HERBATA DATA CENTRE, NAAS

EIAR
VOLUME I MAIN TEXT – CUMULATIVE EFFECTS AND INTERACTIONS

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17 CUMULATIVE EFFECTS AND INTERACTIONS

17.1 Introduction

The EIA Directive and its transposing Regulations requires that in addition to assessing impacts on human beings, fauna, flora, soil, water, air, climate, landscape, material assets and cultural heritage, the interrelationship between these factors in-combination must be taken into account as part of the environmental impact assessment process.

EPA's 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (EPA, 2022) provides a checklist for the assessment of cumulative effects, it should be considered whether the EIAR has:

- *'described cumulative effects?*
- *considered cumulative effects due to cumulation of effects with those of other projects that are existing or are approved but not yet built or operational?'*

The assessment presented in this EIAR Chapter draws on the assessment of impacts provided in Chapters of this EIAR, and information in the public domain relating to other known developments within the Study Area.

This EIAR is provided in accordance with the EU EIA Directive 2011/92/EU1 and EIA Directive 2014/52/EU and the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018, in order to inform the consideration of the Application and provide the planning authority with the environmental information that must be taken into account when determining the Application.

The requirement for cumulative and combined impact assessments is stated in the relevant European Directive and domestic legislation, as detailed below:

- European Directive 2014/52/EU on the assessments of effects of certain public and private projects on the environment requires an assessment of: "the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the project".
- S.I. No. 296/2018 - European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 – "the cumulation of effects with other existing or approved developments, or both, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources", and (ii) the description of the likely significant effects on the factors specified in paragraph (b)(i)(I) to (V) of the definition of 'environmental impact assessment' in section 171A of the Act should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and longterm, permanent and temporary, positive and negative effects of the proposed development, taking into account the environmental protection objectives established at European Union level or by a Member State of the European Union which are relevant to the proposed development.

17.2 Interaction and In-combination Effects

Table 17.2 (at end of this chapter) is a matrix table indicating the significant inter-relationships that are likely to occur between the various environmental disciplines with regard to the proposed development. Where a cross exists in a box in the table, this indicates that a relationship exists between the two environmental areas. The purpose of the table is to allow interaction between various disciplines to be recognised, although the level of interaction and in-combination effect will vary in each case. It is assumed in presenting this table that an environmental discipline has a potential inter-relationship both during the construction and operational phases of the development. An assessment of expected interaction and in-combination effect is given in Table 17.1.

Table 17.1: Summary of Interaction and In-combination Effects

Environmental Discipline	Inter-relationship with	Interaction and In-combination Effects
Biodiversity	Landscape and Visual	Existing external boundary trees and hedgerows will be retained, protected, and augmented with additional native tree and hedge planting where necessary. Around the eastern boundary of the site to the M7, there will be a 30m wide landscape buffer provided. On other boundaries a minimum 10m buffer will be provided, which will allow for earth mounding and native, screen woodland planting to be provided to help integrate the development into the landscape, mitigate visual effects and increase site biodiversity. Only those trees which require removal to facilitate the development will be replaced. All other trees which can be maintained within the Project shall be retained and protected from damage in accordance with BS 5837:2012 (Trees in relation to design, demolition, and construction). It is important that a landscape management plan is prepared to ensure the healthy establishment of all trees within the Project and the replacement of any dead or dying plants in subsequent year
	Land andSoils	Earthworks by heavy plant in proximity to surface waters carries an inherent risk of pollution of watercourses. There is a risk involved with any construction activity in proximity to surface waters that a pollution incident might arise and result in spills or leaks of polluting substances.
	Water and Hydrology	Both temporary and permanent impacts on surface waters may occur during construction. Pollution from mobilised suspended solids (silt) is the prime concern. Suspended sediment due to run off from stripped construction areas, stockpiled earth and the dewatering of excavations can have a severe negative impact on water quality. If allowed to enter surface watercourses this run off can give rise to high suspended solids and detrimental impacts.
	Noise and Vibration	Disturbance from noise can impact on wildlife depending on the host environment. The noise consultant has liaised with the ecology team during the EIA process to ensure they were aware of the noise impact assessment process including sources of noise during construction and operation and predicted impacts.
Lands andSoils	Water and Hydrology	Both temporary and permanent impacts on surface waters may occur during construction. Pollution from mobilised suspended solids (silt) is the prime concern. In addition to their contribution to sediment release soil erosion, removal of vegetation cover, soil compaction (caused by the bearing weight of heavy machinery) and increased hard standing can alter preferential drainage paths and ultimately change the hydrological regime of a watercourse by changing the timing and magnitude of flows entering it thus exacerbating sediment movement. In the absence of mitigation these processes have the potential to have permanent effects on associated watercourses downstream of the application site having a knock-on effect on water quality.
	Biodiversity	Earthworks by heavy plant in proximity to surface waters carries an inherent risk of pollution of watercourses. There is a risk involved with any construction activity in proximity to surface waters that a pollution incident might arise and result in spills or leaks of polluting substances.
	Material Assets – Built Services	Excavation of soils and reduction of levels on site can lead to direct impact on utilities above and below ground. Subject to mitigation measures including close liaison with utility companies in advance of construction no significant effects are predicted.
	Air Quality	Earthworks and disturbance of soils has potential to impact upon air quality. As the risk of dust impact on receptors from soiling has been

