treelines.	c. 398 m
Chainage 2919 to 3269 M4 Motorway Crossing (RDX04) and Aghnahillagh Stream crossing (WCX02)	The pipeline will be routed south under the entire M4 Motorway, this crossing is expected to include the Aghnahillagh Stream as a combined crossing. The pipeline is expected to be installed using open cut methods. In addition to the pipeline, at this location a temporary haulage road along the pipeline route will be established to the west of the M4 motorway crossing location utilising an existing overpass bridge.	c. 350 m
Chainage 3269 to 3919	The pipeline will be routed south across agricultural lands crossing existing hedgerows/treelines. This crossing stretch passes to townland boundary between Ardnamullen and Ticrohan.	c. 650 m
Chainage 3919 to 3931 L40181 Road Crossing (RDX05)	The pipeline will be routed south across the Ticrohan Road (L40181). The pipeline is expected to be installed using open cut methods.	c. 12 m

2.3.1.2 Pipeline Section 2: L40181 Road (RDX05) to the L4091 Road (RDX09)

Pipeline Section 2 of the pipeline is located between the L40181 road crossing (RDX05) and the L4091 road crossing (RDX09); and is c. 3.51 km in length. The route section and ancillary works is summarised in Table 2-5, and shown in Figure 2-3. Section 2 is located within the townlands of Ticroghan, Park, Ballyboggan, and Ballynakill, County Meath.

Table 2-5 Pipeline Section 2: Route Description

Approximate Chainage	Description of Location	Pipeline length (m)
Chainage 3931 to 4892	The pipeline is routed south through agricultural lands crossing existing hedgerows and treelines. This pipeline stretch passes the townland boundary between Ticroghan and Park.	c. 961 m
Chainage 4892 to 4895 Unnamed watercourse crossing (WCX03)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 3 m
Chainage 4895 to 5143	The pipeline is routed south through agricultural lands crossing existing hedgerows and treelines.	c. 248 m
Chainage 5143 to 5158 L8022 Road Crossing (RDX06)	The pipeline is routed south across the Park Road (L8022). The pipeline is expected to be installed using open cut methods.. The pipeline crosses underneath an existing overhead telecom cable.	c. 15 m
Chainage 5158 to 6473	The pipeline is routed south parallel to Park Road (L8022) through agricultural lands crossing existing hedgerows and treelines.	c. 1,315 m
Chainage 6473 to 6497 R401 Road Crossing (RDX07)	The pipeline is routed south across the R401 road. The pipeline crosses underneath an underground telecom cable. The pipeline is expected to be installed using open cut methods.	c. 24 m

Chainage 6497 to 6663	The pipeline is routed southwest through agricultural lands. The pipeline crosses underneath an overhead electricity cable.	c. 166 m
Chainage 6663 to 6670 Unnamed Stream Crossing (WCX04)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 7 m
Chainage 6670 to 7132	The pipeline is routed south, crosses underneath and then runs parallel to an existing overhead electricity cable, through agricultural lands crossing existing hedgerows and treelines. This crossing stretch passes the townland boundary between Park and Ballyboggan.	c. 462 m
Chainage 7132 to 7148 L80241 Ballyboggan Road Crossing (RDX08)	The pipeline is routed south across the L80241 (Ballyboggan Road). The pipeline is expected to be installed using open cut methods.	c. 16 m
Chainage 7148 to 7300	The pipeline is routed south across an agricultural field.	c. 152m
Chainage 7300 to 7306 Unnamed Stream Crossing (WCX05)	Unnamed watercourse crossing. This crossing passes the townland boundary between Ballyboggan and Ballynakill. The pipeline is expected to be installed using open cut methods.	c. 6m
Chainage 7306 to 7421	The pipeline is routed south across an agricultural field crossing existing hedgerows and treelines.	c. 115m
Chainage 7421 to 7441 L4091 Road Crossing (RDX09)	The pipeline is routed south across the L4091 (Ballynakill Road). The pipeline crosses underneath an overhead telecom cable. The pipeline is expected to be installed using open cut methods.	c. 20m

2.3.1.3 Pipeline Section 3: L4091 Road (RDX09) to the Yellow River (RVX02)

Pipeline Section 3 of the pipeline is located between the L4091 road crossing (RDX09) and the Yellow River crossing (RVX02); and is 4.228 km in length. The route section and ancillary works is summarised in Table 2-6, and shown in Figure 2-4. Section 3 is located within the townlands of Ballynakill, Harristown, Castlejordan, and Clongall, County Meath.

Table 2-6 Pipeline Section 3: Route Description

Approximate Chainage	Description of Location	Pipeline length (m)
Chainage 7441 to 7486	The pipeline is routed south across an agricultural field.	c. 45 m
Chainage 7486 to 7506 Unnamed Stream Crossing (WCX06)	Unnamed watercourse crossing.. This crossing passes the townland boundary between Ballynakill and Harristown. The pipeline is expected to be installed using open cut methods.	c. 20 m
Chainage 7506 to 8028	The pipeline is routed south across agricultural fields crossing existing hedgerows and treelines. The pipeline crosses underneath an overhead electricity cable.	c. 522 m
Chainage 8028 to 8033 Unnamed Stream Crossing (WCX07)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 5 m
Chainage 8033 to 8813	The pipeline is routed southwest and south across agricultural fields, crossing existing hedgerows and treelines. The pipeline crosses underneath an overhead electricity cable.	c. 780 m
Chainage 8813 to 8818 Unnamed Stream Crossing (WCX08)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods. The Proposed Development site boundary is at a distance of c. 350 m to the southeast of the River Boyne (County Meath-County Kildare border).	c. 5 m
Chainage 8818 to 9275	The pipeline is routed southwest across agricultural fields, crossing existing hedgerows and treelines.	c. 457 m

Chainage 9275 to 9281 Unnamed Stream Crossing (WCX09)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 6 m
Chainage 9281 to 9600	The pipeline is routed southwest across agricultural fields, crossing existing hedgerows and treelines.	c. 319 m
Chainage 9600 to 9607 Unnamed Stream Crossing (WCX10)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 7 m
Chainage 9607 to 10033	The pipeline is routed south across an agricultural field.	c. 457 m
Chainage 10033 to 10039 Unnamed Stream Crossing (WCX11)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods. This crossing passes the townland boundary between Harristown and Castlejordan.	c. 6 m
Chainage 10039 to 10122	The pipeline is routed south across an agricultural field.	c. 83 m
Chainage 10122 to 10128 Unnamed Stream Crossing (WCX12)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods. This crossing passes the townland boundary between Castlejordan and Clongall. 10,075	c. 6 m
Chainage 10128 to 11160	The pipeline is routed south across agricultural fields, crossing existing hedgerows and treelines. This crossing passes within c. 150 m of the River Boyne (County Meath-County Kildare border).	c. 1032 m
Chainage 11160 to 11669 Yellow River Crossing (RVX02)	The pipeline is routed south across the Yellow River. The pipeline will be installed using trenchless crossing methods. The Yellow River marks the townland boundary between Clongall and Clonmore, and the county boundary between County Meath and County Offaly. The pipeline crosses beneath overhead electrical cables.	c. 509 m

2.3.1.4 Pipeline Section 4: Yellow River (RVX02) to the R441 Road (RDX12)

Pipeloine Section 4 of the pipeline is located between the Yellow River crossing (RVX02) and R441 road crossing (RDX12); and is 3.679 km in length. The route section and ancillary works is summarised in Table 2-7, and shown in Figure 2-5. Section 4 is located within the townlands of Clonmore, Roosk, Lenamarran, and Mountwilson, County Offaly.

Table 2-7 Pipeline Section 4: Route Description

Approximate Chainage	Description of Location	Pipeline length (m)
Chainage 11669 to 12913	The pipeline is routed south across agricultural fields, crossing existing hedgerows and treelines, within the townland of Clonmore. The pipeline crosses beneath existing overhead electricity cables.	c. 1244 m
Chainage 12913 to 12919 Unnamed Stream Crossing (WCX13)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 6 m
Chainage 12919 to 13120	The pipeline is routed south across an agricultural field.	c. 201 m
Chainage 13120 to 13128 Unnamed Stream Crossing (WCX14)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods. This crossing passes the townland boundary from Clonmore to Roosk.	c. 8 m
Chainage 13128 to 13374	The pipeline is routed south across agricultural fields.	c. 246 m
Chainage 13374 to 13379 Unnamed Stream Crossing (WCX15)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 5 m
Chainage 13379 to 14435	The pipeline is routed south and southwest across agricultural fields, crossing existing hedgerows and treelines.	c. 1056 m

Chainage 14435 to 14448 L1004 (Roosk) Road Crossing (RDX10)	The pipeline is routed south across the L1004 (Roosk) Road. The pipeline is expected to be installed using open cut methods. The pipeline crosses underneath overhead telecom cables, overhead electricity cables, and watermains. TThis crossing passes the townland boundary between Roosk and Lenamarran.	c. 13 m
Chainage 14448 to 14675	The pipeline is routed southwest across an agricultural field. The pipeline crosses underneath Overhead Electricity Cables. This pipeline stretch passes within 712m of the Black Castle Bog NHA at its nearest point.	c. 227 m
Chainage 14675 to 14683 Private Late Crossing (RDX11)	The pipeline is routed south across a private laneway. The pipeline is expected to be installed using open cut methods.	c. 8 m
Chainage 14683 to 14866	The pipeline is routed southwest across an agricultural field, crossing existing hedgerows and treelines.	c. 180 m
Chainage 14866 to 14876 Unnamed Stream Crossing (WCX16)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods. This crossing passes the townland boundary between Lenamarran and Mountwilson.	c. 10 m
Chainage 14876 to 15329	The pipeline is routed southwest across agricultural fields, crossing existing hedgerows and treelines.	c. 453 m
Chainage 15329 to 15348 R441 Road Crossing (RDX12)	The pipeline is routed south across the R441 road, and crosses underground water mains. The pipeline is expected to be installed using open cut methods.	c. 19 m

2.3.1.5 Pipeline Section 5: R441 Road (RDX12) to the L5003 Road (RDX15)

Pipeline Section 5 of the pipeline is located between the R441 road crossing (RDX12) and L5003 road crossing (RDX15); and is 4.146 km in length. The route section and ancillary works is summarised in Table 2-8, and shown in Figure 2-6. Section 5 is located within the townlands of Mountwilson, Thornwell, Monasteroris, Rathmore, and Drumcooly, County Offaly.

Table 2-8 Pipeline Section 5: Route Description

Approximate Chainage	Description of Location	Pipeline length (m)
Chainage 15348 to 15540	The pipeline is routed southwest across an agricultural field. The pipeline crosses under overhead electricity cables.	c. 192 m
Chainage 15540 to 15546 Unnamed Stream Crossing (WCX17)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 6 m
Chainage 15546 to 16053	The pipeline is routed south across agricultural fields, crossing existing hedgerows and treelines. The pipeline crosses under overhead electricity cables. This crossing stretch passes the townland boundary between Mountwilson and Thornwell.	c. 507 m
Chainage 16053 to 16056 Unnamed Stream Crossing (WCX18)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 3 m
Chainage 16056 to 16363	The pipeline is routed south across an agricultural field.	c. 307 m
Chainage 16363 to 16370 Unnamed Stream Crossing (WCX19)	Unnamed watercourse crossing. The pipeline will be installed using open cut methods. This crossing passes the townland boundary between Thornwell and Monasteroris.	c. 7 m
Chainage 16370 to 16702	The pipeline is routed southeast across an agricultural field.	c. 332 m
Chainage 16702 to 16711 Unnamed Stream Crossing (WCX20)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 9 m
Chainage 16711 to 16790	The pipeline is routed south across an agricultural field.	c. 79 m

Chainage 16790 to 16810 L5007 (Monasteroris Road) Crossing (RDX13)	The pipeline is routed south across the L5007 (Monasteroris) Road. The pipeline is expected to be installed using open cut methods. The pipeline crosses underneath an overhead telecom cable and crosses an underground watermain.	c. 20 m
Chainage 16810 to 16880	The pipeline is routed south across an agricultural field.	c. 70 m
Chainage 16880 to 16885 Unnamed Stream Crossing (WCX21)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 5 m
Chainage 16885 to 17201	The pipeline is routed south across agricultural fields, crossing existing hedgerows and treelines. This stretch is c. 2.6 km west of Edenderry town centre at its nearest point.	c. 316 m
Chainage 17201 to 17207 Unnamed Stream Crossing (WCX22)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 6 m
Chainage 17207 to 17994	The pipeline is routed south across agricultural fields, crossing existing hedgerows and treelines. This crossing stretch is c. 2.5 km west of Edenderry town centre at its nearest point.	c. 787 m
Chainage 17994 to 18186 Grand Canal Crossing (WCX23)	The pipeline is routed south across the Grand Canal. The pipeline will be installed using trenchless methods. This crossing passes the townland boundary between Monasteroris and Rathmore, and passes through the Grand Canal pNHA.	c. 192 m
Chainage 18186 to 18730	The pipeline is routed south across agricultural fields, crossing existing hedgerows and treelines.	c. 544 m
Chainage 18730 to 18756 R402 Road Crossing (RDX14)	The pipeline is routed south across the R402 Road. The pipeline is expected to be installed using open cut methods. The pipeline crosses underneath an overhead telecom cable. This crossing passes the townland boundary between Rathmore and Drumcooly.	c. 26 m
Chainage 18756 to 19485	The pipeline is routed south across agricultural fields, crossing existing hedgerows.	c. 729 m
Chainage 19485 to 19494 L5003 (Drumcooly) Road Crossing (RDX15)	The pipeline is routed south across the L5003 Road. The pipeline is expected to be installed using open cut methods. The pipeline crosses underneath overhead electricity cables.	c. 9 m

2.3.1.6 Pipeline Section 6: L5003 Road (RDX15) to the Ballykilleen AGI

Pipeline Section 6 of the pipeline is located between the L5003 road crossing (RDX15) and the Ballykilleen AGI; and is c. 4.156 km in length. The route section and ancillary works is summarised in Table 2-9, and shown in Figure 2-7. Section 6 is located within the townlands of Drumcooly, Rathgreedan, Ballykilleen, and Shean, County Offaly.

Table 2-9 Pipeline Section 6: Route Description

Approximate Chainage	Description of Location	Pipeline length (m)
Chainage 19494 to 20520	The pipeline is routed south then southwest across agricultural fields, crossing existing hedgerows and treelines. This crossing stretch passes the townland boundary between Drumcooly and Rathgreedan.	c. 1026 m
Chainage 20520 to 20524 Unnamed Stream Crossing (WCX24)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods. This crossing stretch passes the townland boundary between Rathgreedan and Ballykilleen.	c. 4 m

Chainage 20524 to 20676	The pipeline is routed south across an agricultural field.	c. 152 m
Chainage 20676 to 20682 Unnamed Stream Crossing (WCX25)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 6 m
Chainage 20682 to 21032	The pipeline is routed southwest across an agricultural field.	c. 350 m
Chainage 21032 to 21037 Unnamed Stream Crossing (WCX26)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 5 m
Chainage 21037 to 22085	The pipeline is routed southwest and south across agricultural fields, crossing existing treelines and hedgerows. The pipeline crosses underneath an overhead telecom cable.	c. 1048 m
Chainage 22085 to 22095 Private Lane Crossing (RDX16)	The pipeline is routed south across a private laneway. The pipeline is expected to be installed using open cut methods.	c. 10 m
Chainage 22095 to 22457	The pipeline is routed south across an agricultural field. The pipeline crosses underneath an overhead electricity cable.	c. 362 m
Chainage 22457 to 24462 Unnamed Stream Crossing (WCX27)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 5 m
Chainage 22462 to 22615	The pipeline is routed south across an agricultural field.	c. 153 m
Chainage 22615 to 22620 Unnamed Stream Crossing (WCX28)	Unnamed watercourse crossing. The pipeline is expected to be installed using open cut methods.	c. 5 m
Chainage 22620 to 22695	The pipeline is routed southeast across an agricultural field, crossing existing treelines and hedgerows.	c. 75 m
Chainage 22695 to 22815 Unnamed Stream (WCX29) and R401 Road Crossing (RDX17)	The pipeline is routed across an unnamed watercourse and the R41 Road. This is expected to be a single combined trenchless crossing of the watercourse and road. The pipeline crosses underneath overhead electricity and telecom cables. This crossing passes the townland boundary between Ballykileen and Shean.	c. 120 m
Chainage 22815 to 23149	The pipeline is routed southeast across an agricultural field. The pipeline crosses underneath overhead electricity cables.	c. 334 m
Chainage 23154 to 23154 Unnamed Watercourse Crossing (WCX30)	Unnamed watercourse crossing. The pipeline will be installed using open cut methods.	c. 5 m
Chainage 23154 to 23650	The pipeline is routed southwest into the Edenderry Renewable Energy Complex site. This crossing stretch passes the townland boundary between Shean and Ballykillen.	c. 496 m
Chainage 23650 (Ballykilleen AGI)	The pipeline will terminate at the proposed Ballykilleen AGI installation.	N/A

Figure 2-2 Site Location Plan (Sheet 1 of 6)

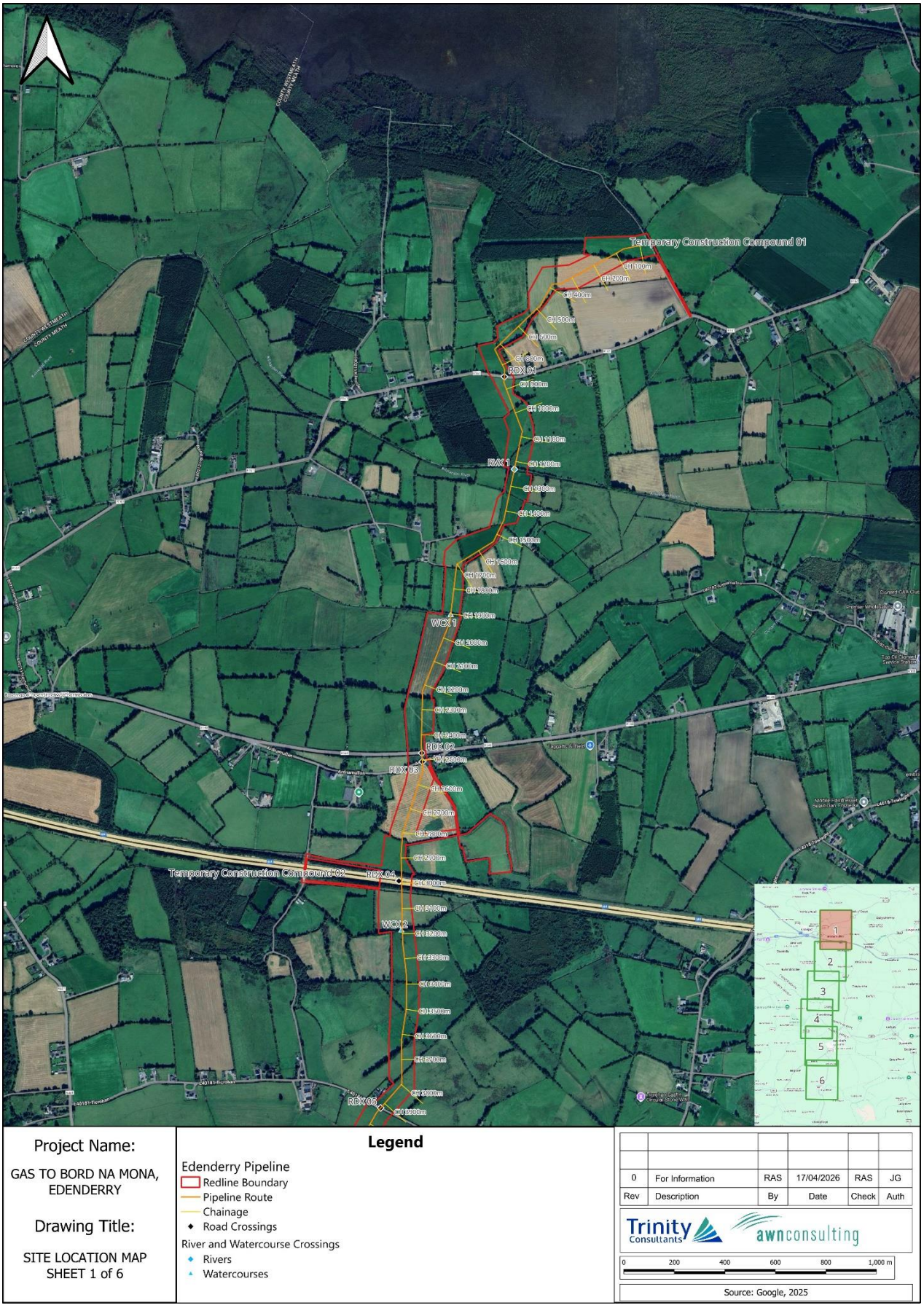


Figure 2-3 Site Location Plan (Sheet 2 of 6)

Figure 2-4 Site Location Plan (Sheet 3 of 6)

Figure 2-5 Site Location Plan (Sheet 4 of 6)

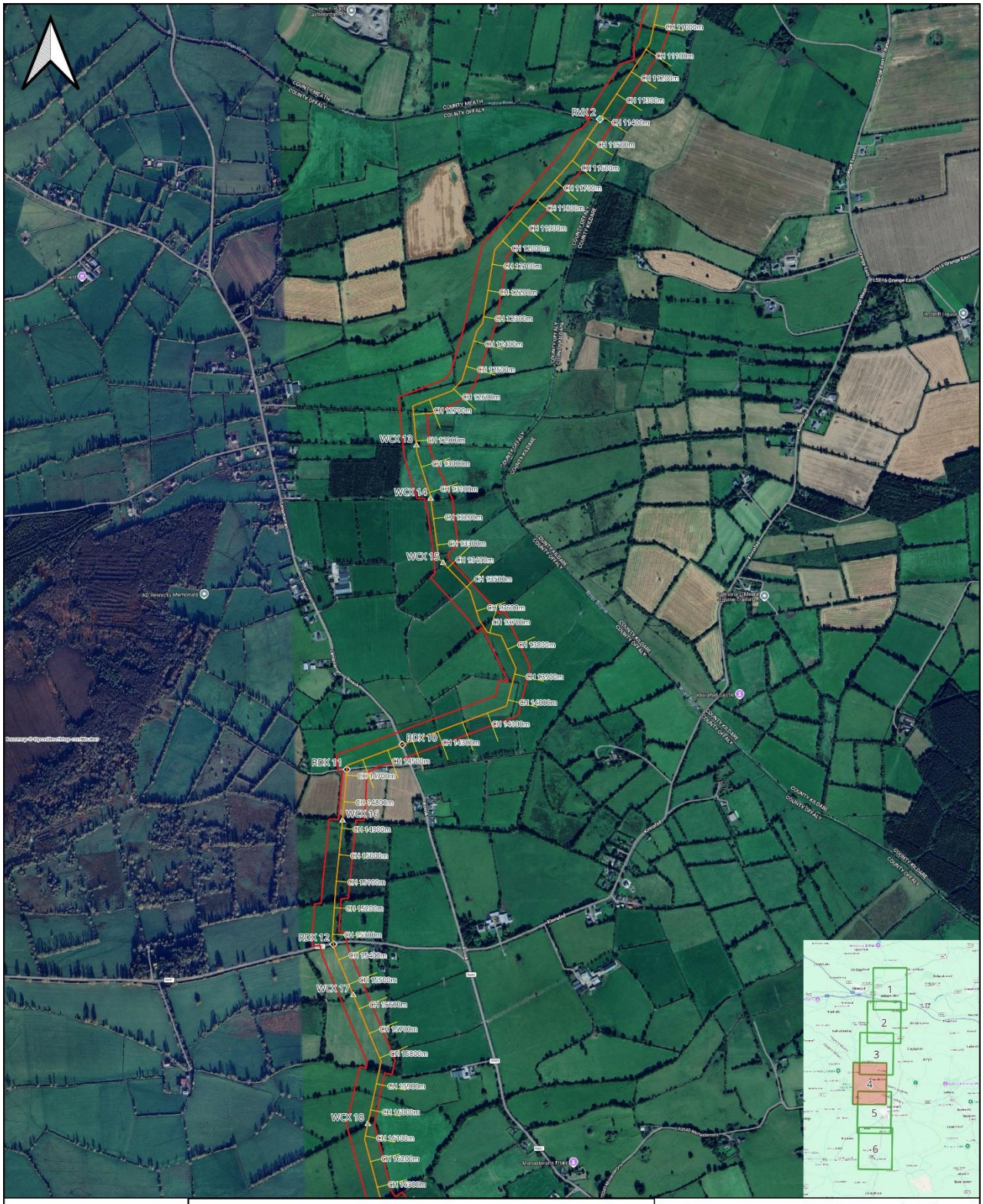


Figure 2-6 Site Location Plan (Sheet 5 of 6)

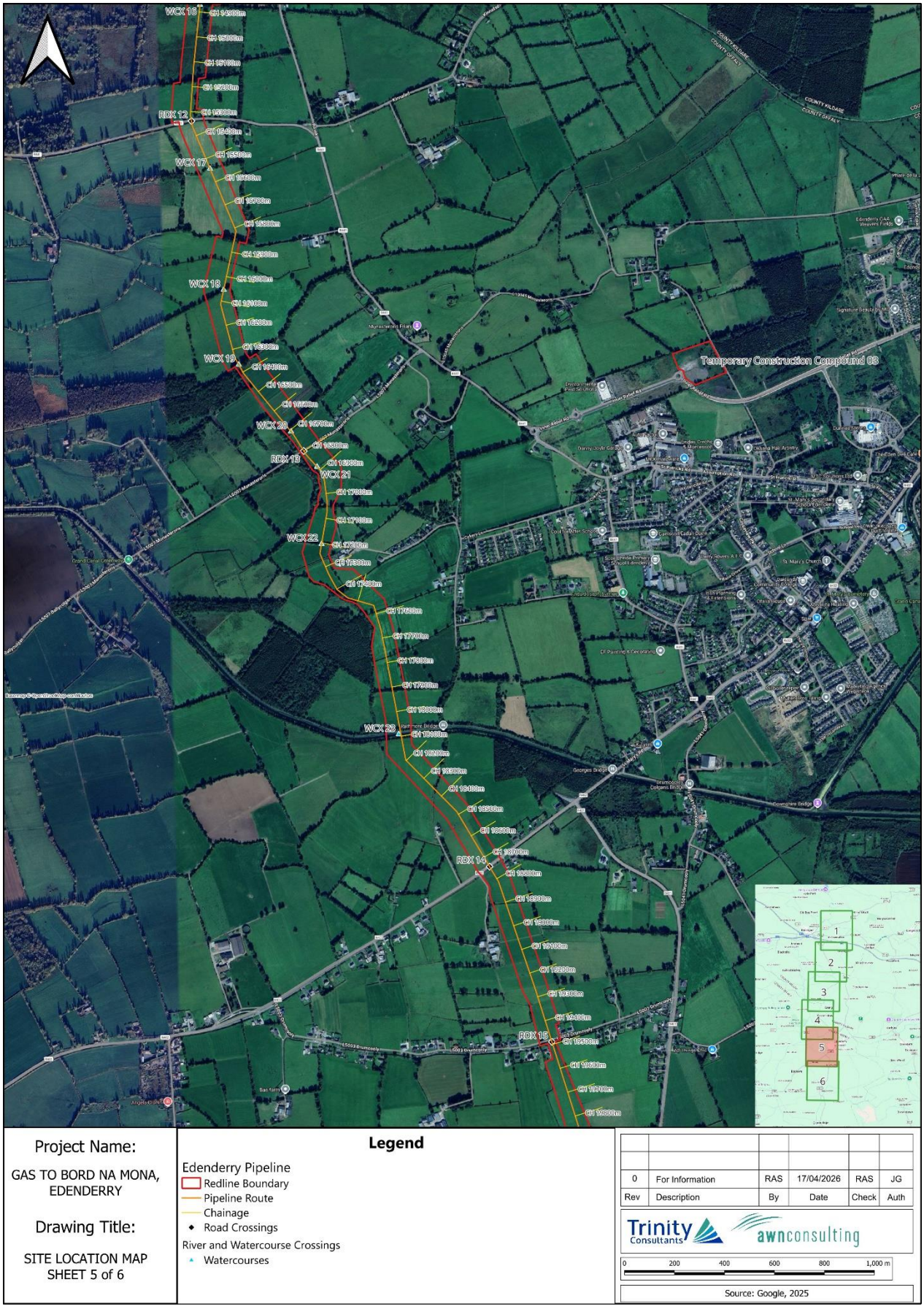
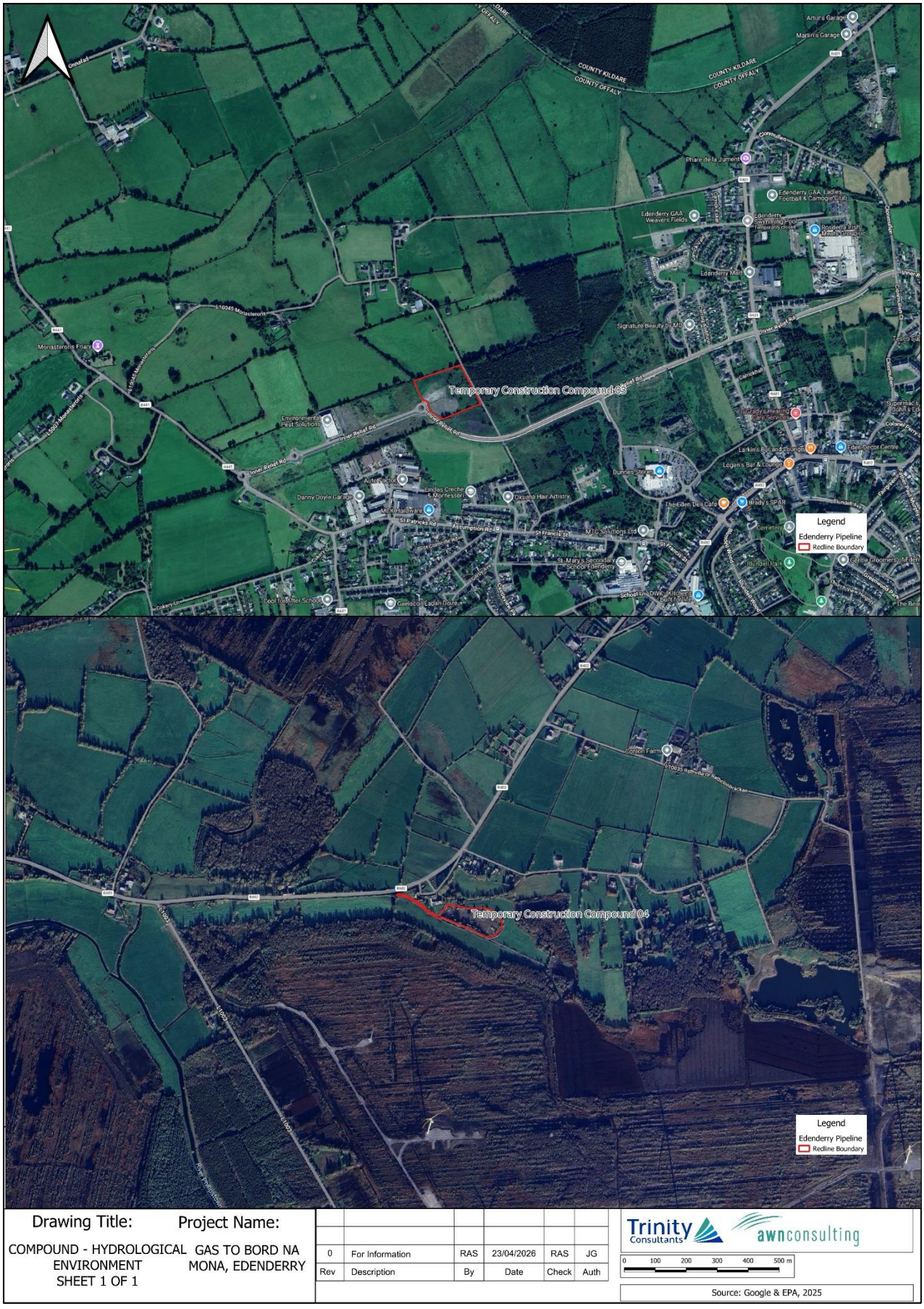


Figure 2-7 Site Location Plan (Sheet 6 of 6)

Figure 2-8 Site Location – Temporary Construction Compound 03 and 04



2.3.2 Proposed Kilwarden Offtake Installation

The proposed Kilwarden Offtake Installation forms the northernmost above-ground element of the GNI 143 Ballykilleen Pipeline and will accommodate the hot-tap tie-in to the existing 750 mm NB PTTW pipeline, enabling the new 300 mm NB transmission pipeline to be connected without interruption to the existing network. The installation will include a below-ground isolation valve located within an access pit, above-ground pipework and connection points for a temporary PIG (pipeline inspection gauging) trap to facilitate future inspection and maintenance of the GNI 143 Pipeline, and all associated mechanical and civil works required to support operation. No permanent power supply or utility supply is required (the installation operates as a "dead site"), the Installation incorporates all provisions for GNI access and pipeline maintenance activities.

The footprint of the installation will be enclosed by a 2.4 m high palisade security fence, with a 1.2 m stock-proof fence installed along the external boundary to maintain agricultural land separation.

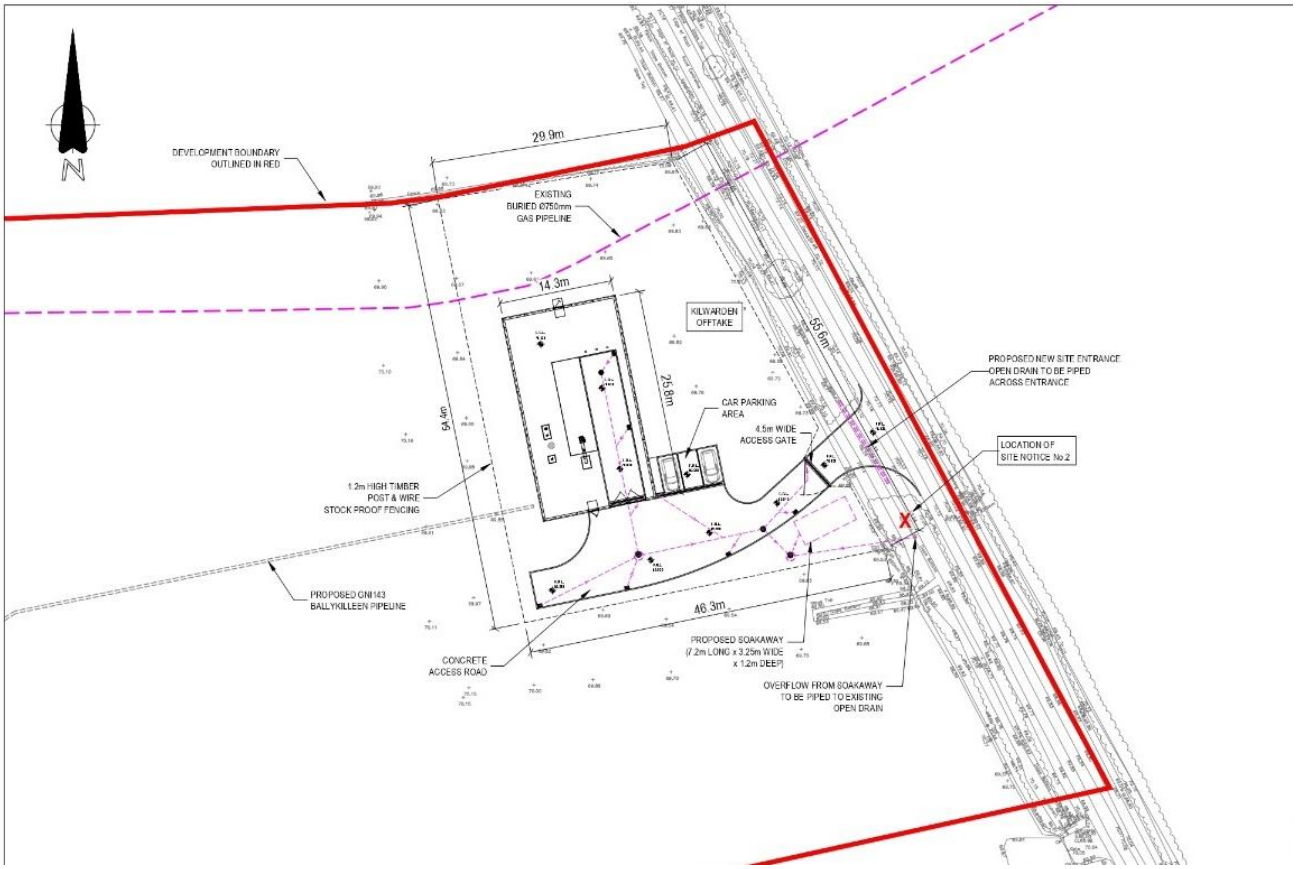
The Kilwarden Offtake Installation will be accessed by a dedicated permanent access road will be developed from the existing laneway off the R161, including localised widening, surface upgrades, and installation of a culvert over the existing drainage ditch along the laneway, all to accommodate construction vehicles and long-term GNI operational access. Three designated parking spaces will be provided adjacent to the entrance gates, with additional parking available within the compound when required for maintenance operations.

The Kilwarden Offtake Installation will include proposed landscaping were possible, aimed to first protect and conserve as much of the existing vegetation and complement this with native planting after construction works have been completed.

An onsite drainage system will allow for removal of surface water from areas of hardstand. A 7.2 m × 3.25 m × 1.6 m soakaway pit will be constructed in the southeastern corner of the compound to facilitate infiltration and manage surface water runoff, this soakaway overflows to an existing drainage ditch along the laneway used to access the site.

Temporary construction works are described further in Section 2.4. The proposed Ballykilleen AGI is shown in Insert 2-1 below.

Insert 2-1 Kilwarden Offtake Installation (extract DWG no. 14301-GNI-01-PL-SLA-0001)



2.3.3 Proposed Ballykilleen Above Ground Installation

The proposed Ballykilleen AGI forms the southernmost above-ground element of the GNI 143 Ballykilleen Pipeline and is the termination point of the GNI asset, enabling the regulation, metering and monitoring of natural gas prior to onward delivery to the Cushaling Peaker Plant.

The AGI will comprise a series of aboveground units and supporting infrastructure designed in accordance with Gas Networks Ireland (GNI) standards. Core components will include a Pressure Reduction System (PRS) kiosk containing gas filtering, metering and preheating equipment; a Packaged Boiler Unit (PBU) kiosk to maintain required gas temperatures; an Electrical and Instrumentation (E&I) kiosk; and a Gas Analyser kiosk for gas quality monitoring. The PBU includes 4 no. gas boilers (c. 0.13 MWth input each) with flues c. 5.670m above ground level, a 1 no. gas fired backup generator (c. 0.0375 MWth) , and solar panels at roof level. The Medium Combustion Plant Regulations do not apply to the proposed combustion plant, as each unit has a rated thermal input of less than 1 MWth.

Provision is also made for a temporary PIG (pipeline inspection gauging) trap to facilitate future pigging and inspection of the pipeline. All above-ground plant will be enclosed within a 2.4 m high palisade security fence with a 1.2 m weld-mesh inner boundary, ensuring controlled access, operational safety and security including associated lighting / CCTV columns (c. 8m).

The Ballykilleen AGI will be accessed via the existing entrance to the Edenderry Renewable Energy Complex entrance and internal roadway network. This ensures that all construction and operational traffic will utilise established industrial access routes designed to accommodate heavy vehicles. Three designated parking spaces will be provided adjacent to the AGI entrance gates for inspection and maintenance personnel.

The Ballykilleen AGI will include proposed landscaping were possible after construction works have been completed.

The proposed Ballykilleen AGI will include a concrete standing area, internal access routes, and a site drainage system connected to the existing Edenderry Renewable Energy Complex stormwater drainage network, in line with agreement between GNI and Bord na Móna. This system will drain stormwater through the existing stormwater drainage network and discharge to the Figile River.

ESB power connection is required to support operation of the associated kiosks, a gas fired backup generator is also provided.

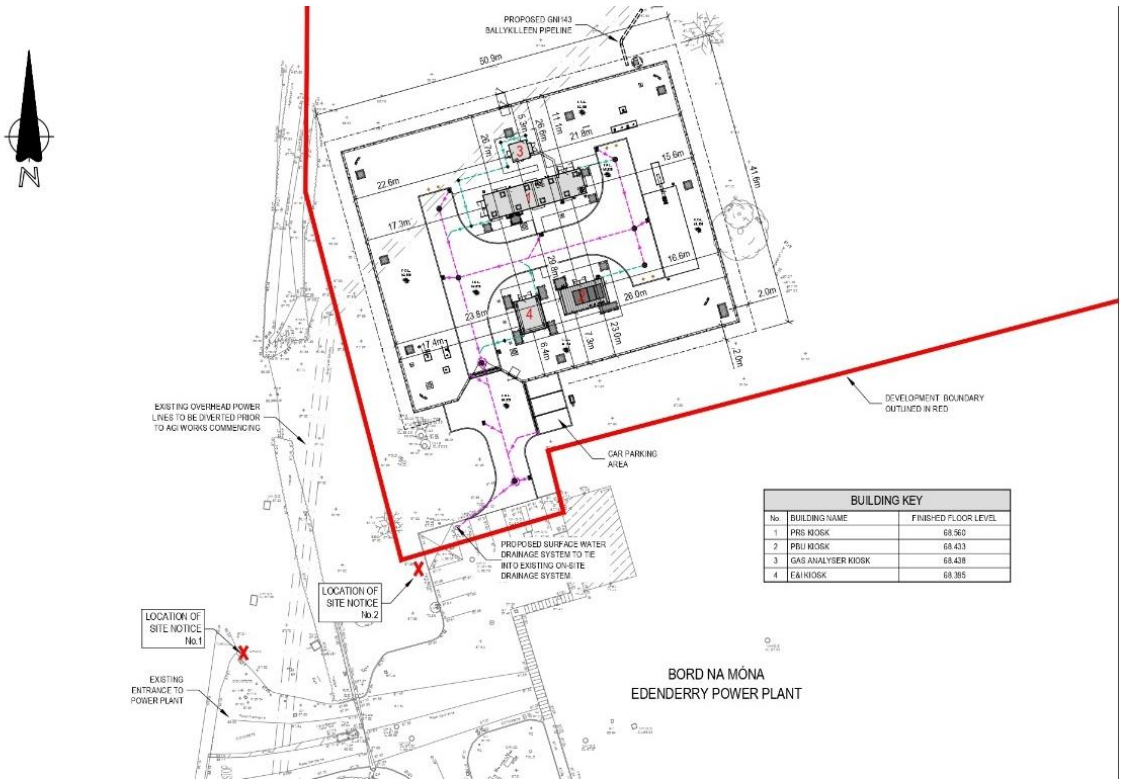
A 20 kV ESB Networks overhead line currently traverses the area required to accommodate the proposed Ballykilleen AGI. These powerlines form part of the public ESB medium-voltage distribution network. A diversion of this existing 20 kV overhead line will be required. As per ESB Networks procedures, engagement on diversion design, routing options, and associated constraints can only commence once planning permission for the Proposed Development has been obtained. Following the granting of planning permission, BnM will submit a formal diversion application to ESB Networks, who will assess feasible rerouting options. These may include:

- Removal of existing poles and installation of new overhead structures to divert the line around the AGI boundary; or
- Undergrounding the line along an ESB-approved route, subject to technical and land-use constraints.