Environmental Discipline	Inter-relationship with	Interaction and In-combination Effects
		identified to range from medium to high during the demolition stage specifically, the highest risk category should be applied when considering general mitigation measures.
	Noise and Vibration	Machinery used in earthworks and construction could increase noise levels. No significant noise effects are predicted with implementation of mitigation measures. Mitigation by careful scheduling of the works, timing of activities and using best practicable will be implemented such that no significant effects arise, and levels are as low as possible.
Water and Hydrology	Land and Soils	Both temporary and permanent impacts on surface waters may occur during construction. Pollution from mobilised suspended solids (silt) is the prime concern. In addition to their contribution to sediment release soil erosion, removal of vegetation cover, soil compaction (caused by the bearing weight of heavy machinery) and increased hard standing can alter preferential drainage paths and ultimately change the hydrological regime of a watercourse by changing the timing and magnitude of flows entering it thus exacerbating sediment movement. In the absence of mitigation these processes have the potential to have permanent effects on associated watercourses downstream of the application site having a knock-on effect on water quality.
	Biodiversity	Both temporary and permanent impacts on surface waters may occur during construction. Pollution from mobilised suspended solids (silt) is the prime concern. Suspended sediment due to run off from stripped construction areas, stockpiled earth and the dewatering of excavations can have a severe negative impact on water quality.
Air Quality	Land and Soils	Earthworks and disturbance of soils has potential to impact upon air quality. As the risk of dust impact on receptors from soiling has been identified to range from medium to high during the demolition stage specifically, the highest risk category should be applied when considering general mitigation measures.
	Population, Human Health	Construction of the proposed development has the potential to influence human health from nuisance dust and from changes to local air quality associated with construction traffic. However, the human health effects from changes to air quality are predicted to be of local spatial extent, short term duration and intermittent. It is predicted that the impact is not of a concentration or exposure sufficient to quantify any change in baseline health..
	Water and Hydrology	As outlined in the Site Specific Flood Risk Assessment the Project is located wholly within Flood Zone C where the probability of flooding from the Bluebell stream is less than 0.1% (1 in 1000 years). This means that there will be no risk of the site being subjected to flooding during the construction of the development and the risk of impacts of suspended solids and other pollutants from site run-off will be from overland flow generated from rainfall falling on the site and not from flood waters from the Bluebell Stream (Liffey_100 river water body).
Noise and Vibration	Landscape and Visual	Noise has the potential to interact with LVIA due to the creation of noise attenuation measures. Temporary construction noise barriers will be used to achieve attenuation of noise levels between ground based construction plant and the nearest noise-sensitive properties.There is a potential relationship with LVIA, as the visual impact of acoustic barriers bears consideration.