The chosen solution will be determined by ESB Networks based on network requirements, safety clearances, and agreement with Bord na Móna. Any works associated with the diversion will be subject to ESB Networks' statutory powers and separate approval processes. The diversion does not form part of the AGI construction works but is required in advance of AGI development.

The proposed Ballykilleen AGI is shown in Insert 2-2 below.

Insert 2-2 Ballykilleen Above Ground Installation (extract DWG no. 1718-DG-PLG-2003)



2.3.4 Proposed Access, Roads and Parking

There will be no permanent access or trackway to the GNI 143 Ballykilleen Pipeline. Access to the Proposed Development during contraction will be provided via a combination of newly established construction entranceways and existing road infrastructure. Temporary access points and stoned haul routes will be developed along the pipeline alignment to facilitate safe movement of construction vehicles, plant, and personnel. Existing agricultural field gates will be used wherever possible, with widening or localised upgrading undertaken as required to accommodate machinery and delivery vehicles. Temporary laydown areas will be established at road crossings to provide parking, welfare facilities, and material storage. Temporary construction works are described further in Section 2.4.

Access to the Kilwarden Offtake Installation will be via an upgraded entrance off the private laneway from the R161. Three designated parking spaces will be provided adjacent to the compound entrance, with additional temporary parking available inside the compound during construction.

Access to the Ballykilleen AGI will be provided entirely via the existing Edenderry Renewable Energy Complex entrance and internal road network. Three designated operational parking spaces will be located at the AGI entrance gates, with internal space available for temporary construction parking and laydown activities.

2.3.5 Proposed Utilities Connections: Gas, Electricity, Potable Water, Foul Water and Telecommunications

The Proposed Development does not require extensive permanent utility connections, as the pipeline and associated compounds are designed to operate with minimal services. The proposed GNI 143 Ballykilleen Pipeline does not require an operational electrical supply, potable water supply, foul wastewater demand or telecommunications connection. There will be no stormwater management required during operation of the pipeline.

At the Kilwarden Offtake Installation, the facility will operate as a "dead site" and will not require electrical, potable water, foul water or telecommunications connections. The installation will incorporate a below-ground isolation valve and hot-tap pipework, together with a temporary pigging connection, none of which require permanent utility services. Surface water drainage will be managed on-site via a dedicated soakaway system to ground.

The drainage system serving the AGI will connect to the existing Edenderry Renewable Energy Complex drainage infrastructure, in line with agreement between GNI and Bord na Móna. This system will drain stormwater through the existing stormwater drainage network and discharge to the Figile River. No potable water or foul water connections are required, as the AGI will not be staffed and includes no welfare facilities. The proposed Ballykilleen AGI will require electrical and telecommunications connections (ESB and Eir). Engagement with the relevant utility providers for these operational connections will begin once planning permission has been granted. Existing utilities in the area are expected to be utilised to facilitate these connections.

The proposed underground transmission gas pipeline in itself does not consume gas but will connect to the existing gas transmission line BGE77 in order to transport gas to the Bord na Móna Cushaling Peaker Plant.

2.4 Description of Construction

This report section provides an outline description of the construction phase of the Proposed Development for the purposes of EIAR. All dimensions and descriptions in this Section 2.4 are approximations, except where they form part of the mitigation measures. Construction methodologies and materials will be implemented to ensure the pipeline is installed in accordance with Gas Networks Ireland (GNI) standards

and guidelines. Further detail the Gas to Bord na Móna, Edenderry Construction Methodology prepared by Fingleton White (2026) (Appendix 2.1), including sequencing of works and supporting diagrams.

In addition to the Construction Methodology, AWN Consulting have prepared the project outline Construction Environmental Management Plan (oCEMP), which provides the framework for the full CEMP to be developed by the contractor (Appendix 2.2). The CEMP will provide measures to avoid, minimise, or mitigate construction effects on the environment prior to site commencement and should be viewed as a live document, updated as required. The contractor will prepare specific method statements detailing site working requirements, including measures to manage environmental risks such as traffic management and work safety plans.

The Contractor and their appointed Site Manager will prepare project-specific Method Statements outlining the construction methodology in detail and incorporating all mitigation and control measures specified in the CEMP, consent and accompanying reports, and as required by any applicable consent conditions.

The proposed works will primarily involve the installation of long sections of underground pipeline, generally laid within open-cut trenches at a nominal minimum depth of 1.2 metres. Excavation, backfilling, and reinstatement requirements will vary depending on whether works are undertaken within greenfield areas or within public roadways.

The underground pipeline construction methods anticipated for the Proposed Development include:

- Open Cut – Greenfield Areas
- Open Cut - Service Crossings
- Open Cut - Watercourse Crossings
- Open Cut - Road Crossings
- Trenchless - River/Watercourse/Road Crossings

In addition to the main pipeline works, the construction phase will also include the installation of the Kilwarden Offtake and the Ballykilleen Above Ground Installation (AGI).

Temporary construction compounds will be established along the proposed pipeline corridor to facilitate construction activities. There are three distinct categories of temporary construction compounds which serve different purposes – these are Temporary Construction Compounds, Laydown Areas (Type A) and Laydown Areas (Type B), see Section 2.4.4.4 for further details. Temporary compounds associated with the construction of the GNI 143 Ballykilleen pipeline will be located at selected points along the route, as described further in Section 2.4.4.4.

2.4.1 Kilwarden Offtake Installation

The Kilwarden Offtake Installation involves construction of a hot-tap connection to the existing 750 NB BGE77 transmission pipeline within an agricultural field south of the R161. Summary of works is provided in

Table 2-10. Full Kilwarden Offtake Installation construction methodology is detailed in Appendix 2.1 including excavation approach, civil works, welding procedures, protection measures and reinstatement.

Hot Tapping allows a connection to an existing pipeline to be completed while the line is fully operational, ensuring no shutdown is required and that no gas is lost from the pipe. The valve arrangement detailed below will allow for safe welding of the new transmission gas pipeline to the existing gas pipeline by controlling gas flow during installation.

A Temporary Working Area will be established at the Kilwarden Offtake Installation to facilitate construction. See Section 2.4.4 below for further details on these temporary construction works.

Table 2-10 Kilwarden Offtake Installation Construction Works Summary

Construction Element	Summary of Works
Site Establishment	Establish Temporary Working Area with perimeter fencing, welfare facilities, car parking and laydown area. Strip topsoil to a depth of 300 mm. The topsoil shall be stored separately to the subsoil for future reinstatement. Topsoil will be kept free from disturbance for the duration of construction to reduce risk of physical damage and compaction. Upgraded entrance off the private laneway from the R161 works will be completed.
Excavation Works	A trench will required to expose existing 750 NB BGE77 pipeline (depth ~1.63 m). The depth of pit excavation to allow for pit base and welding space is c. 3.4 m deep c. 10m x 5m wide. To ensure excavation stability for the Kilwarden Offtake Installation, a battered excavation method will be used. In the event that a battered excavation is deemed unsuitable due to site constraints sheet piling may be considered as an alternative option to support the excavation for the hot tap, however this must be agreed with GNI prior to conducting works.
Civil Works	A temporary concrete working platform will be constructed to facilitate welding operations within the hot tap excavation. Upon completion of drilling and welding works, the concrete slab will be broken out from site. Concrete pipe supports will also be installed beneath the existing pipeline either side of the proposed hot tap tie in point to prevent overstressing the existing pipe. A concrete plinth will be constructed for the baseplate of the hot tap valve. Following the installation and backfilling of the hot tap and associated pipework, the site will be brought up to the agreed formation level. Concrete will be poured and levelled for the civil support base of the temporary pig trap and the concrete roadway within the site. Site drainage will also be installed. Install permanent fencing (2.4 m palisade + 1.2 m stock-proof fence). Construction of permant laneway access.
Mechanical works	All welded fittings shall be installed onto the pipeline in accordance with AD/SP/004 and supervised by a welding inspector. All high-pressure welds shall be subject to 100% non-destructive testing as per AD/SP/002 Clause 8.3. All above ground pipework shall be painted in accordance with AD/SP/009 while all below ground pipework shall be coated in accordance with AD/SP/008. Where a pipe is in contact with a mechanical jack or ring type support, the pipe will be coated in MCL (Refer to AD/SP/008), at 100 mm either side of the contact area.
Backfilling & Reinstatement	Backfill with approved CL503 material. Reinstate site to agreed formation levels. Restore topsoil and complete compound surfacing with stone chip. Landscaping undertaken where required.

2.4.2 Pipeline Construction

Construction methodologies to be implemented and materials to be used will ensure that the pipeline is installed in accordance with the guidelines and standards of GNI. See further detail presented in Appendix 2.1 to this EIAR Chapter including sequencing of works and diagrams.

The detailed construction methodologies referenced below are described in the following sections:

- Section 2.4.2.1 – Open-cut construction in greenfield areas and at service crossings;
- Sections 2.4.2.2, 2.4.2.3, and 2.4.2.4– Open-cut road and watercourse crossing methodologies; and
- Section 2.4.2.5 – Trenchless construction techniques for river, watercourse and road crossings.

General Construction Methodology

The proposed works primarily involve the installation of long sections of conventional pipeline, laid in open-cut trenches, with the pipeline installed at a minimum depth of cover of 1.2 metres, traversing multiple agricultural fields (greenfield lands). This approach will be used for the majority of the GNI 143 Ballykilleen Pipeline, which traverses predominantly agricultural greenfield lands.

This open-cut greenfield methodology represents the principal construction technique for the Proposed Development and is described further in Section 2.4.2.1 and Table 2-14.

Special Crossings – Anticipated Construction Methodologies

Where the pipeline intersects with roads, rivers and watercourses, construction techniques other than the standard open-cut greenfield approach are required. These locations are referred to as special crossings.

A limited number of crossings have been confirmed through design to require trenchless construction These crossings and the expected construction design and are described in detail in Section 2.4.2.5.

- Kilwarden River (RVX01);
- Yellow River (RVX02);
- M4 Motorway (RDX04); and
- Grand Canal (WCX23).

For all other special crossings, the anticipated construction methodology at EIAR stage has been identified based on the current design and available ground information. The proposed approach for each crossing is summarised in Tables 2-11 to 2-13, which together provide the single point of reference for crossing methodologies assessed within this EIAR:

- Table 2-11 summarises road crossings;2.4.2.4
- Table 2-12 summarises river crossings; and
- Table 2-13 summarises watercourse crossings.2.4.2.3

Except where trenchless construction is confirmed by design, the methodologies identified in these tables represent the anticipated approach only. The appointed contractor may, during detailed design and construction planning, elect to use trenchless techniques at certain locations where this is considered more appropriate having regard to site-specific ground conditions, constructability, health and safety considerations, or environmental sensitivities. In some cases, trenchless installation may be less intrusive than open-cut construction.

Where the final construction technique for a special crossing has not been confirmed, the relevant EIAR chapters assess potential environmental effects based on a precautionary reasonable worst-case scenario, generally representing the most intrusive construction method relative to that environmental factor. This ensures that any alternative methodology selected during construction would result in equal or lesser environmental impacts, and that the final construction approach will not give rise to effects beyond those assessed in this EIAR, in accordance with the requirements of the EIA Directive.

The Contractor and their appointed Site Manager will prepare a targeted Method Statement concisely outlining the construction methodology and incorporating all mitigation and control measures specified in the planning application and accompanying reports, and as required by planning conditions where relevant.

Table 2-11 GNI143 Ballykilleen Pipeline Road Crossing Methodology

Road Crossing Reference	Road No.	Pipeline Chainage (m)[a]	Approximate Crossing Span / Length (m)	Anticipated Crossing Methodology
RDX01	R161	850	16	Open Cut
RDX02	R148	2472	65	Trenchless[b]
RDX03	L80217	2505		Trenchless[b]
RDX04	M4	3000	350	Trenchless[c]
RDX05	L40181	3925	12	Open Cut
RDX06	L8022	5150	15	Open Cut
RDX07	R401	6485	24	Trenchless[b]
RDX08	L80241	7140	16	Open Cut
RDX09	L4091	7431	20	Open Cut
RDX10	L1004	14441	13	Open Cut
RDX11	Private Lane	14679	8	Open Cut
RDX12	R441	15338	19	Trenchless[b]
RDX13	L5007	16800	20	Open Cut
RDX14	R402	18743	26	Trenchless[b]
RDX15	L5003	19489	9	Open Cut
RDX16	Private Lane	22090	10	Open Cut
RDX17	R401	22757	120	Trenchless

a. Pipeline Chainage (m) indicates the approximate location of the crossing along the pipeline.
b. The crossing is currently anticipated to be undertaken using trenchless construction techniques. Refer to Section 2.4.2.1 for further detail.
c. The M4 (RDX04) crossing has been confirmed to be installed using trenchless construction methods. See Section 2.4.2.5.

Table 2-12 GNI143 Ballykilleen Pipeline River Crossing Methodology

RVX No.	River	Pipeline Chainage (m)	Approximate Crossing Span / Length (m)	Crossing Construction Technique
RVX01	Kilwarden River	1230	272	Trenchless[a]
RVX02	Yellow River	11414	509	Trenchless[a]

a. The Kilwarden River (RVX01) and Yellow River (RVX02) crossing has been confirmed to be installed using trenchless construction methods. See Section 2.4.2.5.

Table 2-13 GNI143 Ballykilleen Pipeline Watercourse Crossing Methodology

Water Crossing	Stream	Pipeline Chainage[a]	Approximate Crossing Span / Length (m)	Anticipated Crossing Technique
WCX01	Unmapped channel	1900	3	Open Cut
WCX02	Aghnagillagh Stream	3187	6	Trenchless[b]
WCX03	Unmapped channel	4893	3	Open Cut
WCX04	Knockerasally or Colehill River	6666	7	Open Cut
WCX05	Park River	7303	6	Open Cut
WCX06	Ballynakill Stream	7496	20	Open Cut
WCX07	Unmapped channel	8030	5	Open Cut
WCX08	Unmapped channel	8815	5	Open Cut
WCX09	Unmapped channel	9278	6	Open Cut

WCX10	Unmapped channel	9603	7	Open Cut
WCX11	Castlejordan River	10036	6	Open Cut
WCX12	Rahin Stream	10125	6	Open Cut
WCX13	Unmapped channel	12916	6	Open Cut
WCX14	Unmapped stream	13124	8	Open Cut
WCX15	Unmapped channel	13376	5	Open Cut
WCX16	Roosk River	14871	10	Open Cut
WCX17	Unmapped channel	15543	6	Open Cut
WCX18	Unmapped channel	16054	3	Open Cut
WCX19	Kinnafad River	16366	7	Open Cut
WCX20	Unmapped stream	16706	9	Open Cut
WCX21	Unmapped channel	16882	5	Open Cut
WCX22	Unmapped channel	17204	6	Open Cut
WCX23	Grand Canal	18090	192	Trenchless[c]
WCX24	Ballyleakin River	20522	4	Open Cut
WCX25	Unmapped channel	20679	6	Open Cut
WCX26	Unmapped channel	21034	5	Open Cut
WCX27	Unmapped channel	22459	5	Open Cut
WCX28	Unmapped channel	22617	5	Open Cut
WCX29	Ballykilleen Stream	22753	4	Trenchless[b]
WCX30	Ballykilleen Stream	23151	5	Open Cut

a. Pipeline Chainage (m) indicates the approximate location of the crossing along the pipeline.
b. The crossing is currently anticipated to be undertaken using trenchless construction techniques. Refer to Section 2.4.2.1 for further detail.
c. The Grand Canal (WCX23) crossing has been confirmed to be installed using trenchless construction methods. See Section 2.4.2.5.

2.4.2.1 Construction Methods Open Cut - Greenfield Areas

The GNI 143 Ballykilleen Pipeline shall be laid in agricultural lands (c. 22 km in total) using an open cut method as described in this section.

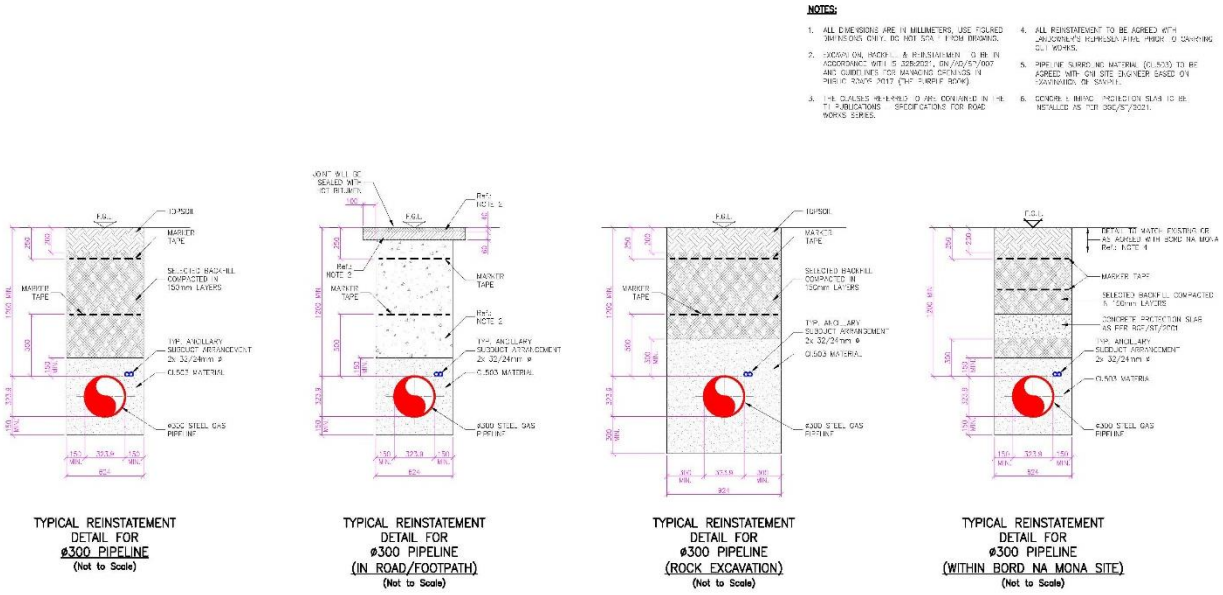
Table 2-14 presents a summary description of the construction method, see further construction detail presented in the Construction Methodology. Refer to the drawing GNI143-GNI-PL-MIS-0005 (Insert 2-4) for the typical cross section working within field, and typical reinstatement details in drawing GNI143-GNI-PL-RD-0001 (Insert 2-3).

Table 2-14 Open Cut Methodology in Greenfield Areas

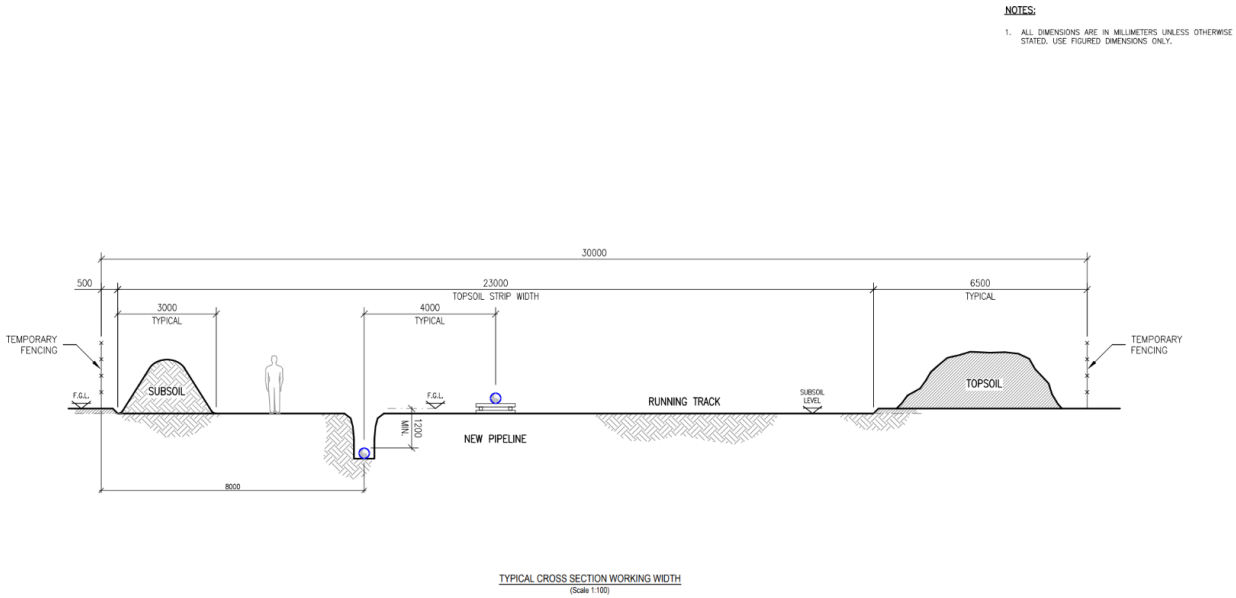
Construction Element	Summary of Works
Route Preparation and Working Width	Survey and peg out the pipeline route before construction commences. Install pre-construction field drainage if necessary to ensure existing drainage systems remain functional and good environmental management of construction run-off. Fence off a 30 m wide working area within agricultural land, in some areas additional width may be required in order to work around any environmental or engineering constraints. Remove hedges and trees within the working width as needed.
Topsoil Stripping	Strip topsoil to a depth of 300 mm. The topsoil shall be stored separately to the subsoil for future reinstatement. Topsoil will be kept free from disturbance for the duration of construction to reduce risk of physical damage and compaction.
Pipe Stringing	String out individual pipe lengths (standard 12 m or 18 m lengths) in preparation for welding.

	Cold bend pipes using specialist machines to accommodate minor changes in direction (e.g., changes in site contour). Prefabricated bends will be used for larger directional changes.
Pipe Welding	Weld the strung-out sections of pipe together above ground. Conduct non-destructive (x-ray) testing on all welds. Apply protective coating to welds and perform holiday testing, to detect discontinuities.
Trenching & Excavation	Excavate trenches to a depth of 1674 mm (to base of trench), ensuring a minimum cover of 1200 mm above the pipe. Where the trench requires excavation in rock, the depth of excavation will be 1824 mm. Subsoil will be stored on the opposite side of the trench to the topsoil to prevent mixing. Trench supports and close sheet piling may be used where necessary to aid construction. Dewatering of the pipe trench may be required along the pipeline route and will be carefully controlled to prevent sediment entering watercourses in accordance with the CEMP.
Pipe Lowering In and Backfilling	Ensure the trench is evenly bedded with pre-approved material (Cl. 503) to a depth of 150 mm (300 mm in rock). Lower the pipeline into the trench. Surround and cover the pipeline with pre-approved material (Cl. 503) to the top of the pipe. Install the 2no 32/24mm ancillary ducts at this level running parallel to the gas pipeline. The ducts must be positioned offset from the pipeline, i.e., not directly above the pipe. Backfill further with pre-approved material (Cl. 503) to a minimum 150mm above the top of pipe. Backfill the trench in 300 mm layers, incorporating warning tape and compacting the material. Install water stops in the trench as needed to prevent it from acting as a conduit for groundwater. Spread topsoil across the working width after backfilling.
Reinstatement	Regrade the working area to allow normal farming activities to resume. Install land drains as needed, ensuring they do not create contamination pathways or cause flooding. Replant grass seed and replace hedgerow sections that were removed, matching the original hedgerow where possible. Rebuild fences and walls to meet the landowner's specifications using materials that match the existing structures.

Insert 2-3 Typical Reinstatement Details (extract DWG no.: GNI143-GNI-PL-RD-0001)



Insert 2-4 Typical cross section working width (extract DWG no.: GNI143-GNI-PL-MIS-0005)



2.4.2.2 Construction Methods Open Cut - Service Crossing

Open cut excavation will be used where the Proposed Development crosses existing third-party services, including electricity, surface water sewers, foul sewers, potable water mains and telecommunications infrastructure. Known utility crossings and interactions along the pipeline route are identified in the utilities schedules presented in Table 2-15. These existing utilities are shown on DWG Ref.: GNI143-GNI-PL-SLA-0001-01 to GNI143-GNI-PL-SLA-0011-01.

Crossing of existing underground third-party services (electric, storm sewer, foul sewer, potable water, etc) will follow a typical service crossing, whereby the pipeline will be installed to avoid interaction with

the existing underground service. A minimum separation distance of 500mm will be maintained between the pipeline and the third-party service where required. A typical service crossing drawing provided is included in drawing GNI143-GNI-PL-MIS-0006-01 (Insert 2-5).

Where the Proposed Development passes beneath or in proximity to existing overhead third-party services, including overhead electricity and telecommunications lines, works will be undertaken to avoid direct interaction with the overhead infrastructure.

No disruption or disconnection of third-party services is anticipated as part of the works. All service crossings will be carried out in consultation with the relevant asset owners, and appropriate protection, monitoring and reinstatement measures will be implemented in accordance with statutory requirements and best practice.

Insert 2-5 Typical service crossing (extract DWG no.: GNI143-GNI-PL-MIS-0006-01)

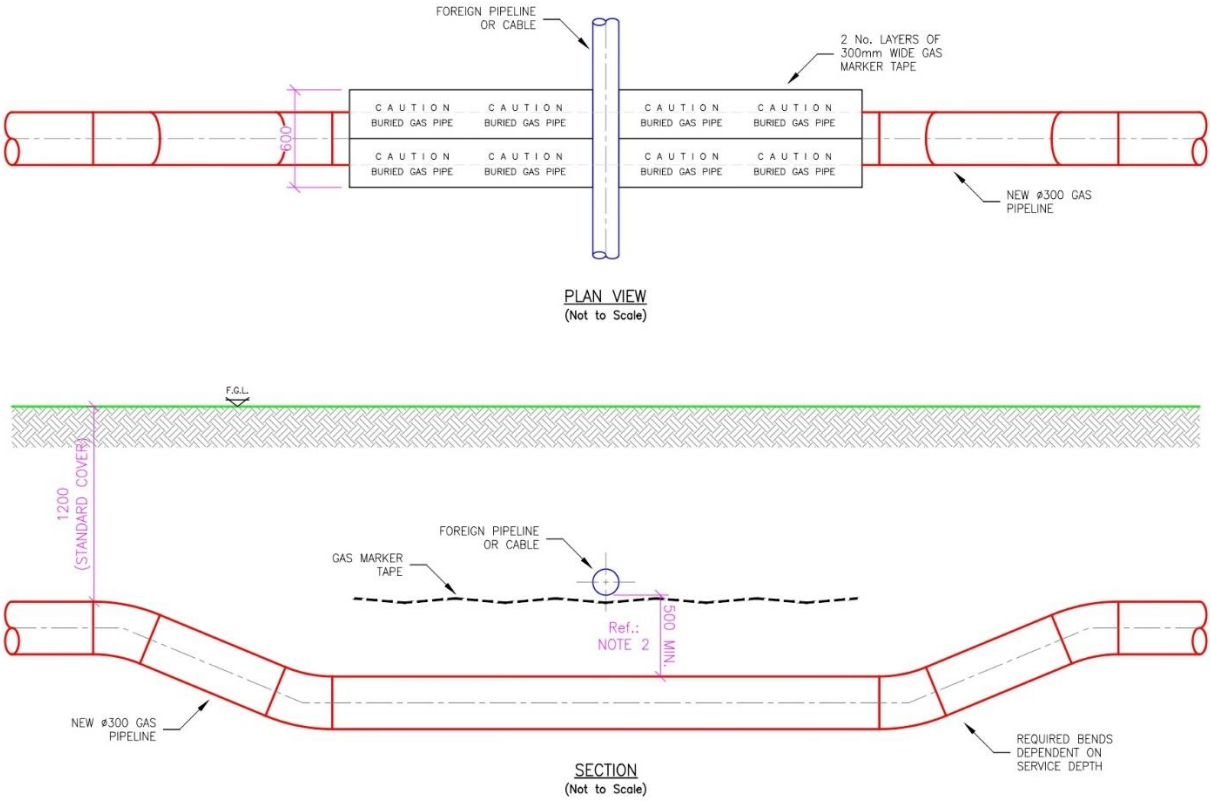


Table 2-15 Known Utility Crossing

Ref / Chainage / Feature	Utilities
Ch. 700–800	Overhead electricity
Ch. 842–858 – R161 Road Crossing (RDX01)	Overhead telecom
Ch. 1,500–1,600	Overhead electricity
Ch. 2,400–2,550 – RDX02 & RDX03	Overhead electricity; overhead telecom; underground telecom
Ch. 3,800–4,000	Overhead electricity ×2
Ch. 6,450–6,550 – RDX07	Overhead telecom; overhead electricity
Ch. 6,550–6,700	Overhead electricity ×3
Ch. 6,790–7,100	Pipeline runs parallel to overhead electricity
Ch. 7,421-7,441 – L4091 Road Crossing (RDX09)	Overhead telecom

Ch. 8,050–8,150	Overhead electricity
Ch. 13,750–13,800	Overhead electricity
Ch. 14,435–14,448 – L1004 (Roosk) Road Crossing (RDX10)	Watermain; overhead telecom; overhead electricity
Ch. 14,500–14,750	Overhead electricity ×2
Ch. 15,329–15,348 – R441 Road Crossing (RDX12)	Underground watermain; overhead telecom; underground telecom
Ch. 15,450–15,550	Overhead electricity
Ch. 15,900–16,000	Overhead electricity
Ch. 16,790–16,810 – L5007 (Monasteroris Road) Crossing (RDX13)	Underground watermain; overhead telecom
Ch. 18,730–18,756 – R402 Road Crossing (RDX14)	Overhead telecom
Ch. 18,800–18,900	Overhead electricity
Ch. 19,485–19,494 – L5003 (Drumcooly) Road Crossing (RDX15)	Overhead electricity
Ch. 21,050–22,800	Pipeline runs parallel to overhead electricity
Ch. 21,600–21,700	Overhead electricity
Ch. 22,695–22,815 – Unnamed Stream (WCX29) & R401 Road Crossing (RDX17)	Overhead telecom; overhead electricity
Ch. 22,750–22,850	Overhead electricity
Ch. 23,650 – Ballykilleen AGI	Overhead electricity

2.4.2.3 Construction Methods Open Cut - Watercourse Crossings

It is anticipated that the pipeline construction will have 27 no. open cut trenched crossings through watercourses as set out in Table 2-13. The pipeline will be installed under the stream bed with a minimum of 1600mm separation distance from the bed of the watercourse, and a precast concrete marker slab will be laid 300mm above the pipeline see GNI143-GNI-PL-MIS-0007-01 (Insert 2-6).

For the open-cut watercourse crossings, water will be temporarily diverted using a flume (pipe). The flume will temporarily direct water away from the trench area, preventing interference from construction activities and ensuring the safety of workers and the integrity of the watercourse. The flume (temporary culvert) is installed to allow for an uninterrupted running track for the duration of the construction works, and removed once reinstatement of the working area is completed.

Temporary crossings for construction vehicles will also be established, and no fording of rivers or watercourses will be permitted. Temporary bridge or culvert crossings will be installed at all river and watercourse crossings (with the exception of the Grand Canal (WCX23) and Yellow River (RVX02)) to facilitate construction access and maintain an uninterrupted construction route (see Section 2.4.4.2 for further details).

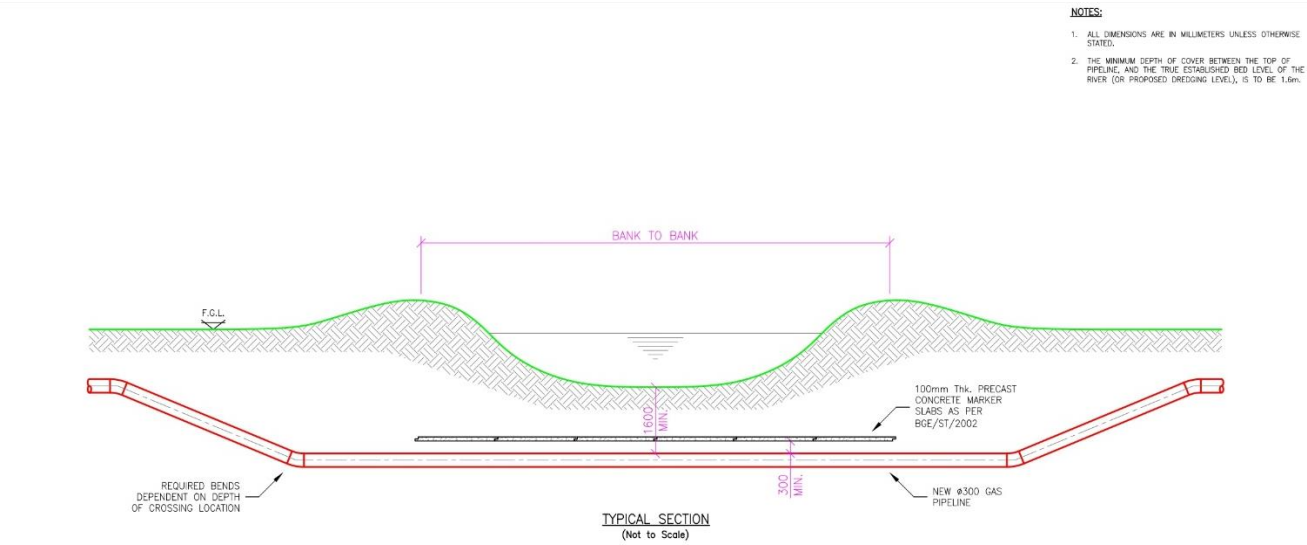
In addition to the activities set out in Section 2.4.2.1 the additional steps in Table 2-16 are required for construction are required for these water crossings.

Table 2-16 Open Cut Watercourse Crossing Methodology

Construction Element	Summary of Works
Route Preparation & Working Width	Establish a Method Statement in accordance with IFI Guidelines. Ensure relevant biosecurity measures are identified and in Method Statement, before works commence. Survey and record pre-condition with ecologist. Survey and peg out the pipeline route before construction commences. Fence off working width at the water course crossing. Remove minimum hedges and trees within the working width as needed. When the running track is no longer required, the temporary bridge crossing is removed.

Topsoil Stripping	The banks are then graded back to bed level. The topsoil shall be stored separately to the subsoil for future reinstatement. Topsoil will be kept free from disturbance for the duration of construction to reduce risk of physical damage and compaction.
Installation of Flume	Flume pipes sized to ensure they are capable of accommodation flood flow water volumes are inserted into the watercourse, ensuring they extend past the area of the proposed trench and running track. The flume pipes are surrounded with sandbags to create a seal. The waters being crossed shall be effectively dammed both upstream and downstream of the trench location so as to ensure that works are undertaken in the dry. Straw bales are placed downstream to capture sediments as required. The water course is then left uninterrupted until a few days (estimated 2-3 days) before the pipeline install time.
Excavation	The pipe trench is then excavated below the flume pipe. This excavated material is stored separately to the topsoil and subsoil and only this material will be used to backfill the watercourse trench. Trench supports and close sheet piling may be used where necessary to aid construction. Dewatering of the pipe trench may be required along the pipeline route and will be carefully controlled to prevent sediment entering watercourses in accordance with the CEMP.
Pipe Stringing	String out individual pipe lengths (standard 12 m or 18 m lengths) in preparation for welding. Cold bend pipes using specialist machines to accommodate minor changes in direction (e.g., changes in site contour). Prefabricated bends will be used for larger directional changes.
Pipe Welding & Trenching	Weld the strung-out sections of pipe together above ground. Conduct non-destructive (x-ray) testing on all welds. Apply protective coating to welds and perform holiday testing to detect discontinuities. A precast marker slab will be laid 300mm above the pipeline.
Pipe Insertion & Backfilling	Ensure the trench is evenly bedded with pre-approved material (Cl. 503) to a depth of 150 mm (300 mm in rocky areas). Lower the pipeline into the trench. Surround and cover the pipeline with pre-approved material (Cl. 503) to the top of the pipe. Install the 2no 32/24mm ancillary ducts at this level running parallel to the gas pipeline. The ducts must be positioned offset from the pipeline, i.e., not directly above the pipe. Backfill further with pre-approved material (Cl. 503) to a minimum 150mm above the top of pipe. Backfill the trench in 300 mm layers, incorporating warning tape and compacting the material. A precast marker slab will be laid 300mm above the pipeline. Install water stops in the trench as needed to prevent it from acting as a conduit for groundwater.
Reinstatement	The trench is backfilled such that it is level with the rest of the watercourse bed. The watercourse banks are then reformed to their original profile. The flume pipe is removed. Where appropriate the banks of the watercourse shall be reinstated with suitable native plants informed by pre-condition survey and fencing is erected as agreed with the landowner.

Insert 2-6 Typical open cut watercourse crossing (extract DWG no.: GNI143-GNI-PL-MIS-0007-01)



2.4.2.4 Construction Methods Open Cut - Road Crossings

It is anticipated that there will be 11 no. open cut road crossings, however the number of road crossings to be open cut shall be confirmed prior to construction. The pipeline will be installed under the road bed with a minimum of 1600mm separation distance from the road bed, and any adjacent roadside ditches that may exist, a precast concrete marker slab will be laid 300mm above the pipeline. See GNI143-GNI-PL-RD-0001 (Insert 2-3) for reinstatement details, and GNI143-GNI-PL-MIS-0008-01 (Insert 2-7) for typical crossing details.

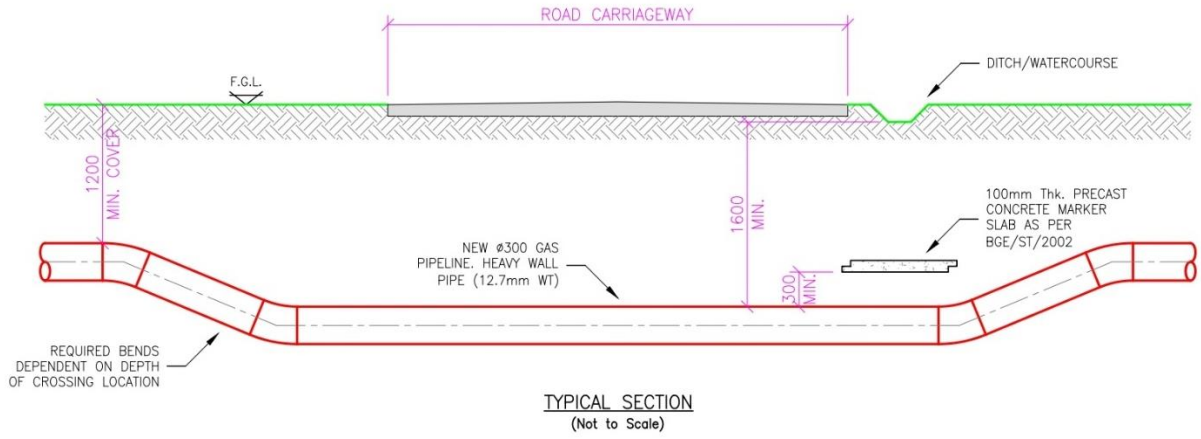
It is envisaged that the L40181 (RDX05), L8022 (RDX06), L80241 (RDX08), L4091 (RDX09), L1004 (RDX10) and L5007 (RDX13) road crossings can be closed, and diversions put in place to allow for the works to be undertaken. For roads where a full road closure is not permissible, one half of the road will be closed for construction and the other side of the road will be open to traffic using a stop-go traffic light system. Where a full road crossing is not possible, the road crossing will be done in two parts and will be complete in line with the method outlined in the Construction Methodology (Appendix 2.1)

Table 2-17 Open Cut Methodology for Road Crossings

Construction Element	Summary of Works
Route Preparation and Working Width	Survey and peg out the pipeline route before construction commences identifying and marking all existing underground services, installing warning posts for overhead cables, and indicating temporary crossing points. Install pre-construction field drainage if necessary to ensure existing drainage systems remain functional and good environmental management of construction run-off. Fence off a 40 m x 45 m wide working width either end of the road crossing. Remove hedges and trees within the working width as needed.
Topsoil Stripping	Adjacent to the road, topsoil will be cleared to a typical depth of 300 mm and stored separately from the subsoil for future reinstatement. Topsoil will be kept free from disturbance for the duration of construction to reduce risk of physical damage and compaction.

Trenching & Excavation	Excavate trenches to a depth of 1674 mm (to base of trench), ensuring a minimum cover of 1200 mm above the pipe. Where the trench requires excavation in rock, the depth of excavation will be 1824 mm. Subsoil will be stored on the opposite side of the trench to the topsoil to prevent mixing. Trench supports and close sheet piling may be used where necessary to aid construction. Dewatering of the pipe trench may be required along the pipeline route and will be carefully controlled to prevent sediment entering watercourses in accordance with the CEMP.
Pipe Stringing	String out individual pipe lengths (standard 12 m or 18 m lengths) in preparation for welding. Cold bend pipes using specialist machines to accommodate minor changes in direction (e.g., changes in site contour). Prefabricated bends will be used for larger directional changes.
Pipe Welding	Weld the strung-out sections of pipe together above ground. Conduct non-destructive (x-ray) testing on all welds. Apply protective coating to welds and perform holiday testing, to detect discontinuities.
Pipe Lowering In and Backfilling	Ensure the trench is evenly bedded with pre-approved material (Cl. 503) in accordance with IS 328:2021, GNI/AO/SP/007, Guidelines for Managing Openings in Public Roads 2017 (The Purple Book) and compact. Lower the pipeline into the trench. Surround and cover the pipeline with pre-approved material (Cl. 503) in accordance with IS 328:2021, GNI/AO/SP/007, Guidelines for Managing Openings in Public Roads 2017 (The Purple Book). Place gas pipeline marker tape on compacted CL.503 and subsoil, 500 mm from the top of the pipe and 250 mm from the surface.
Reinstatement	Rebuild fences and walls to meet the landowner's specifications using materials that match the existing structures. Concrete and asphalt/bitmac road crossings will have immediate permanent reinstatement in accordance with design drawings, IS 328:2021, GNI/AD/SP 007, Guidelines for Managing Openings in Public Roads 2017 (The Purple Book) and to the approval of the local authority and/or private landowners, unless otherwise agreed with local authorities.

Insert 2-7 Typical open cut road crossing (extract DWG no.: GNI143-GNI-PL-MIS-0008)



2.4.2.5 Construction Methods Trenchless - River / Watercourse / Road Crossings

Trenchless construction techniques will be employed where required to facilitate the installation of the pipeline beneath rivers, watercourses and roads without surface excavation.

Trenchless construction is confirmed by design at the following locations primary trenchless crossings provided in Table 2-20:

- Kilwarden River (RVX01);
- Yellow River (RVX02);
- M4 Motorway (RDX04); and
- Grand Canal (WCX23).

In addition, trenchless construction techniques may be employed at road and watercourse crossings where considered appropriate by the appointed contractor, having regard to site-specific ground conditions, construction constraints and environmental considerations. It is currently anticipated that trenchless construction techniques may also be used at:

- R148 Road Crossing (RDX02) and L80217 Road Crossing (RDX03) (application drawing GNI143-GNI-PL-CRD-0002-01),
- R401 Road Crossing (RDX07) (GNI143-GNI-PL-CRD-0006-01),
- R441 Road Crossing (RDX12) (GNI143-GNI-PL-CRD-0011-01),
- R402 Road Crossing (RDX14) (GNI143-GNI-PL-CRD-0013-01),
- Unnamed Stream (WCX29) and R401 Road Crossing (RDX17) (GNI143-GNI-PL-CRD-0016-01).

Temporary crossings for construction vehicles will also be established and no fording of rivers or watercourses will be permitted. Temporary bridge or culvert crossings will be installed at all river and watercourse crossings (with the exception of the Grand Canal (WCX23) and Yellow River (RVX02)) to facilitate construction access and maintain an uninterrupted construction route (see Section 2.4.4).