Environmental Discipline	Inter-relationship with	Interaction and In-combination Effects
	Population, Human Health	Potential human health effects from changes in noise exposure would be limited to increased annoyance from a reduction in local amenity during the daytime. This would be a direct and local impact resulting from on-site construction activities and associated transport movements. Due to the nature of the construction period, the impact would be short term and intermittent. The human health effects from changes in noise exposure are predicted to be of local spatial extent, short term duration and intermittent. It is predicted that the impact will affect the receptor directly, but is not of a magnitude, exposure, duration or timing to quantify any change in baseline health.
	Biodiversity	Disturbance from noise can impact on wildlife depending on the host environment. The noise consultant has liaised with the ecology team during the EIA process to ensure they were aware of the noise impact assessment process including sources of noise during construction and operation and predicted impacts. Overall predictions are that there will be no significant noise impact generated during construction or operation when ecological features are assessed.
	Land and Soils	Machinery used in earthworks and construction could increase noise levels. No significant noise effects are predicted with implementation of mitigation measures. Mitigation by careful scheduling of the works, timing of activities and using best practicable will be implemented such that no significant effects arise, and levels are as low as possible.
	Traffic and Transportation	Construction traffic noise will be controlled through management of parking, loading and traffic arrangements. These will be managed by the contractor to reduce traffic volumes and in and around the site prevent congestion.
Cultural Heritage	Landscape and Visual	Developments can sometimes infringe upon the amenity use and visual setting of a cultural heritage feature and as a result lead to unacceptable impacts. The proposed development will introduce a new type of development within the local area.
	Climate	Buried archaeological deposits, particularly those that may contain waterlogged deposits (preserved in situ) can be vulnerable to the effects of climate change, including increased cycles of wetting and drying causing changeable ground conditions. Extreme temperatures (both high and low) can have an effect on the soil structure and levels of preservation of organic remains (wood, pollen, charred remains etc.). Proposed mitigation will provide for a stable ground environment via engineered project design (drainage provisions). Monitoring of ground conditions during operational phase advised.
Landscape and Visual	Land and Soils	The quality of the excavated material will dictate if it can be reused on site in landscaped areas. The material of lower quality that cannot be adopted into the proposed development and used on site as landscape fill material will need to be reused or disposed off-site. There are a number of viable options that will be considered, all with the aim of ensuring no impact on the receiving environment. The proposed development will result in a surplus of excavated material, which may contain contaminants. Any contaminated material will be exported to an approved licensed waste facility.
	Biodiversity	Only those trees which require removal to facilitate the development will be replaced. All other trees which can be maintained within the Project shall be retained and protected from damage in accordance with BS 5837:2012 (Trees in relation to design, demolition, and construction).

Environmental Discipline	Inter-relationship with	Interaction and In-combination Effects
		It is important that a landscape management plan is prepared to ensure the healthy establishment of all trees within the Project and the replacement of any dead or dying plants in subsequent year
	Noise and Vibration	Noise has the potential to interact with LVIA due to the creation of noise attenuation measures. Temporary construction noise barriers will be used to achieve attenuation of noise levels between ground based construction plant and the nearest noise-sensitive properties.
	Cultural Heritage	Developments can sometimes infringe upon the amenity use and visual setting of a cultural heritage feature and as a result lead to unacceptable impacts. The proposed development will introduce a new type of development within the local area. The introduction of the proposed development will not however impact upon any inter-relationships between monuments located within the local landscape.
	Material Assets – Built Services	Excavation of soils and reduction of levels on site can lead to direct impact on utilities above and below ground. Subject to mitigation measures including close liaison with utility companies in advance of construction no significant effects are predicted.
	Climate	Impact of the Project on the surrounding landscape. Proposed planting has been identified as resilient to projected climate change.
Traffic and Transportation	Air Quality	Potential air quality effects during the construction phase can occur due to dust emissions and from construction traffic movements, with the pollutants of most concern being nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$).
	Human Health	Construction works and constructed-related vehicles and traffic have the potential to disrupt local vehicle traffic (private and public transport) as well as some sustainable travel (bus routes) and active travel (pedestrians and cyclists). This may include health-related journey times, community severance or road safety. There is also potential for increases in vehicle movements during the operational phase, relating to the movement of materials and people to and from the Project site, which may cause delays in local vehicle traffic and health-related journey times and disruptions in active travel.
Material Assets – Built Services	Landscape and Visual	The alteration to existing utilities on the site has potential for visual impact. As far as practicable utilities will be underground and not visible. No significant landscape or visual effects are predicted. New landscape planting will have a beneficial landscape effect.
	Land and Soils	Excavation of soils and reduction of levels on site can lead to direct impact on utilities above and below ground. Subject to mitigation measures including close liaison with utility companies in advance of construction no significant effects are predicted.
Population and Human Health	Noise and Vibration	Potential human health effects from changes in noise exposure would be limited to increased annoyance from a reduction in local amenity during the daytime. This would be a direct and local impact resulting from on-site construction activities and associated transport movements. Due to the nature of the construction period, the impact would be short term and intermittent. The human health effects from changes in noise exposure are predicted to be of local spatial extent, short term duration and intermittent. It is predicted that the impact will affect the receptor directly, but is not of a

Environmental Discipline	Inter-relationship with	Interaction and In-combination Effects
		magnitude, exposure, duration or timing to quantify any change in baseline health. The magnitude is therefore considered to be negligible.
	Traffic and Transportation	An increase in HGVs and vehicle movements has the potential to change the transport nature (composition and flow rate on local roads). Depending on the magnitude of change, there is the potential for an increased risk of accident and injury; feelings of isolation from increased severance; and loss of amenity from increased severance or transport disruption. Any change to transport nature and flow rate would be a direct and local impact where due to the nature of the construction period, the impact would be short term and intermittent. The human health effects from changes in transport nature and flow rate are predicted to be of local spatial extent, short term duration and intermittent. It is predicted that the impact will affect the receptor directly but is not of an order of magnitude sufficient to quantify any change in baseline health outcome. The magnitude is therefore considered to be negligible.
	Air Quality	Construction of the proposed development has the potential to influence human health from nuisance dust and from changes to local air quality associated with construction traffic. However, the human health effects from changes to air quality are predicted to be of local spatial extent, short term duration and intermittent. It is predicted that the impact is not of a concentration or exposure sufficient to quantify any change in baseline health. The magnitude is therefore considered to be negligible.
Climate	Landscape and Visual	Impact of the Project on the surrounding landscape. Proposed planting has been identified as resilient to projected climate change.
	Biodiversity	Impact of temporary and permanent habitat loss and disturbance during construction of the Project. Proposed planting has been identified as resilient to projected climate change.
	Cultural heritage	Buried archaeological deposits, particularly those that may contain waterlogged deposits (preserved in situ) can be vulnerable to the effects of climate change, including increased cycles of wetting and drying causing changeable ground conditions. Extreme temperatures (both high and low) can have an effect on the soil structure and levels of preservation of organic remains (wood, pollen, charred remains etc.). Proposed mitigation will provide for a stable ground environment via engineered project design (drainage provisions). Monitoring of ground conditions during operational phase advised.
	Human Health	Impact of climate change on the health of Project users during its operation. Increasing temperatures may impact those using the site during its operation. The human health assessment scopes in climate change within its operational phase assessment, as a determinant of health.

17.3 Cumulative Effects

17.3.1 Introduction

Cumulative effects are those that accrue over time and space from a number of development activities – the impact of the Project is considered in conjunction with the potential impacts from other projects or activities which are both reasonably foreseeable in terms of delivery (i.e. have planning consent or relevant applications which have been submitted and are in the planning system) and are located within a realistic geographical

scope where environmental impacts could act together with the Project to create a more significant overall effect.

As identified in Chapter 1 of the EIAR (Section 1.4), there are a number of other projects which have been identified for consideration in terms of their potential for cumulative effects. A number of planning applications (permitted, submitted but undetermined and under construction) have been identified within the locale of the Project site. While a range of applications have been submitted or approved within proximity to the Project, namely within the Osberstown Business Park and M7 Business Park. It is not considered that such proposals, which will take place within areas of existing development would have potential to act cumulatively with the Project.