2.4.2.5.1 Minimum Design and Environmental Criteria

Where trenchless construction techniques are employed, the selected method will, as a minimum, comply with the following design and environmental criteria:

Watercourse Crossings

- A minimum vertical clearance of 1.6 metres shall be maintained between the true riverbed and the trenchless crossing.
- All ancillary works at ground level (including launch and reception pits, compounds and temporary works areas) shall be located a minimum of 10 metres from the watercourse.

Road Crossings

- A minimum vertical clearance of 1.2 metres shall be maintained between the bottom of the road formation and the trenchless crossing.

The general construction methodology for trenchless crossings is outlined in Table 2-18 (Horizontal Directional Drilling) and Table 2-19 (Auger Boring). These methodologies will be followed for any trenchless crossing of a road or watercourse where this technique is selected.

2.4.2.5.2 Trenchless Construction Techniques

Based on the current pipeline alignment and ground investigation (GI) data, Horizontal Directional Drilling (HDD) has been proposed as the optimum method at each of the primary crossing locations. This is the current proposed construction methodology however may be subject to change. The appointed contractor may choose an alternative trenchless technique if deemed more appropriate based on site-specific conditions.

2.4.2.5.3 Primary Trenchless Crossings

The primary trenchless crossings confirmed by design are summarised in Table 2-20 below. Indicative design details and cross-sections for these crossings are provided in Inserts 2-8 to 2-11 and the associated application drawings.

Table 2-20 below outlines minimum construction criteria for any trenchless technique that is selected. The exact crossing methodology is subject to detailed design by the contractor. The main trenchless methods are:

- Horizontal Directional Drilling (HDD) – summarised in Table 2-18
- Auger boring (Un-guided Auger Boring or Guided Auger Boring) – summarised in Table 2-19

The final trenchless method at each location will be confirmed during the detailed design stage; however, Horizontal Directional Drilling (HDD) is currently the preferred approach due to the depth, span, and ground conditions identified along the route.

Table 2-18 Trenchless Methodology for River/Watercourse / Road (Horizontal Directional Drilling)

Construction Element	Summary of Works
HDD Launch	The HDD works will be undertaken from on one side of the river, watercourse or road, with a corresponding reception pit formed on the opposite side. The HDD launch compound will require c. 1,500–2,000 m². The compound will accommodate temporary storage of stripped topsoil, the HDD drilling rig, welfare facilities, drilling fluid mixing tanks, fluid return and settlement tanks, drill rod storage, cabins and associated hydraulic power packs. A temporary water supply will be required for the preparation of bentonite-based drilling fluids. Surface runoff within the compound will be controlled and managed as required.

Pilot Hole Drilling	A pilot hole will be drilled along a pre-determined profile beneath the obstacle using the surface-launched drilling rig. drilling fluid will be pumped to the cutting head to fluidise the ground, cool the drill bit and act as a lubricating agent. Drill cuttings suspended in the drill fluid will be transferred through the HDD bore annulus back to the HDD entry pit where they will be collected before being transferred into the recycling unit.
Enlarging the bore	Once the pilot hole is complete the bore is enlarged in stages using reamers in soft ground or hole openers in hard ground to a diameter approximately 40% greater than the diameter of the pipeline to be installed.
Inserting Pipeline	When the bore has been enlarged to the required diameter the product pipeline is pulled through using the drilling rig. A stringing site equivalent to the length of the HDD crossing is required to fabricate the product pipeline in a single length allowing the installation operation to be completed without interruption.

Table 2-19 Trenchless Methodology for River/Watercourse / Road (Auger Boring)

Construction Element	Summary of Works
Launch and Reception Pits	The auger boring works will be undertaken from a launch pit located on one side of the river, watercourse or road, with a corresponding reception pit formed on the opposite side. The pits will be sized to safely accommodate the auger boring rig, jacking frame and installation of the product pipe. Excavated materials will be temporarily stored adjacent to the pits for segregation prior to reuse or off-site disposal, as required. Pit excavation will be undertaken to competent ground level and any groundwater ingress managed where encountered.
Auger Boring Set-Up	The auger boring rig will be positioned within the launch pit and aligned to the predetermined bore line and level to ensure the crossing passes beneath the river, watercourse or road at the required depth. The works will be undertaken as a controlled, operation to maintain line and level throughout the bore. The reception pit will be monitored to confirm breakthrough location and alignment.
Bore Excavation	Guided auger boring involves 'steering' a small diameter pilot bore along the pre-designed profile between two excavations before enlarging the bore to the required diameter in stages using auger screws located inside the casing pipe. Unguided auger boring involves driving a casing pipe into the ground with an auger screw installed inside; a cutting head suitable for the ground being bored is located at the front of the lead auger.
Pipe Jacking and Installation	As the bore advances, the product pipe (typically steel or concrete) will be incrementally jacked into position behind the auger using the jacking frame. Pipe sections will be installed sequentially until the pipe reaches the reception pit. Once installation is complete, the auger will be withdrawn and the pipe inspected prior to final connection works.
Completion and Pit Backfilling	Following completion of the crossing, the launch and reception pits will be backfilled with suitable material and compacted in layers. Temporary works will be removed and ground surfaces reinstated to their original condition or as required by landowner agreements. Where applicable, topsoil will be replaced and disturbed areas seeded or landscaped.

2.4.2.5.4 Primary Trenchless Crossings

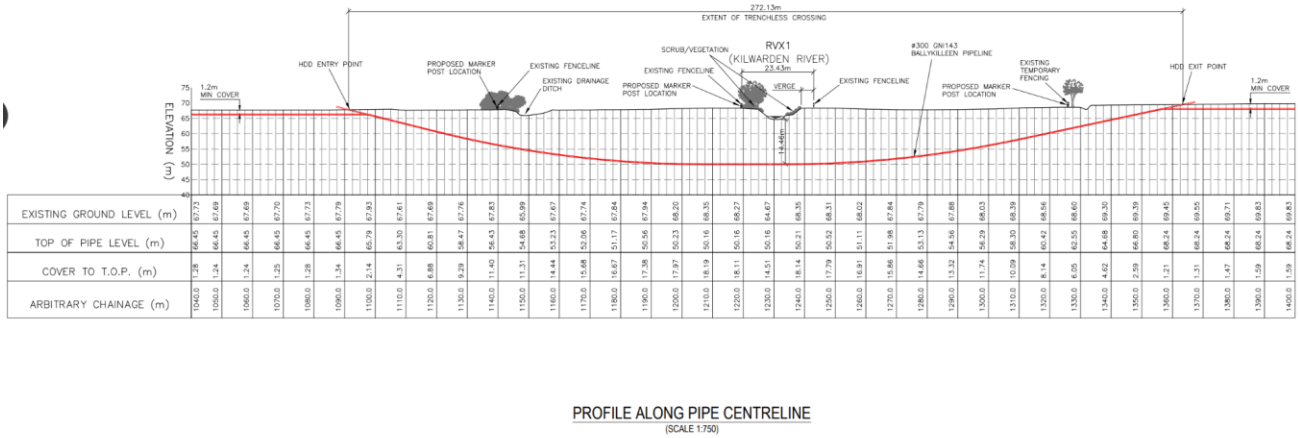
The primary trenchless crossings confirmed by design are summarised in Table 2-20 below. Indicative design details and cross-sections for these crossings are provided in Inserts 2-8 to 2-11 and the associated application drawings.

Table 2-20 Summary of Primary Trenchless Crossings (Preliminary Design)

Crossing	Description
Kilwarden River Crossing (RVX01)	The HDD at RVX01 involves drilling an 18" (Approx.) diameter bore below the watercourse and land drain on the north side of the watercourse and installing the 12" pipeline inside the completed bore. The drill maintains a depth of at least 8.18m below the bed of the river. This allows for additional coverage to ensure a minimum of 1.6 m cover beneath the true riverbed level, in accordance with I.S. 328. The pipe string for the HDD crossing can be fabricated within the current pipeline working width on the south side of the crossing. Some curvature of the pipe string will be required in order to follow the working width alignment. The indicative planning design provides for an HDD crossing length of approximately 271.13 m (c. 272 m), gas transmission pipeline installed entirely underground. The HDD reaches a maximum depth of approximately 50 mOD below ground, corresponding to a depth of approximately 14.46 m beneath the bed of the Kilwarden River (RVX01) at its deepest point. See Insert 2-8 and application drawing GNI143-GNI-PL-CRI-0001
M4 Motorway Crossing (RVX01)	The HDD at RDX04 involves drilling an 18" (Approx.) diameter bore below the carriageway and installing the 12" pipeline inside the completed bore. The drill maintains a depth of at least 9.44m below the carriageway. This allows for additional coverage to ensure a minimum of 1.2 m cover beneath the road is maintained. The pipe string for the HDD crossing can be fabricated within the current pipeline working width on the south side of the crossing. It is expected that this trenchless crossing would also accommodate the crossing of the Aghnahillagh Stream crossing (WCX02). The indicative planning design provides for an HDD crossing length of approximately 349.65 m (c. 350 m), gas transmission pipeline installed entirely underground. The HDD reaches a maximum depth of approximately 50 m mOD below ground, corresponding to a depth of approximately 20 m beneath the existing M4 Motorway (RVX01) at its deepest point, and 6.85m below the Aghnagillagh Stream (WCX02). See Insert 2-9 and application drawing GNI143-GNI-PL-CRD-0003
Yellow River Crossing (RVX02)	The HDD at RVX02 involves drilling an 18" (Approx.) diameter bore below the watercourse and installing the 12" pipeline inside the completed bore. This is the longest of the proposed HDD designs with a span of 458m. The drill maintains a depth of at least 8.53m below the bed of the river. This allows for additional coverage to ensure a minimum of 1.6 m cover beneath the true riverbed level, in accordance with I.S. 328. The pipe string for the HDD crossing can be fabricated within the current pipeline working width on the south side of the crossing. The indicative planning design provides for an HDD crossing length of approximately 508.7 m (c. 508 m), gas transmission pipeline installed entirely underground. The HDD reaches a maximum depth of approximately 40 m mOD below ground, corresponding to a depth of approximately 21.73 m beneath the Yellow River (RDX02) at its deepest point. See Insert 2-10 and application drawing GNI143-GNI-PL-CRI-0002.
Grand Canal Crossing (WCX23)	The HDD at WCX23 involves drilling an 18" (Approx.) diameter bore below the watercourse and installing the 12" pipeline inside the completed bore. This is the shortest of the HDD designs with a span of 192m. The drill maintains a depth of at least 9.22m below the bed of the canal. This allows for additional coverage to ensure a minimum of 1.6 m cover beneath the true riverbed level, in accordance with I.S. 328.

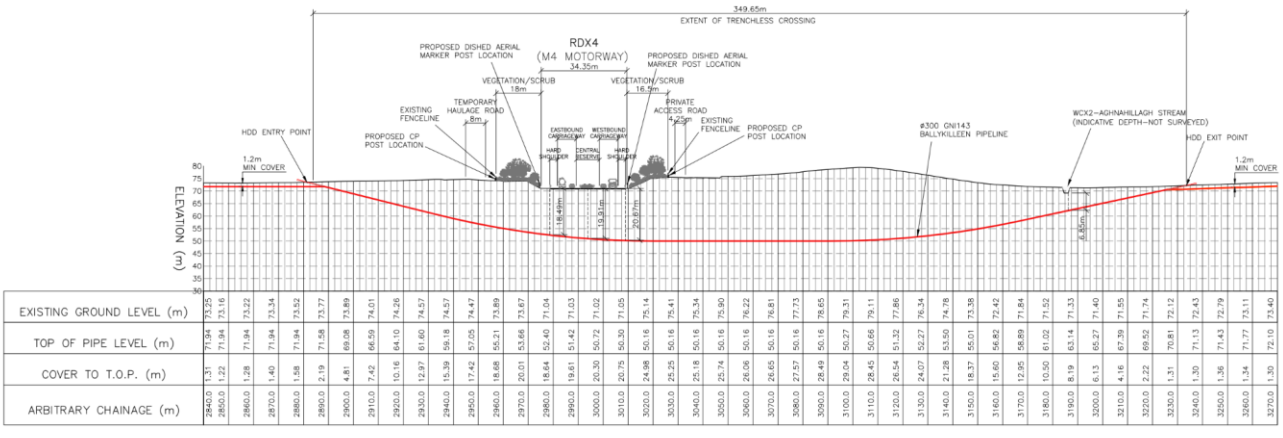
	The pipe string for the HDD crossing can be fabricated within the current pipeline working width on the north side of the crossing. The indicative planning design provides for an HDD crossing length of approximately 191.59 m (c. 192 m), gas transmission pipeline installed entirely underground. The HDD reaches a maximum depth of approximately 66 m mOD below ground, corresponding to a depth of approximately 9.2m beneath the Grand Canal (WCX23) at its deepest point. See Insert 2-11 and application drawing GNI143-GNI-PL-CWC-0001.

Insert 2-8 Cross Section of HDD Crossing at the Kilwarden River (RVX01) (extract DWG no.: GNI143-GNI-PL-CRI-0001)

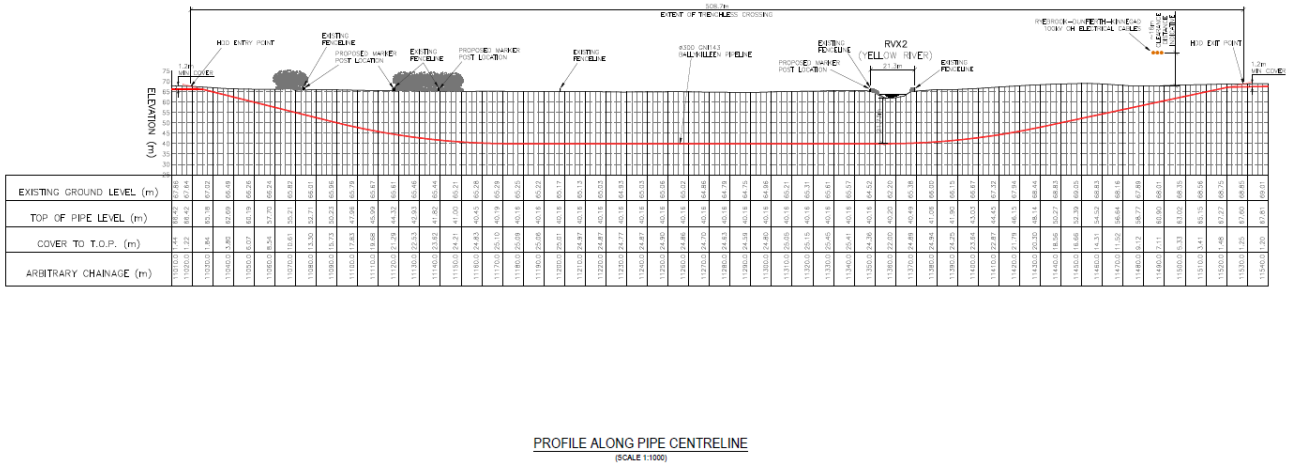


PROFILE ALONG PIPE CENTRELINE
(SCALE 1:750)

Insert 2-9 Cross Section of HDD Crossing at the M4 Motorway (RDX04) (extract DWG no.: GNI143-GNI-PL-CRD-0003)

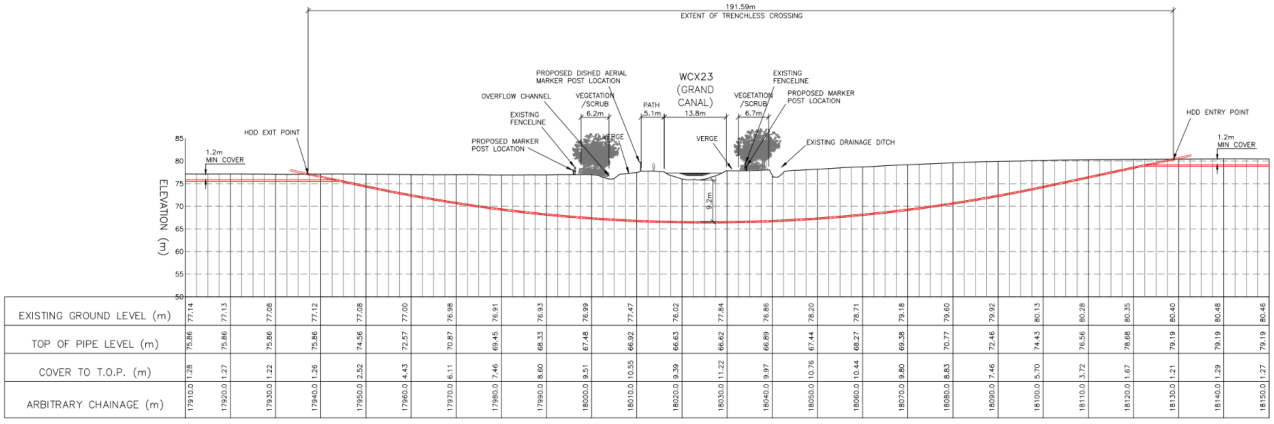


Insert 2-10 Cross Section of HDD Crossing at the Yellow River (RVX02) extract DWG no.: GNI143-GNI-PL-CRI-0002)



PROFILE ALONG PIPE CENTRELINE
(SCALE 1:1000)

Insert 2-11 Cross Section of HDD Crossing at the Grand Canal (WCX23) (extract DWG no.: GNI143-GNI-PL-CWC-0001)



PROFILE ALONG PIPE CENTRELINE
(SCALE 1:500)

2.4.3 Ballykilleen Above Ground Installation

The Ballykilleen AGI will be constructed within the Edenderry Renewable Energy Complex, an established industrial setting that already accommodates energy-related infrastructure. Summary of works is provided in Table 2-21. Full Ballykilleen AGI construction methodology is detailed in Appendix 2.1.

Construction activities involve the development of a secure compound, installation of below-ground and above-ground gas infrastructure, and provision of all supporting civil, mechanical and electrical systems required for the safe operation of the installation.

Table 2-21 Ballykilleen AGI Construction Works Summary

Construction Element	Summary of Works
Site Establishment	Establish temporary construction compound within the Edenderry Renewable Energy Complex. Set up site offices, welfare facilities, parking and plant storage. Strip and store topsoil separately for reinstatement. Excavation of unsuitable peat and wet soils identified during site investigation. Replacement with suitable granular fill (e.g., 6F2 or T1) and installation of geotextile membrane to provide stable bearing capacity Formation of site to required levels.
Below-Ground Installation	Excavation of pipe trenches for inlet, outlet, fuel gas, pipework and electrical/communications ducting. Installation of all below-ground pipework and ducting, including protective coatings. Backfilling and compaction using approved materials. Completion of welding for high-pressure and low-pressure pipework. 100% non-destructive testing of high-pressure welds. plication of protective coatings and painting in accordance with GNI specifications.
Above-Ground Installation	Construction of foundations for AGI components (PRS kiosk, PBU kiosk, E&I kiosk, Gas Analyser kiosk, temporary pig trap). Installation of internal concrete roadway, footpaths, and parking areas. Installation of site drainage system, connecting to existing stormwater infrastructure within the Renewable Energy Complex. Erection of security fencing (2.4 m palisade + 1.2 m mesh). Delivery and placement of prefabricated kiosks (PRS, PBU, E&I, Gas Analyser). Installation of mechanical pipework between all units. Installation of lighting and CCTV columns (~8 m height) and all associated cabling.
Reinstatement	Placement of stone chip surface across the compound. Landscaping and final finishing within the site boundary. Removal of temporary works and reinstatement of any disturbed ground.

2.4.4 Temporary Construction Works

2.4.4.1 Temporary Construction - Haul Road / Running Track

A temporary haul road or 'running track' will be established along the entire pipeline route within greenfield lands to allow safe movement of machinery, pipe, and personnel along the pipeline route. GNI143-GNI-PL-MIS-0005 (Insert 2-4) provides a typical cross section of this haul road / running track alongside the pipeline construction works. Construction personnel will access the pipeline haul road or 'working spread' at each of the designated road crossings. For the majority of the pipeline route there will be a seamless haul road established withing the Proposed Development site to facilitate construction of the pipeline and transportation of personnel and materials along the route. The construction working spread along the pipeline will be interrupted at certain locations requiring construction traffic diversions on private and public road network, including:

- M4 crossing (RDX04): To access the work area located on the opposite side of the M4 crossing (RDX04), construction personnel must use the private agricultural access roads running parallel to the M4, and existing M4 overbridge.
- Yellow River (RVX02): Access to the northern section of RVX02 will be provided via RDX09, while the southern section will be accessed via RDX10.
- Grand Canal (WCX23):Access to the northern section of WCX23 will be provided via RDX13, while the southern section will be accessed via RDX14.

The running track and temporary haulage road will:

- Be c. 8m wide and formed using compacted stone placed over geotextile membrane where ground conditions require additional support;
- Ensure all-weather access for construction vehicles;
- Be located fully within the designated working width to avoid unnecessary land disturbance;
- Include bog mats in soft ground areas or flood zones (e.g., at the Yellow River floodplain) to prevent rutting and protect topsoil.

The running track is temporary works and will be fully removed following pipeline installation. The underlying ground will be regraded and reinstated using stored topsoil to restore agricultural land to pre-construction condition.

2.4.4.2 Temporary Construction – Temporary Culverts and Bridge Structures

Temporary bridges or temporary culverts with a running track crossover will be required to cross watercourses including the Kilwarden River. On this basis, the Proposed Development falls within the scope of works requiring consent under Section 50 of the Arterial Drainage Acts as per the OPW guidance set out in publication Construction, Replacement or Alteration of Bridges and Culverts: A Guide to Applying for Consent under Section 50 of the Arterial Drainage Act, 1945. Rev. 201905-3.

These watercourse crossings structures are required to allow for an uninterrupted running track for the duration of the construction works, and removed once reinstatement of the working area is completed. No watercourse crossings structures will be established over

A temporary bridge structure will be installed over the Kilwarden River (RVX01). A temporary bridge structure will not be installed over the Grand Canal (WCX23) or the Yellow River (RVX02).

A culvert will not be constructed across the Grand Canal (WCX23), the Kilwarden River (RVX01) or the Yellow River (RVX02).

2.4.4.2.1 Temporary Culverts with Running Track Crossover

A temporary culvert crossings will include:

- Pre-cast concrete or steel culvert pipes installed within the channel;
- Surrounding sandbags or stone to seal culvert placement;
- Graded approaches constructed from stone to allow vehicles to cross;
- Flume pipes if water must be diverted to maintain flow during trench excavation.

Temporary culverts will be sized to maintain natural flow conditions and minimise the risk of upstream backing or downstream scour. Sediment control measures such as silt fencing, straw bales, or settlement controls will be installed downstream.

All temporary culverts will be removed once pipeline installation is complete, and the watercourse banks will be reinstated to their original profile.

2.4.4.2.2 Temporary Bridge Structures

A temporary bridge structure will be installed over the Kilwarden River (RVX01) and may also be utilised over other watercourse crossings to facilitate an uninterrupted running track and construction access.

It is anticipated that the prefabricated bridge structure will rest on timber bogmats placed on each side to serve as temporary abutments. The typical temporary bridge installation and dismantling process is outlined in Table 2-22 for reference. The temporary bridge will remain operational for the duration of the construction works, with installation and dismantling phases expected to take approximately 4 weeks. During operations, regular maintenance and monitoring will be undertaken under the guidance of an

Environmental Clerk of Works (ECoW) to ensure the crossing functions effectively and that any potential issues are promptly addressed.

Table 2-22 Temporary Bridge Installation and Dismantling

Stage	Description
Site Preparation	Define and demarcate working areas, maintaining a minimum 10m clearance from the riverbank except for approach roads/ramps. Verify that working areas align with land acquisition and working width drawings. Conduct clearing works, including topsoil stripping and stockpiling for later reinstatement. Measures will be implemented to manage runoff and prevent sedimentation of nearby watercourses. All temporary works areas related to the crossing shall be designed to drain runoff away from the watercourse banks to prevent contamination of the watercourse.
Crane and Bridge Preparation	A stoned pad will be constructed adjacent to the river for a suitable crane. The pad will use compacted stone, avoiding the use of concrete. A crane will be positioned to facilitate efficient and safe lifting operations. Load-bearing checks will be carried out to confirm the stability of the crane pad and lifting equipment. The prefabricated bridge structure designed by the contractor, will feature safety elements such as guardrails, raised curbs, and safety rails.
Abutment Installation	Install a bogmat abutment on one side of the river. Abutments will be placed at least 2m back from the top of the riverbank. The crane will lift and place the bogmat abutment on the other side of the river.
Bridge Installation	The crane will lift the prefabricated bridge structure and position it on the abutment across the river. Construct approach ramps on both sides using stone materials. The ramps will be graded to match the bridge elevation and will be stabilised to prevent erosion.
Construction Activities	Transport materials and equipment across the bridge. Complete the haul road and establish a stoned working area on both sides. Fence off the working areas to maintain minimum 10m clearance from the riverbank. Conduct pipeline installation as per sec 3.3 below.
Dismantling and Removal	Once construction activities are completed, materials and equipment will be transported back across the bridge. Stone and other materials will be removed, using the bridge for transport. Use the crane to lift out the bridge and abutments.
Site Reinstatement	Both sides of the watercourse will be restored to their original condition. This includes re-grading the land to match pre-construction levels and re-grassing to replicate pre-existing vegetation. Stockpiled topsoil will be redistributed. All temporary structures, including fencing, will be removed. Post-reinstatement monitoring will be conducted to ensure the site has fully returned to its pre-construction state, with corrective actions taken if necessary. This includes confirming stabilisation of the riverbanks and absence of erosion or sedimentation.

2.4.4.3 Temporary Construction Access

5 no. Temporary Construction Compounds and Laydown Areas (Type A) (see Section 2.4.4.4.2 and Section 2.4.4.4.3 below) will act as primary access points for all construction traffic and access points for HGV and Plant Machinery, including access for linepipe deliveries at these locations.

Laydown Areas (Type B) (see Section 2.4.4.4.4 below) will act as secondary access points. Light goods vehicles and construction plant can access the site at these locations. HGVs and Linepipe deliveries will not access the site at these locations.

In addition, during construction, temporary access points to the construction working width for the transmission gas pipeline route will be created at each of the designated road crossing, with the exception of the M4 crossing (RDX04).

Temporary access gates will be installed on both sides of the road crossing, with the selected entry point depending on the location of active works. Inside each access point, a temporary laydown area will be established to provide car parking, material storage, and welfare facilities.

To establish the temporary construction access existing agricultural gates will be repurposed where possible as the temporary access points, provided they align with the pipeline route. In some cases, these gates may require widening to accommodate heavy machinery or to facilitate movement across the road between work zones.

2.4.4.4 Temporary Construction Compounds

2.4.4.4.1 General Principles

All temporary construction compounds and laydown areas will be established, operated, and reinstated in accordance with the following principles, which apply across all compound types:

- Temporary Works: All construction compounds and laydown areas are temporary facilities required solely for the construction phase of the Proposed Development and will not be required following completion of construction works.
- Existing access: Where practicable, compounds will utilise existing entrances or access points to avoid the creation of new access roads and minimise disturbance to existing infrastructure.
- Surface water protection: Temporary construction compounds and laydown areas will, where practicable, be located a minimum of 20 m from surface water features (including rivers, streams, drains and ponds). Where this separation distance cannot be achieved due to site constraints, appropriate measures to control runoff, erosion and sediment will be implemented in accordance with best-practice construction management and the oCEMP.
- Utilities: Not all compounds will require utilities. Where electricity, water or foul drainage are required, these will be provided via temporary connections where feasible, or by self-contained units.
- Construction Environmental Management: Construction best-practice measures will be implemented across all compounds to manage noise, dust, traffic, and lighting.
- All temporary construction compound options have been assessed as part of the Proposed Development; however, it is not envisaged that the contractor will require all compounds at the same time, and the number of compounds in use at any one time will be determined by construction sequencing.

Prior to commencement of construction activities, the following works will be undertaken, as required:

- The topsoil in these areas will be stripped to a typical depth of 300 mm and stored separately from the subsoil for future reinstatement.
- A stone chipping layer may be installed where required to provide a stable working surface for construction vehicles and plant.
- Temporary access gates will be installed, typically on one or both sides of road crossings depending on construction sequencing.
- Temporary culverting will be installed where roadside drainage is present to maintain existing drainage functionality.
- Temporary security fencing and gates will be installed to define working areas and control site access.
- Traffic management measures, including appropriate sightlines and visibility controls, will be implemented where works interface with the public road network.
- Temporary utilities (electricity, water and/or foul drainage) will be provided where required via temporary connections or self-contained units

Temporary Construction Compound 03 and 04 include areas of existing hardcore or stone surfacing. As a result, a reduced level of site preparation and groundworks will be required at these locations compared to compounds established on undisturbed agricultural land.

On completion of construction activities, all temporary construction compounds and laydown areas will be fully decommissioned and reinstated unless otherwise agreed with the landowner. Reinstatement works include:

- Removal of stone surfacing, fencing and all temporary infrastructure;
- Replacement of stored topsoil;
- Regrading of land to pre-construction levels; and
- Restoration of land to its original condition or to a condition agreed with the relevant landowner.

Reinstatement will be undertaken in accordance with best-practice construction management and the oCEMP.

2.4.4.4.2 Temporary Construction Compound(s)

Temporary construction compounds will act as primary construction access points and will facilitate key construction activities including site management, welfare provision, plant and machinery storage, material storage and car parking. Temporary Construction Compounds will have capacity to accommodate storage of the full project line-pipe quantity.

Table 2-23 Temporary Construction Compounds

Temporary Construction Compound	Location Description	Drawing Reference	Approx. Area (ha)	Access
Temporary Construction Compound 01	Kilwarden Offtake Installation	GNI143-GNI-PL-TCC-0001-01	2.2621	widening of existing agricultural entrance from the R161.
Temporary Construction Compound 02	Near RDX04	GNI143-GNI-PL-TCC-0002-01	3.0110	access via private lane off the R148.
Temporary Construction Compound 03	Near Edenderry Town	GNI143-GNI-PL-TCC-0003-01 (See Figure 2-8 below)	2.2507	access via the Inner Relief Road off the R441.
Temporary Construction Compound 04	In townland of Esker More	GNI143-GNI-PL-TCC-0004-01 (See Figure 2-8 below)	0.9140	access via private lane off the R402.
Temporary Construction Compound 05	Ballykilleen AGI	GNI143-GNI-PL-TCC-0005-01	0.4958	access via the existing Edenderry Power Station entrance off the R041.

These primary construction compounds may accommodate the following activities, as required:

- HGV and plant entry point: Controlled access for delivery of materials, equipment, and heavy plant. Access for delivery and loading of linepipe and construction materials.
- Bulk linepipe storage: Designated areas for storage of steel pipeline sections.
- Technical facilities and Cabins: Temporary dark rooms (where required for welding and inspection), material and equipment storage containers.
- Security and access control: Temporary security fencing, controlled access points, and site signage.
- Site offices: Offices for site management, engineering, supervision, and administration.
- Welfare facilities: Temporary welfare units including toilets, showers, drying rooms, changing facilities, and break areas.
- Plant and machinery storage: Designated areas for temporary storage of construction plant and equipment.

- Materials storage: Storage of construction materials including pipeline sections, aggregates, sheet piling, steel, cement, and ancillary materials.
- Chemical and fuel storage: Any fuels, oils, or chemicals stored will be contained within designated, secure, fully bunded areas with a minimum capacity of 110% (or 25% of total volume stored, whichever is greater).
- Parking: Parking provision for up to approximately 60 workers' vehicles, construction vehicles, and plant not in use.
- Waste storage: Segregated waste storage areas for construction and hazardous wastes, where applicable, with appropriate containment measures.

2.4.4.4.3 Laydown Areas (Type A)

Laydown Areas (Type A) will act as primary access points along the pipeline route and will facilitate the movement of heavy plant, delivery vehicles (including line-pipe deliveries) and construction traffic associated with the main pipeline working spread.

Seven Type A laydown areas will be established at the following locations: RDX01; RDX02 & RDX03 (combined); RDX07; RDX10; RDX12; RDX14; and RDX17. Typical size of these areas: 75m x 45m.

These Laydown Areas (Type A) may accommodate the following activities, as required:

- HGV and plant entry point: Access for construction traffic, including linepipe deliveries.
- Security and access control: Temporary fencing, controlled entry points, and signage.
- Site offices: Temporary offices for site supervision and coordination where required.
- Technical facilities and Cabins: Temporary dark rooms (where required for welding and inspection), material and equipment storage containers.
- Welfare facilities: Temporary welfare units including toilets, showers, drying rooms, changing facilities, and break areas.
- Plant and machinery storage: Designated areas for temporary storage of construction plant and equipment.
- Materials storage and staging: Temporary storage of construction materials including pipeline sections, aggregates, sheet piling, steel, cement, and ancillary materials.
- Chemical and fuel storage: Any fuels, oils, or chemicals stored will be contained within designated, secure, fully bunded areas with a minimum capacity of 110% (or 25% of total volume stored, whichever is greater).
- Parking: Parking provision for up to approximately 60 workers' vehicles, construction vehicles, and plant not in use.
- Waste storage: Segregated waste storage areas for construction and hazardous wastes, where applicable, with appropriate containment measures.

2.4.4.4.4 Laydown Areas (Type B)

Laydown Areas (Type B) will act as secondary construction access points, facilitating movement of construction vehicles and plant across roads to maintain continuity of the pipeline working spread.

Eight Laydown Areas (Type B) will be established at RDX05; RDX06; RDX08; RDX09; RDX11; RDX13; RDX15; and RDX16. Typical size of these areas 45m x 30m.

These Laydown Areas (Type B) may accommodate the following activities, as required:

- Light vehicle entry point: Access primarily for light vehicles and construction plant.
- Security and access control: Temporary fencing and controlled access points.
- Limited site facilities: Single storey temporary offices, temporary welfare facilities where required.
- Plant and machinery holding: Short-term holding of plant and equipment.

- Materials storage and staging: Temporary storage and staging of pipe, fittings, and small quantities of construction materials.
- Parking: Parking for up to approximately 10 workers' vehicles and limited construction plant.

2.4.5 Expected Construction Duration and Site Personnel

It is expected that the construction of the Ballykilleen AGI and GNI143 Ballykilleen Pipeline will be completed during normal construction hours i.e., 7am to 7pm Monday to Friday, and 8am to 2 pm on Saturdays. However, it is possible that the contractor may wish to carry out certain operations outside these hours i.e., Sunday or evening hours during long summer days etc. Such occurrences will be kept to a minimum and take place over a short timeframe and as such are unlikely to cause excessive disturbance.

It is estimated that there will initially be 30-40 site personnel on site on a typical day, however during peak construction periods this is expected to fluctuate up to a maximum of 80 site personnel and contractors on site per day. Site personnel will include management, engineers, construction crews, supervisors, environment health and safety personal, and pipeline specialist contractors.

Estimates for the duration of the construction works are included in Table 2-24 below. The overall start-to-finish duration would take up to 22 months if the construction activities for the hot tap, pipeline and AGI do not run concurrently. Construction is anticipated to commence in Q1 2028. Commissioning of the Proposed Development is estimated to take place over 1 – 2 months.

Table 2-24 Estimated Construction Duration

Works Area	Estimated Construction Duration (Months)
Kilwarden Offtake Installation	4
GNI 143 Ballykilleen Pipeline	10
Ballykilleen AGI	8

2.4.6 Expected Construction Equipment and Materials

The key civil engineering works will involve the excavation of topsoil, subsoil, stones, bedrock, bitumen, and concrete through open-cut excavations, as well as trenchless crossings. Other construction activities will include on-site storage of fuels for construction vehicles, storage of aggregates for backfilling, and reinstatement works.

Construction materials will be brought to the site by road using clean vehicles. Lorries and trucks transporting friable construction materials or spoil will be properly enclosed or covered to prevent the escape of material onto public roadways. Where possible, general construction materials will be sourced locally to minimise transportation distances.

All plant, machinery, and equipment will be stored on site within the works area or in the temporary construction compound. Typical construction equipment is listed below; this list will be further refined during detailed design prior to construction works commencing.

2.4.6.1 Plant and Machinery

The construction phase of the Proposed Development will involve site clearance, excavation and the construction of the proposed pipeline. A variety of plant will be in use, such as excavators, breakers, lifting equipment, dumper trucks, compressors, generators and pile drivers. All plant, machinery and equipment will be stored on site within the works area or within the temporary construction compounds. An outline of typical construction plant and machinery listed below:

- Excavation and earthmoving plant - tracked excavators (including rock breaker attachments), trenchers, dozers, graders, front-end loaders
- Material transport equipment - tracked dumpers, tractor-and-trailer units, tipper lorries
- Trenchless installation plant - Tunnel Boring Machines, pipe-jacks, winches
- Lifting and handling equipment - mobile cranes, telehandlers, lifting frames/slings
- Pipe preparation and joining equipment - welding rigs/shelters, pipe bending machines, bevelling tools, generators
- Ground reinstatement plant - soil compactors, rollers
- Pumping and dewatering equipment - water pumps, vacuum excavation units (if required)
- General site equipment - small tools, lighting towers, traffic management equipment, environmental protection supplies (e.g. spill kits)

2.4.6.2 Material Sourcing and Transportation

Construction material will be minimised, sourced locally and/or with lower carbon wherever possible to minimise the environmental impact of transportation and embodied carbon. The methods of transport of construction materials have not been finalised yet. All materials shall be transported to the site by road. Estimated construction materials are set out in Table 2-25.

Table 2-25 Estimated Construction Materials (Resource Use)

Material	Quantity
300 NB Steel Pipeline	c. 23.65 km
Binding Concrete (used at road crossings)	52 m^3
Concrete (used for roadway and temporary pig trap base in hot tap site)	32.1 m^3
Precast Concrete Slab	645 slabs (dimensions: 573mm x 2000mm x 100)
Aggregate, Sand, Trench Backfilling Material, etc.	2,904 tonnes

2.4.6.3 Excavation, Demolition, and Waste Generation

There will be excavation / demolition of road surfaces required as part of the road crossings to facilitate the Proposed Development. It is envisaged that all concrete and asphalt/bitmac sections will undergo immediate permanent reinstatement, which will be carried out in accordance with preapproved material in accordance with the design drawings and *IS 328:2021, GNI/AO/SP/007, Guidelines for Managing Openings in Public Roads 2017 (The Purple Book)* and to the approval of the local authority and/or private landowners, unless otherwise agreed with local authorities.

There will be soil and stone excavated to facilitate the installation of the underground transmission gas pipeline. It has been estimated by the project engineers that a total of c. 265,333.6 m^3 of topsoil, subsoil, and stones will be excavated to facilitate the Proposed Development. This volume consists of 232,650 m^3 of topsoil across the pipeline working width, up to 31,725 m^3 of subsoil for the pipeline trench, 260.6 m^3 at the Kilwarden Offtake Installation and 708 m^3 at the Ballykilleen AGI. It is anticipated that the majority (95% - c. 252,067 m^3) of this clean excavated material will be reinstated as backfill provided that the soil excavated is deemed clean inert soil. It is currently estimated that 5% of the excavated material (c. 13,267 m^3) will need to be removed off site for reuse, recovery, recycling or disposal.

When material that requires removal from the site is deemed to be a waste, removal and reuse / recycling / recovery / disposal of the material will be carried out in accordance with the Waste Management Act 1996 (as amended), the Waste Management (Collection Permit) Regulations 2007 (as amended) and the Waste Management (Facility Permit & Registration) Regulations 2007 (as amended). Alternatively, the material may be classed as by-product under Regulation 27 (By-products)of the European Union (Waste Directive) Regulations 2011-2020, (Previously Article 27 of the European Communities (Waste Directive)

Regulations). For more information in relation to the envisaged management of by-products, refer to the RWMP (Appendix 14.1) of Chapter 14 of this EIAR.

Waste will also be generated from construction workers e.g. organic / food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided on site during the construction phase. Waste printer / toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

2.4.7 Construction and Environmental Management

2.4.7.1 Construction Environmental Management Plan

The oCEMP included as Appendix 2.2 of this EIAR has been prepared by AWN Consulting and includes all the mitigation measures set out within this EIAR. The construction contractor will update this oCEMP to include any additional mitigation required to ensure compliance with any subsequent consent conditions relevant to the Proposed Development. It will also set out in detail the overarching vision of how the construction Contractor of the Proposed Development will manage the site in a safe and organised manner.

The oCEMP documents all mitigation measures in this EIAR to ensure implementation of procedures to control pollution and nuisances arising from site clearance and construction activities. Pollution and nuisances will be prevented where possible and managed in accordance with best environmental protection practices.

The oCEMP will be implemented and adhered to by the construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, Resource Manager and Ecological Clerk of Works where relevant. All personnel working on the Site will be trained in the implementation of the procedures.

2.4.7.2 Construction Traffic Management

Traffic management and road signage will be in accordance with the *Department of Transport: Traffic Signs Manual - Chapter 8: Temporary Traffic Measures and Signs for Road Works* and in agreement with South Dublin County Council. Construction traffic management and mitigation measures to minimise the impacts associated with the construction phase upon the peak periods on the surrounding road network are set out in Chapter 13 – Material Assets - Traffic and Transportation of this EIAR. The project Outline Construction Traffic Management Plan prepared by CST Group is included as Appendix 13.2 of this EIAR.

2.4.7.3 Dust Management

Chapter 8 (Air Quality) of this EIAR includes construction stage dust mitigation measures. The suite of measures is designed to control dust at the construction site to ensure that no significant nuisance occurs at nearby receptors, and has been informed by international best practice guidance documents. The mitigation measures will be implemented in full during the construction works. For further information, refer to Chapter 8 (Air Quality).

2.4.7.4 Noise and Vibration Management

Chapter 10 (Noise and Vibration) defines construction noise thresholds with reference to BS 5228 (i.e. BS 5228-1:2009+A1:2014 and BS 5228-2:2009+A1:2014) for noise and vibration control on construction and open sites, which offers detailed guidance on the control of noise and vibration from demolition and construction activities.

2.4.7.5 Resource and Waste Management Plan

Chapter 14 (Material Assets – Waste) contains a detailed description of waste management relating to construction of the Proposed Development. A site-specific Resource & Waste Management Plan (RWMP) is included as Appendix 14.1 of this EIA Report. This RWMP will be implemented to ensure best practice is followed in the management of waste from the Proposed Development.

2.4.8 Construction Phase Vulnerability to Major Accident Hazards and Disasters

2.4.8.1 Control of Major Accident Hazards involving Dangerous Substances and Seveso Establishments

The Proposed Development does not exceed the chemical storage thresholds, set out in the COMAH Regulations (2015), for either Lower or Upper tier. Therefore, the Proposed Development during either construction or operation is not subject to the provisions of the COMAH Regulations (2015). Therefore, a Land Use Planning assessment under the COMAH Regulations (2015) is not required for the Proposed Development.

The location of the Proposed Development is not within the consultation distance of any notified Seveso establishment, there are no implications for major accidents or hazards from external Seveso establishment at the Proposed Development site.

The likelihood of a Seveso establishment initiating a major accident at the Proposed Development is negligible, and the likelihood of the project initiating major accident at a nearby a Seveso establishment during construction is considered negligible; therefore, as likelihood of the occurrence is low/negligible there are no likely significant effects.

2.4.8.2 Flash fire, Jet fire, Vapour Cloud Explosion following natural gas release at the gas pipeline

In any flash fire or jet fire event there is potential for harm to persons on-site, or in the vicinity. However, during the construction of the Proposed Development pipeline does not contain natural gas. Natural gas is only filled in the transmission pipeline during the completion and commissioning of the project once the pipeline is buried underground. Commissioning tests are outlined in the next section.

The construction and commissioning of the project includes:

- The pipeline will be installed to Irish Installation Standard IS 328:2021 Gas transmission pipelines and pipeline installations. This standard ensures that the pipeline is constructed according to established guidelines to ensure safety and functionality.
- Sections of pipe are welded together above ground, and all welds are subject to non-destructive testing. The pipe welds are then coated for corrosion protection. The coating is then subject to holiday testing, to detect any discontinuities.
- Work zones are strictly controlled to prevent the presence of ignition sources, minimising the potential for any accidental fires or explosions during the construction process.
- The pipeline is installed and backfilled only after successful results of non-destructive testing.
- Once installation is completed, the pipework will be cleaned and hydrostatic tested in accordance with the IS328:2021 and GNI/AD/SP/007 to prove the strength and integrity of the pipeline after construction.

The installation of the pipeline is completed (including backfilling, and commissioning, and successful completion of hydrostatic testing) prior to gassing up, therefore once gassed up the gas transmission pipeline is below ground (therefore there are no ignition sources). By following these comprehensive procedures and adhering to established standards, the pipeline construction process is designed to ensure the safety, reliability, and long-term functionality of the infrastructure. On the basis of the foregoing, it is

concluded that the likelihood (with reference to Table 2-2) of a leak or rupture during the construction and commissioning phase resulting in a flash fire or jet fire is 'very unlikely'.

The likelihood of an offsite major accident initiating a flash fire, jet fire, or vapour cloud explosion at the Proposed Development is negligible, and the likelihood (with reference to Table 2-2) of the project initiating a flash fire, jet fire, or vapour cloud explosion during construction of the transmission pipeline is considered unlikely to very unlikely; therefore, as likelihood of the occurrence is unlikely / negligible there are no likely significant effects to off-site receptors.

2.4.8.3 Landslides, Seismic Activity and Volcanic Activity

Any construction or built environment, whether it's a building, infrastructure, or other development, can be at risk of being affected by natural events like landslides, seismic (earthquake-related) activity, or volcanic eruptions. These events have the potential to cause damage or disruption to the development due to their unpredictable and often powerful nature.

The location of the Proposed Development is not at significant risk of landslides ('Low' to 'Moderately Low'.), seismic activity or volcanic activity. Therefore, the likelihood of a landslide initiating a major accident at the Proposed Development is negligible and the likelihood of the project initiating a landslide during construction is considered negligible; therefore, as likelihood of the occurrence is low/negligible there are no likely significant effects.

2.4.8.4 Flooding / Sea Level Rise

A Flood Risk Assessment has been undertaken by JBA Consulting in accordance with the Planning System and Flood Risk Management Guidelines for Planning Authorities (DoEHLG & OPW, 2009). With reference to this assessment:

- For sections of the pipeline constructed in Flood Zone A/B, observations of river flood levels and weather warnings will ensure that the flood risk has been minimised.
- Due to the location of the pipeline and the mitigation methods employed, the potential impacts from flooding to the pipeline are considered negligible. There will be no impact to groundwater flow as a result of the mitigation methods related to the pipe drilling and trench construction methods.

Therefore, the likelihood of a flood initiating a major accident at the Proposed Development is negligible and the likelihood of the proposed project causing a flood is negligible; therefore, as likelihood of the occurrence is low/negligible there are no likely significant effects.

2.4.8.5 Extreme, Storm events, lightening, heat or cold weather resulting in result structural damage and/or pollution to soils, groundwater or surface waters

In order to prioritise safety and mitigate potential risks, as with any construction project a proactive approach will be taken towards anticipating and managing extreme weather events during the construction process. Weather forecasting will be reviewed to monitor meteorological conditions closely and identify the occurrence of storm events, lightening, heat or cold weather etc.

When an impending extreme weather event is detected through these forecasting systems, as part of safety protocols the work zones, construction equipment, materials, and machinery that may be vulnerable to damage or displacement by severe weather will be 'made safe' by being secured or moving to safe locations. The site will be monitored and adjustments to safety measures as needed to address changing conditions. Refer to the oCEMP for further details on emergency preparedness and environmental incident planning.

On the basis of the foregoing, the likelihood of an extreme weather initiating a major accident at the Proposed Development is negligible; therefore, as likelihood of the occurrence is low/negligible there are no likely significant effects.

2.4.8.6 Pollution to Soils / Groundwater / Surface Waters

In order to mitigate potential impacts during the construction phase, best practice construction methods will be implemented in order to prevent water (surface water and groundwater) pollution. These mitigation measures as outlined in Chapter 5 (Land, Soils and Geology), and Chapter 6 (Hydrology and Hydrogeology) of the EIAR; and duplicated in the outline Construction Environmental Management Plan will be implemented during the construction phase.

On the basis of the foregoing, and implementation of the mitigation measures set out in this EIAR, the likelihood of a major spill or pollution event initiating a major accident at the Proposed Development is negligible and the likelihood of the project initiating a major spill or pollution event during construction is considered negligible; therefore, as likelihood of the occurrence is low/negligible there are no likely significant effects.

2.4.9 Potential Impacts and Mitigation Measures During Construction

There are potential temporary nuisances such as traffic impacts, dust, noise, as well as the potential for pollution of groundwater associated with excavations and construction.

In order to manage these temporary impacts, the mitigation measures set out in this EIAR (Chapters 4 through 15) will be implemented and adhered to by the construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, Resource Manager and Ecological Clerk of Works where relevant. The specific mitigation measures to address potential environmental impacts, are presented in each individual EIAR chapter. The main potential impacts during excavation, construction, and commissioning which require mitigation are:

- Management of run-off water in terms of silt runoff and dewatering (if required) (see Chapter 5 (Land, Soils, Geology, and Hydrogeology) and Chapter 6 (Hydrology) for further information);
- Impacts on human beings in terms of nuisances relating to the air quality of the environs due to dust and other particulate matter generated (see Chapter 8 (Air Quality) for further information);
- Impacts on human beings in terms of nuisances due to plant noise and vibration from equipment (see Chapter 10 (Noise and Vibration) for further information); and
- Effects on the road network due to single lane closures when works are being carried out on public roads and construction workers and other staff attending site (see Chapter 13 (Material Assets - Traffic and Transportation) for further information).

The potential for impacts depends on the type of construction activity being carried out in conjunction with environmental factors including prevailing weather conditions i.e. levels of rainfall, wind speeds and wind direction; as well as the distance to potentially sensitive receptors.

2.5 Commissioning of the Project

Once the construction of the Proposed Development is completed, Gas Networks Ireland will mobilise to complete the commissioning. Commissioning will be carried out over a 1-2 month period and is included within the construction timelines in Section 2.4.5 above.

Commissioning works primarily involve suitably qualified individuals connecting the proposed gas pipeline at the hot tap connection to the existing 750 NB transmission gas pipeline BGE77.

The pipework will be cleaned and tested in accordance with the *IS328:2021, GNI/AO/SP/007*. The pipelines will be swabbed with pigs to clean out any debris and a gauge pig will be used to prove the pipelines

internal diameter. The GNI143 Ballykilleen Pipeline will be hydrostatic tested (pressurised with clean water) to prove the strength and integrity of the pipeline after construction.

This will involve filling the entire GNI143 Ballykilleen Pipeline with clean potable water, requiring approximately 6,667,655 litres and pressurised to identify any leak. There are no chemical additives to this water. The required water will be sourced from an existing supply either from nearby municipal supply point (mains water supply, local authority fire hydrants) or alternatively, abstraction from another water supply in private ownership from groundwater / surface water that is permitted and registered with the EPA under the European Union (Water Policy) (Abstractions Registration) Regulations 2018 (S.I. No. 261 of 2018).

Following hydrostatic testing (6,667,655 litres) this water will be discharged to nearby surface water or to ground, alternatively, it may be removed via tankering. There shall not be discharge of untreated, silty, or contaminated water from the works to any watercourse. The discharge of hydrostatic testing water from the site will be managed and controlled for the duration of the works. All water discharges associated with hydrostatic testing and commissioning will be controlled in terms of timing and flow rate to ensure they do not cause localised flooding, erosion, or mobilisation of sediments. Appropriate mitigation measures will be implemented as required, including attenuation or phased discharge where necessary.

Following successful completion of the hydrostatic test, the pipelines will be dried using foam pigs and desiccant air. Finally, a nitrogen gas 'slug' between 2 pipeline inspection gauges (PIGs) is then admitted to one end of the pipeline. The natural gas is then admitted behind the nitrogen slug and the pipeline is commissioned and pressurised in accordance with IS328 and GNI Procedures. It then becomes operational. There are minimal gas emissions to the environment.

The working area will be reinstated as agreed with land owners e.g. such that normal farming activities can be recommenced by the landowners. Any existing land drains (perforated underground pipes) will be reinstated as required taking care to ensure the drains do not act as pathways for contamination or do not cause flooding of site. The working area will be regraded, and grass seed will be set. Fences and walls will be reinstated to meet landowner's requirements using materials that match the existing fences/walls as appropriate. Hedgerow sections that were removed will be replaced to match the removed hedgerow where possible. Any additional hard landscaping and soft landscaping will be completed.

A permanent wayleave of 14 m will be sought to allow access for GNI to excavate and inspect the pipeline in the future.

2.5.1 Potential Impacts During Commissioning and Mitigation Measures

As there is no requirement for chemicals usage and minimal access to the underground route by personnel there is no likely environmental effect as a result of commissioning.

2.6 Description of Operations

GNI will own and operate the GNI 143 Ballykilleen Pipeline, Kilwarden Offtake Installation and Ballykilleen Above Ground Installation (AGI) for the purpose of supplying natural gas to the Bord na Móna (BnM) Cushaling Peaker Plant. The proposed pipeline and associated infrastructure are required to enable the Cushaling Peaker Plant to operate reliably on natural gas. GNI will operate the underground transmission gas pipeline and undertake routine inspection and maintenance in accordance with I.S. 328:2021 and GNI's Functional Specification Requirements.

Once operational, the GNI 143 Ballykilleen Pipeline and associated installations will not require permanent on-site staffing. Routine operational checks will be carried out by GNI personnel approximately every two weeks to one month, with a single van accessing the sites via the established entrances.

Following construction, the GNI 143 Ballykilleen Pipeline will not require on-site operational staff. GNI maintenance personnel will undertake fortnightly to monthly routine checks, travelling along the pipeline route via existing access points and using one van. The operation of the pipeline is based on a closed system, therefore during normal operating conditions there will be no release of natural gas to the atmosphere. There will be minimal emissions from the operation of safety relief valves and venting down of filters, etc for maintenance. All such activities are highly controlled and undertaken in accordance with I.S. 328:2021 and GNI Functional Specifications. Approximately every 7 - 10 years, the pipeline will be 'pigged' using an intelligent pig launched from the AGI in order to monitor the mechanical status of the pipeline itself. De-pressurising the pig traps at either end of the system involves the release of natural gas. This may be recompressed in lower pressure gas systems if available. The quantities will not be significant and the emission will be controlled.

The Kilwarden Offtake Installation will operate as a passive, low-intensity "dead site" with no permanent utility connection or energy supply. Its operational function is to provide the live hot tap connection to the existing 750 mm NB PTTW pipeline, allow isolation of the GNI 143 Pipeline, and accommodate temporary pig-trap installation for inspection. Maintenance requirements are minimal and typically confined to small-scale mechanical or civil upkeep within the compound. Pigging operations, if required, will involve short-term installation of temporary equipment and small increases in operational traffic. No permanent emissions, process activities, or utility demands arise at this Installation.

The Ballykilleen AGI will operate as the southern termination point of the transmission pipeline, regulating, metering, pre-heating and monitoring the gas prior to supply to the Cushaling Peaker Plant. Operational activities will be limited to routine inspection and maintenance visits by GNI personnel. Maintenance of kiosks, filters, boilers, instrumentation, and security systems will follow GNI's Functional Specification Requirements. Operational gas emissions from the AGI will be minimal and arise only during controlled maintenance events such as venting filters or operating safety relief valves. Minor combustion emissions from the PBU boilers and backup generator will occur during operation. Then backup generator would only operate when these is a power failure to the site.

Enabling the Cushaling Peaker Plant to operate on natural gas is the primary purpose of the Proposed Development. Following modification of the plant (works undertaken by Bord na Móna), emissions and operational effects associated with gas-firing at the Cushaling Peaker Plant (e.g., noise and emissions to air) will arise as a consequence of this connection. These potential indirect effects are discussed in Section 2.8.

2.6.1 Operational Access, Roads and Parking

The GNI 143 Ballykilleen Pipeline is located predominantly on agricultural land. A permanent wayleave of 14m will be sought to allow access for GNI to excavate and inspect the pipeline in the future. Once constructed, the proposed underground transmission gas pipeline will not require any staff to operate it.

Vehicle access during routine operations will be limited to light commercial vehicles using the dedicated access road. The three visitor parking spaces provided outside the each of the Kilwarden Offtake Installation (access from laneway off the R161) and Ballykilleen AGI (access via the Edenderry Renewable Energy Complex) compound gates will support standard inspection activities.

The operational traffic demand associated with the Installation will be extremely low. Access will be limited to occasional inspection and maintenance visits, typically generating one or two vehicle movements per visit. Pigging, when undertaken, may generate short-term additional vehicle movements but remain infrequent and managed within these access arrangements.

2.6.2 Operational Utilities: Electricity and Telecommunications, Potable Water, Foul Wastewater, and Surface water

2.6.2.1 Electricity and Telecommunications

The GNI 143 Ballykilleen Pipeline and the Kilwarden Offtake Installation do not require operational electrical or telecommunications services. Both are passive installations and do not rely on a continuous power supply or communication links for routine functioning. In parallel with the pipeline installation, ancillary ducting system will be laid within the same trench alongside the gas pipeline to facilitate future telecommunications and fibre-optic services within the same utility corridor.

The Ballykilleen AGI requires operational electricity connections, to support pressure regulation, metering, instrumentation, control systems, and telecommunications connections to facilitate system monitoring, remote operation and data transmission. These connections will be established following: the granting of planning consent, and subsequent engagement with ESB Networks and EIR by GNI in accordance with utility provider procedures. The exact configuration of these connections will be finalised once utility companies formally engage, which per standard ESB and EIR processes can only occur post-planning grant. There are available utilities within the vicinity and adjacent to the proposed Ballykilleen AGI it is expected that connection can be made to these.

2.6.2.2 Potable Water

The Proposed Development does not require an operational potable water supply. No processes, equipment, or facilities within the pipeline, Offtake Installation, or AGI require water for operation. No staff are permanently based at any of the installations.

2.6.2.3 Foul Wastewater

No foul wastewater will be generated during the operational phase of the Proposed Development. The pipeline and associated installations do not include welfare facilities, process wastewater systems, drainage requiring treatment, or any activities that produce foul effluent.

2.6.2.4 Stormwater

Operational stormwater and surface water management is required only where new areas of hardstanding or other impermeable surfaces are introduced—specifically at the Kilwarden Offtake Installation and the Ballykilleen AGI. These are the only locations where the Proposed Development creates permanent impermeable areas capable of generating surface water runoff.

2.6.2.4.1 Kilwarden Offtake Installation

Once operational, stormwater falling on impermeable surfaces within the Kilwarden Offtake Installation will drain to a purpose-designed soakaway located to the southeast of the compound. The soakaway will overflow to an existing agricultural drainage ditch running along the access laneway.

2.6.2.4.2 Ballykilleen AGI

Once operational stormwater on impermeable surfaces will connect to the existing surface water drainage network within the Edenderry Renewable Energy Complex. This established system ultimately discharges to the Figile River, located to the south of the AGI, consistent with existing drainage pathways on the wider site.

2.6.2.4.3 GNI 143 Ballykilleen Pipeline (Greenfield / Agricultural Section / Watercourses)

Once reinstated, the GNI 143 Ballykilleen Pipeline does not alter any existing hardstanding areas or create any new impermeable surfaces along its length that could generate stormwater runoff. The transmission

pipeline is installed entirely below ground and the working corridor is fully reinstated to its original agricultural or greenfield condition following construction. As a result, the reinstated pipeline corridor remains permeable, allowing infiltration and natural drainage to occur unchanged.

Because the operational pipeline produces no runoff, and no permanent changes to natural drainage pathways, it does not require an operational stormwater system.

2.6.2.4.4 GNI 143 Ballykilleen Pipeline (Road Crossings)

The GNI 143 Ballykilleen Pipeline crosses several local roads along its route. These crossings are constructed using trenchless or open-cut methods (depending on road classification, ground conditions, and utility constraints) and are reinstated fully following construction. Once reinstated, road crossings do not create any operational stormwater or surface water impacts, as the pipeline is buried below existing road structures and does not interact with road drainage systems during operation.

Following construction, the road surfaces are reinstated to their pre-existing condition in accordance with local authority requirements and TII/road authority standards. Any existing road drainage systems (e.g., gullies, swales, ditches) remain unchanged and continue to operate as originally designed.

As the pipeline is located entirely below the road formation, there are no operational stormwater requirements at road crossings.

2.6.3 Natural Gas

The route of the Proposed Development does not interact with any existing gas distribution mains, except at the connection point with the BGE77 gas transmission pipeline. During construction, there will be no requirement for a temporary gas connection.

The nature of the Proposed Development is such that, rather than utilising gas itself, it will facilitate the connection of existing infrastructure to the BGE77 gas transmission network. The proposed underground gas transmission pipeline will not have any operational gas demand; its sole function is to transport gas from the existing transmission network to the Bord na Móna Cushaling Peaker Plant.

At the Ballykilleen AGI, limited gas usage will occur to support ancillary equipment, including gas-fired boilers and a gas-fired backup generator. This gas demand will be minor and intermittent in nature and will be supplied via the proposed pipeline. No additional interaction with existing gas distribution infrastructure is required.

2.6.4 Greenhouse Gas Emissions During Operation

Methane emissions from the GNI network are associated with venting which takes place for operational and safety reasons, 3rd party hits, incomplete combustion and fugitive emissions. Fugitive emissions result from unintentional emissions of natural gas from equipment or components such as pipelines, regulators, valves, flanges, connectors, etc. on the gas transportation network.

Gas transmission pipelines used by GNI are designed to National Standard I.S. 328. During construction these pipelines are tested to ensure the integrity of the pipeline and the associated equipment to ensure compliance with I.S. 328. Leak survey is systematically carried out per the requirements of I.S. 328 during the operational phase of GNI pipelines. Any detected leaks above 250ppm are investigated and rectified under GNI standard operating procedures for preventative maintenance. GNI are committed to accurately calculating methane emissions from their network as per the EU methane emissions regulation 24/1787. GNI also includes methane emissions as part of the Scope 1 GHG emissions reporting which are published in the GNI annual Sustainability Report.

2.6.5 Operational Phase Vulnerability to Major Accident Hazards and Disasters

2.6.5.1 Control of Major Accident Hazards involving Dangerous Substances and Seveso Establishments

The Proposed Development does not exceed the chemical storage thresholds, set out in the COMAH Regulations (2015), for either Lower or Upper tier. Therefore, the Proposed Development during either construction or operation is not subject to the provisions of the COMAH Regulations (2015). Therefore, a Land Use Planning assessment under the COMAH Regulations (2015) is not required for the Proposed Development.

The operational phase of the Proposed Development will not be a notified Seveso facility.

The location of the Proposed Development and is not within the consultation distance of any current notified Seveso establishment. There are no current implications for major accidents or hazards from external Seveso establishment at the Proposed Development site.

A Control of Major Accident Hazards (COMAH) status assessment has been undertaken for the Edenderry Renewable Energy Complex (Appendix 2.4 - Preliminary Environmental Appraisal- Bord Na Mona) having regard to the Proposed Development and the related conversion of the Cushaling Peaker Plant to natural gas. The assessment has been completed in accordance with the Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015), which transpose the Seveso III Directive into Irish law.

The assessment considered existing inventories of dangerous substances, including the application of the COMAH factorisation rule across health, physical and environmental hazard categories. The assessment concludes that, both prior to and following conversion of the Cushaling Peaker Plant to natural gas, the Edenderry Renewable Energy Complex will remain a sub-COMAH status facility. Accordingly, the provisions of the COMAH Regulations do not apply. On this basis, the Proposed Development does not introduce a major accident hazard and does not give rise to risks requiring control under the COMAH regulatory framework.

Therefore, the likelihood of a Seveso establishment initiating a major accident at the Proposed Development is negligible, and the likelihood of the project initiating major accident at a nearby a Seveso establishment during construction is considered negligible; therefore, as likelihood of the occurrence is low/negligible there are no likely significant effects.

2.6.5.2 Flash fire, Jet fire, Vapour Cloud Explosion following natural gas release at the gas pipeline

In any flash fire or jet fire event there is potential for harm to persons on-site, or in the vicinity. The release leak or rupture of natural gas is not likely to occur in normal operation.

The operation of the project includes:

- During operation the GNI 143 Ballykilleen Pipeline is below ground (therefore, there are no open ignition sources).
- The Proposed Development will be installed to Irish Installation Standard *IS 328:2021 Gas transmission pipelines and pipeline installations*.
- Marker posts and warning tape will be installed to alert people to the presence of the underground gas pipeline and prevent accidental damage.
- The Kilwarden Offtake Installation and Ballykilleen AGI will be secured by fenced in order to strictly controlled access to prevent the presence of ignition sources, minimising the potential for any accidental fires or explosions during operation.
- The Proposed Development will be regularly maintained and safety checks by Gas Networks Ireland.

- The pipeline will have isolation valve at the Kilwarden Offtake Installation and Ballykilleen AGI that can be closed in the event a leak or rupture, preventing the continuous outflow of natural gas.

These design and operational measures in place significantly minimise the likelihood of natural gas release during routine operations. This emphasises the safety protocols and precautions taken to ensure that the pipeline functions without posing a risk to the environment and nearby communities. On the basis of the foregoing, it is concluded that the likelihood (with reference to Table 2-2) of a leak or rupture during the operational phase resulting in a flash fire or jet fire is 'very unlikely'.

The likelihood of an offsite major accident initiating a flash fire, jet fire, or vapour cloud explosion at the Proposed Development is negligible, and the likelihood (with reference to Table 2-2) of the project initiating a flash fire, jet fire, or vapour cloud explosion during operation of the transmission pipeline is considered unlikely to very unlikely; therefore, as likelihood of the occurrence is unlikely / negligible there are no likely significant effects to off-site receptors.

2.6.5.3 Landslides, Seismic Activity and Volcanic Activity

Any construction or built environment, whether it's a building, infrastructure, or other development, can be at risk of being affected by natural events like landslides, seismic (earthquake-related) activity, or volcanic eruptions. These events have the potential to cause damage or disruption to the development due to their unpredictable and often powerful nature.

The location of the Proposed Development is not at significant risk of landslides ('Low' to 'Moderately Low'.), seismic activity or volcanic activity. Therefore, the likelihood of a landslide initiating a major accident at the Proposed Development is negligible and the likelihood of the project initiating a landslide is considered negligible; therefore, as likelihood of the occurrence is very low/negligible there are no likely significant effects.

2.6.5.4 Flooding / Sea Level Rise

A Flood Risk Assessment has been undertaken by JBA Consulting in accordance with the Planning System and Flood Risk Management Guidelines for Planning Authorities (DoEHLG & OPW, 2009). With reference to this assessment:

- The Justification Test has been applied and passed as part of the FRA process.
- The proposed pipeline will be located underground and following construction, ground levels will be returned to their original state. A trenchless installation method will be used to install the gas pipeline under the Kilwarden River Crossing (RVX01) and Yellow River Crossing (RVX02) which will reduce ground disturbance and change to ground levels.
- The associated AGI plant is located in Flood Zone C and has a greater than 1m freeboard over the predicted 0.1% AEP flood event.
- Due to the location of the pipeline and the mitigation methods employed, the potential impacts from flooding to the pipeline are considered negligible. There will be no impact to groundwater flow as a result of the mitigation methods related to the pipe drilling and trench construction methods.

Therefore, the likelihood of a flood initiating a major accident at the Proposed Development is negligible and the likelihood of the proposed project causing a flood is negligible; therefore, as likelihood of the occurrence is very low/negligible there are no likely significant effects.

2.6.5.5 Extreme Weather, storm events, lightening, heat or cold resulting in result structural damage and/or pollution to soils, groundwater or surface waters

Once the pipeline is constructed and operational the pipeline is buried underground; thus, it is not vulnerable to extreme weather.

Therefore, the likelihood of an extreme weather initiating a major accident at the Proposed Development is negligible and the likelihood of the proposed project causing a flood is negligible; therefore, as likelihood of the occurrence is very low/negligible there are no likely significant effects.

2.6.5.6 Pollution to soils / Groundwater / Surface waters

There is no storage of potentially polluting or relevant hazardous substances to water during operation. There is a low risk leaks and spillages of the fuel and oil during maintenance activities.

The likelihood of a major spill or pollution event initiating a major accident at the Proposed Development is negligible and the likelihood of the proposed project causing a major spill or pollution event is negligible; therefore, as likelihood of the occurrence is very low/negligible there are no likely significant effects.

2.6.6 Potential Impacts During Operation and Mitigation Measures

During operation, the GNI 143 Ballykilleen Pipeline will be buried underground and therefore will not generate any regular operational, noise emission, there will be no regular emissions to the atmosphere, or waste generation. Routine maintenance activities will result in negligible vehicle movements and a low risk of contamination from leaks/spills from maintenance activities.

Each chapter of this EIA Report assesses the potential impact of the operation of the Proposed Development on the receiving environment. Please refer to each specialist chapter respectively.

2.7 Changes to the Project/Decommissioning

The lifespan of the Proposed Development is not defined but it is anticipated that it will be maintained, and periodic upgrading undertaken over a long lifetime to meet future demand and upgrade in technology.

If the GNI 143 Ballykilleen Pipeline is no longer required over the long term, then full decommissioning in accordance with prevailing best practice will be undertaken. Transmission pipelines at the end of their operational life are degassed and isolated at the inlet and outlet. The installation shall be filled with 500 mbar of nitrogen within 1 month of the customer's decommissioning date. The GNI 143 Ballykilleen Pipeline is filled with grout in line with standard GNI pipeline decommissioning procedures. The gas transmission property, plant, and equipment shall be decommissioned in line with the transmission decommissioning process AM/BP/107.

The costs associated with the decommissioning, removal and disposal of the asset will be met by GNI.

2.8 Description of Related Development(s)

In the context of an EIA, a "related development" refers to any other proposed, ongoing, or planned project, activity, or undertaking that is directly or indirectly connected to the Proposed Development under assessment. These related developments can have various interactions with the Proposed Development being evaluated, potentially resulting in cumulative environmental effects that need to be considered.

As part of the assessment of the impact of the Proposed Development, account has been taken of the potential for Cumulative Impacts with the related developments set out in this section in Chapter 17.

2.8.1 Development at Edenderry Renewable Energy Complex

The purpose of the proposed GNI 143 Ballykilleen Pipeline to connect from the existing 750mm NB BGE77 pipeline (also known as Pipeline to the West (PTTW)) to the Edenderry Renewable Energy Complex. The Proposed Development is intended to facilitate the conversion of the existing Cushaling Peaker Plants within the Edenderry Renewable Energy Complex from their current single-fuel operation (liquid fuel) to dual-fuel operation, with natural gas as the primary fuel and HVO retained as backup.

The following related development will occur at the Edenderry Renewable Energy Complex (subject to final design):

- Construction of a new internal gas transmission pipeline linking the Ballykilleen AGI to the existing gas turbine compound;
- Installation of new gas skids within the turbine area to facilitate gas delivery serving the four turbine units;
- Conversion of the existing fuel system from liquid-fuel-only operation to a dual-fuel configuration, enabling firing on natural gas as the primary fuel;
- Retention of liquid fuel as backup to ensure security of supply and operational flexibility during outages or during periods requiring rapid response;
- Modifications to internal plant pipework, valves and ancillary controls to enable safe and efficient fuel switching;
- Operation of the peaking units on natural gas under normal conditions, without any change in operating hours, operational frequency, plant mode, or overall operational status.
- Site clearance, demolition, removals, and preparation works for the development of the Ballykilleen AGI, including diversion of existing ESB Networks 20 KV power lines.

As a result of this fuel transition, this related development will be subject to consenting changes. Updates or alterations will be required to be undertaken by Bord na Móna to the existing regulatory consents, including:

- The Industrial Emissions (IE) Licence (EPA Ref. P0482-04);
- The Greenhouse Gas (GHG) Permit (EPA Ref. IE-GHG166-104292).

Based on the nature, scale and location of the associated works, it is expected that the majority of plant-side modifications, new gas skid, and underground utility connections are likely to constitute Exempted Development (i.e., development not requiring planning permission). This remains subject to confirmation during later design stages and consultation with the relevant consenting bodies.

At this stage of the project, the design of the above elements requires further design to determine the full extent of works required. However, in order to consider the potential for cumulative effects arising from the Proposed Development, and in accordance with the requirements of the EIA Directive and EPA Guidelines (2022), it is necessary to present the available information on the related development so that its cumulative effects can be appropriately assessed.

The plant-side modifications to the existing turbines primarily involve the reconfiguration of existing plant, the replacement of existing equipment, and the installation of new gas skids.

As per ESB Networks procedures, engagement on diversion design, confirmation of the final diversion method—overhead re-routing or undergrounding—cannot be provided at this stage. Responsibility for progressing the ESB diversion lies with Bord na Móna as the landowner. Following the granting of planning permission, BnM will submit a formal diversion application to ESB Networks, who will assess feasible rerouting options.

The plant-side modifications to the existing turbines and ESB line diversion activities are small in scale and are likely to be located in close proximity to the existing infrastructure within the wider established industrial site. In the context of the existing industrial environment, these works are not expected to give rise to significant construction impacts.

The main construction activity associated with the related development is the installation of the new internal gas transmission pipeline required to connect the Ballykilleen AGI to the turbine compound.

In this context, a preliminary routing assessment has been undertaken to provide an indicative alignment of the internal gas transmission pipeline for the purposes of cumulative impact assessment. The indicative

alignment is subject to further refinement, including additional site investigations, verification of third-party services, and engineering assessments as the project progresses to the detailed design stage. These activities may result in localised adjustments or minor modifications to the proposed route.

Three feasible route options have been identified Option A, Option B, and Option C as shown in Insert 2-12.

Option A (Preferred Route)

- Shortest route (~260 m).
- Minimal interaction with utilities.
- Limited tree/vegetation removal (mainly hedgerow and young trees).
- Avoids major stormwater/foul crossings.
- Traverses a small, forested area but avoids the larger wooded section.

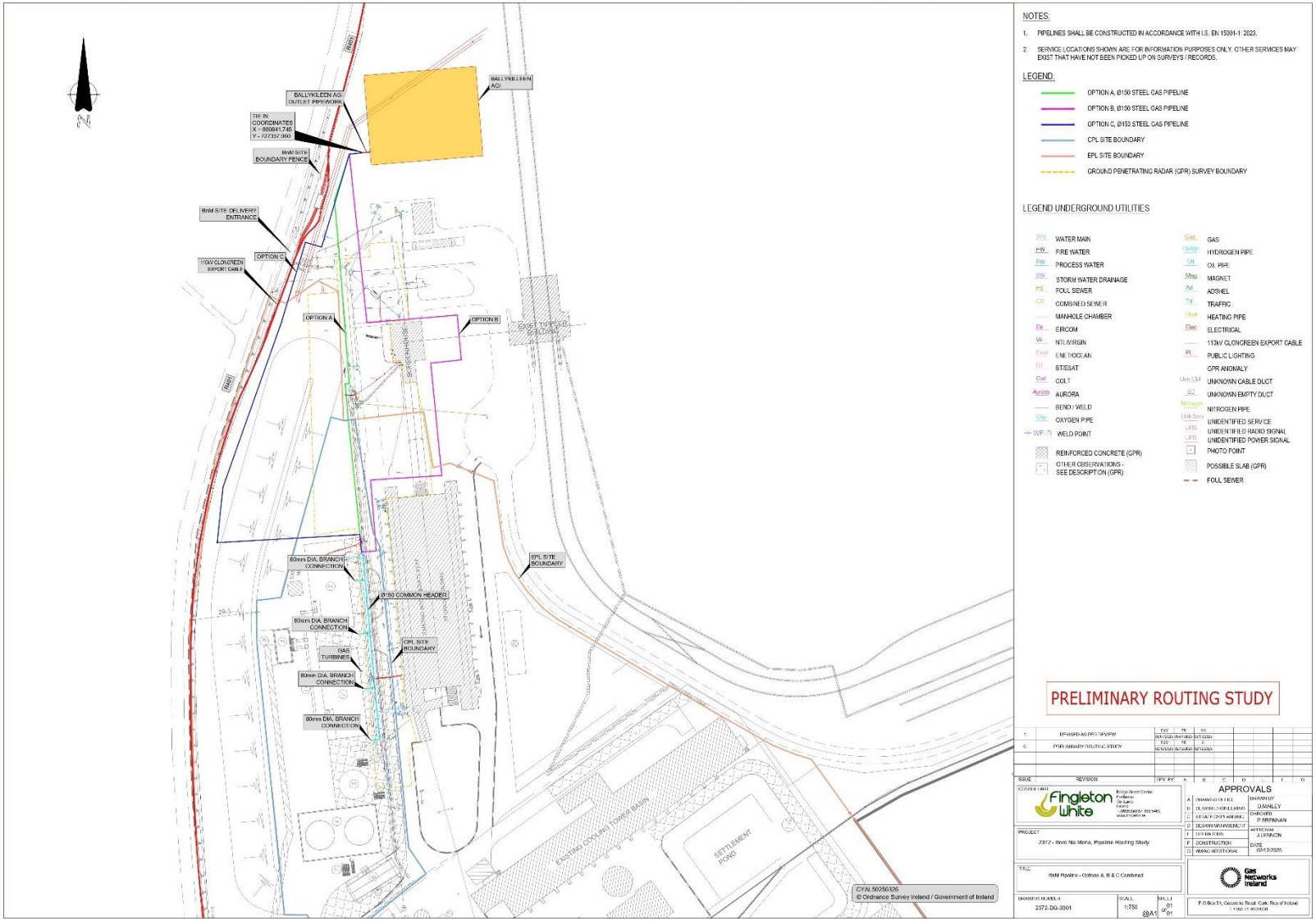
Option B

- Longest route (~342 m).
- Avoids forested area but requires multiple stormwater crossings.
- Greater interaction with existing site services (e.g., LV cables, foul sewer).

Option C

- Medium length (~332 m).
- Runs inside the boundary fence line for 170 m.
- Parallels a 110 kV export cable, posing potential electrical interference concerns.
- More extensive passage through wooded screening areas.

Insert 2-12 Potential Connection from Ballykilleen AGI to Cushaling Peaker Plant



2.8.2 Potential Impacts from Related Projects and Mitigation Measures

Chapter 17 considers the potential for Cumulative Impact with Related Development. This includes developments within the Edenderry Renewable Energy Complex.

The timeline for the delivery of the related development is not currently known. In a worst-case scenario, construction of the Proposed Development could overlap temporally with the related development, and therefore the potential for cumulative impacts must be assessed, in accordance with the EPA Guidelines (2022) and the EIA Directive. On this basis, the potential for cumulative effects has been assessed.

Information on the related development has been described in Section 2.8.1 to support this cumulative assessment. In addition:

- Appendix 2.4 of the EIAR provides a high-level appraisal of environmental considerations associated with related development works within the Edenderry Renewable Energy Complex, including planning and permitting considerations, major accident hazards (Seveso/COMAH) status, climate impacts and air emissions.
- Appendix 2.5 of the EIAR a Preliminary Ecological Appraisal (PEA) of lands within the Edenderry Power Plant, identifying baseline ecological conditions, designated sites, habitats, and species records.

These supporting assessments inform the identification of potential interaction pathways between the Proposed Development and related projects. Chapter 17 provides a detailed cumulative impact evaluation informed by the potential interaction pathways identified here.

2.8.2.1 Construction Phase

The plant-side modifications within the Edenderry Renewable Energy Complex are small in scale, confined within the footprint of existing infrastructure, and largely involve the reconfiguration of existing equipment or the installation of small items of new plant. These works would not proceed in the absence of the Proposed Development, as the proposed GNI 143 Ballykilleen Pipeline is an enabling piece of infrastructure.

However, the construction of the internal gas transmission pipeline associated with the related development may give rise to short-term environmental effects. When considered in combination with the Proposed Development, potential cumulative construction-phase impacts may include:

- Temporary dust emissions, especially where excavation, trenching and reinstatement occur concurrently with related works;
- Short-term construction noise, including movements of machinery, vehicles and excavation equipment;
- Localised risk of surface water or groundwater pollution, arising from excavation, fuel storage, accidental spillages or poor management of construction materials;
- Temporary traffic interactions, if construction overlaps with other site deliveries or regional construction activity;
- Ecological impacts, including removal of vegetation, disturbance to flora and fauna, and potential temporary fragmentation of habitat or movement corridors within the site;
- Temporary landscape and visual disturbance, related to construction compounds, machinery and exposed ground, although such impacts are minor within an existing industrial landscape;
- Temporary impacts on soil quality, including compaction, exposure and loss of topsoil within working areas.

These potential cumulative impacts are expected to be short-term and manageable, provided that standard construction-phase mitigation measures—such as dust suppression, noise management, ecological

protection measures, spill prevention, and traffic control—are implemented. While some cumulative effects may arise if both projects progress simultaneously, they will be temporary in duration.

2.8.2.2 Operational Phase

During the operational phase of the Proposed Development, the underground gas transmission pipeline will have no direct outward emissions. The nature of the development—being fully buried below ground, generating no routine air, noise, or water emissions, and functioning solely as a passive piece of infrastructure designed for the transportation of natural gas—means that it does not give rise to any operational activities that could interact cumulatively with other nearby developments. As a result, and taking into account the mitigation outlined in this EIAR, there are no likely significant cumulative impacts during the operational phases of related projects.

As an enabling project, the pipeline will supply natural gas to the Edenderry Renewable Energy Complex. The downstream operational emissions associated with the Cushaling Peaker Plant are governed under the facility's own regulatory framework, including:

- Industrial Emissions (IE) Licence P0482-04,
- Greenhouse Gas (GHG) Permit IE-GHG166-10429-2,
- and any additional amendments required by the EPA as part of the fuel transition.

The operational indirect climate impacts associated with the peaking plant are assessed and controlled under its own permissions; it is acknowledged that the Proposed Development indirectly facilitates the Cushaling Peaker Plant by providing the fuel supply to transition from their current single-fuel operation (liquid fuel, primarily hydrotreated vegetable oil (HVO)) to dual-fuel operation.

The GNI 143 Ballykilleen Pipeline itself does not generate emissions during operation and does not directly alter the scale, design, or permitted operations of the Cushaling Peaker Plant. Accordingly, indirect climate effects arising from end-use combustion are attributable to the licensed installation rather than the Proposed Development. No significant indirect cumulative environmental effects are predicted from the pipeline infrastructure alone. The consideration of the indirect cumulative climate impacts is included in Chapter 17.

2.8.2.2.1 Control of Major Accident Hazards (COMAH) Status Assessment

A Control of Major Accident Hazards (COMAH) status assessment has been undertaken for the Edenderry Renewable Energy Complex in the context of the Proposed Development and the related conversion of the existing Cushaling Peaker Plant from liquid fuel to natural gas. The assessment has been completed in accordance with the Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015), which transpose the Seveso III Directive into Irish law.

The purpose of the assessment was to determine whether the Proposed Development, either alone or in combination with the related fuel conversion works, would alter the COMAH status of the Edenderry Renewable Energy Complex or introduce a major accident hazard requiring control under the COMAH Regulations.

The assessment considered:

- existing and predicted inventories of dangerous substances;
- the classification of substances under Schedule 1 of the COMAH Regulations;
- the application of the COMAH factorisation rule across health, physical and environmental hazard categories; and
- the contribution of natural gas inventories associated with the internal pipeline.

The assessment concludes that:

- the Edenderry Renewable Energy Complex is currently classified as a sub-COMAH status facility; and
- following conversion of the Cushaling Peaker Plant to natural gas, the facility will remain a sub-COMAH status facility, with factorisation totals remaining well below the lower-tier thresholds defined in the COMAH Regulations.

Accordingly, the provisions of the COMAH Regulations 2015 do not apply to the facility either before or after implementation of the Proposed Development. The Proposed Development does not introduce a major accident hazard within the meaning of the COMAH regulatory framework.

2.9 Other Existing and/or Approved Projects Within the Surrounding Area

As part of the assessment of the impact of the Proposed Development, account has been taken of relevant developments that are currently permitted, or under construction and substantial projects for which planning has been submitted within the surrounding areas. Chapter 17 considers the potential for Cumulative Impact with other Existing and/or Approved Projects.

The identification of relevant, currently permitted, and future developments follows a two-fold approach. Firstly, a comprehensive search is undertaken to identify all reasonably foreseeable developments within the vicinity of the Proposed Development site. Subsequently, a review of the magnitude, size, scale, location and current status of these developments is undertaken to assess their potential to contribute to significant cumulative effects. This review was undertaken in accordance with the methodology set out in Section 17.4 of Chapter 17, with the findings of the search and screening exercise provided in Appendix 2.3 of the EIAR.

Based on this assessment, three other developments have been identified as being of particular relevance due to their scale and proximity to the Proposed Development:

- An application by EirGrid plc to upgrade the existing Rinawade – Dunfirth Tee – Kinnegad 110 kV overhead line (Office of the Chief Electrical Inspector Reg. Ref.: 2560500). This project intersects the Proposed Development boundary immediately south of the Yellow River crossing only (approximately chainage 11,350–11,700).
- The Water Supply Project – Eastern and Midlands Region (An Coimisiún Pleanála Reg. Ref.: 323980). A road crossing identified as RDX087 within this project interacts with the Proposed Development at crossing locations RDX17 and WCX29.
- The Ballydermot Wind Farm, which is located in the wider vicinity of the Proposed Development. This project is not currently within the planning system; however, information on the potential extent of the development has been obtained from publicly available sources (ballydermotwindfarm.ie) and is considered at a high level for contextual completeness.

In addition, a potential future inner/outer relief route is identified at plan level within the Edenderry Local Area Plan 2023–2029 and the associated Edenderry Municipal District – Local Transport Plan. This proposal is indicative in nature only. As such, the relief route is not sufficiently defined to constitute a reasonably foreseeable project for the purposes of cumulative effects assessment under EIA, and a meaningful assessment of potential cumulative environmental effects cannot be undertaken at this stage. On this basis, it has not been included within the scope of the cumulative effects assessment presented in Chapter 17.

2.9.1 Potential Impacts from Other Existing and/or Permitted Projects and Mitigation Measures

2.9.1.1 Construction Phase

The construction of the Proposed Development will be short term in duration, during this period there is the potential for localised nuisance effects where construction activity associated with nearby permitted developments overlaps spatially or temporally with the pipeline works.

- Dust generation, particularly during earthworks, excavation, and reinstatement activities.
- Construction noise, including intermittent noise from machinery, vehicle movements, and temporary traffic management.
- Traffic-related disturbance, where construction traffic from multiple projects may use overlapping road networks.
- Temporary visual and amenity impacts, particularly if multiple construction compounds or work fronts are active in the same local area.

These potential impacts are manageable through the implementation of standard construction mitigation measures as set out in the EIAR and the oCEMP.

2.9.1.2 Operational Phase

Due to the nature of the Proposed Development i.e. underground transmission gas pipelines, there are no regular activities during the Operational Phase.

Accordingly, the EIAR concludes that there is no potential for cumulative operational-phase impacts arising from the Proposed Development in combination with existing and/or approved developments in the surrounding area.