17.3.1.1 GNI Infrastructure Upgrade

As identified in Chapter 1 of the EIAR (Section 1.4.4), the Project will require a physical connection to the gas network to supply the on-site gas turbines. The GNI Infrastructure Upgrade Outline Report, identifying the specification and most likely route for the connection and a description of the works required to provide same, is included in Volume II, Appendix 1.2. The report provides sufficient detail and information to allow a robust cumulative impact assessment to be conducted.

The GNI Infrastructure Upgrade Outline Report notes that the proposed works will likely include the construction of a new circa 300mm dia. high pressure gas pipeline which is likely to follow the existing pipeline route from the Glebe West AGI to the Naas Town AGI. From there it will most likely closely follow the existing low-pressure distribution network around the Southern Link Road to the junction with the R445 Newbridge Road, cross the Grand canal and follow the existing public foul sewer network wayleave across agricultural lands in a north-westerly direction towards the Project site.

17.3.1.2 Biodiversity

As identified in Chapter 1 of the EIAR (Section 1.4.4), the Project will require a physical connection to the gas network to supply the on-site gas turbines. The GNI Infrastructure Upgrade Outline Report, identifying the specification and most likely route for the connection and a description of the works required to provide same, is included in Volume II, Appendix 1.2.

The construction works for the for the gas pipeline will likely comprise of a 14m working corridor within areas of agricultural land, in addition to works within the verge of public roads and watercourse crossings at three watercourses and a large number of minor drainage ditches and field drains. The method of constructing this crossing (and other watercourses along the likely route) will typically consist of either open excavation (from smaller watercourses and ditches) or directional drilling / pipe jacking as appropriate.

On this basis it is considered that the proposed gas pipeline connection to the project will have no potential to give rise to any cumulative effects upon ecological receptors when considered alongside the Project.

Given the nature of the impacts upon biodiversity which are predicted to arise in association with the Project, in addition to the mitigation measures which are set out in Section 5.5 below, it is not envisaged that the Project would have potential to give rise to any further potential significant effects when considered cumulatively with the nearby assessed projects.

17.3.1.3 Lands and Soils

The GNI Infrastructure Upgrade Outline Report notes that the proposed works will likely include the construction of a new circa 300mm dia. high pressure gas pipeline which is likely to follow the existing pipeline route from the Glebe West AGI to the Naas Town AGI. From there it will most likely closely follow the existing low-pressure distribution network around the Southern Link Road to the junction with the R445 Newbridge Road, cross the Grand canal and follow the existing public foul sewer network wayleave across agricultural lands in a north-westerly direction towards the Project site.

A desktop review of the proposed high pressure gas pipeline route was undertaken to assess potential impacts on lands and soils along the most likely route.

The works associated with the proposed new pipeline involve the excavation of a trench to install the new pipe, circa 1.2m deep for approximately 10.5km through agricultural lands, road crossings and along footpaths and verges. The excavated materials will be removed from site and disposed of at appropriately licenced waste facilities. Additionally, works through agricultural lands will also require excavation of topsoils and construction

of temporary haul roads and hardcore working platforms in a corridor circa 14m in width along the route of the pipe. The topsoils will be stockpiled and reinstated along the route as the works progress, following removal of the temporary haul roads and working areas. The impact of these works on Lands and Soils will be Slightly Negative, localised to the works short term and Temporary in nature and are reversible with reinstatement works.

In conclusion, much of the likely pipeline route will follow existing gas pipelines and other services. There are no predicted negative significant cumulative effects on Lands and Soils as a result of these associated projects.

17.3.1.4 Water and Hydrology

As identified in Chapter 1 of the EIAR (Section 1.4), there are a number of other projects which have been identified for consideration in terms of their potential for cumulative effects. Table 7.12 in EIAR Chapter 7 provides an assessment of the potential cumulative effects of these developments (set out in Section 1.4 of Chapter 1)with the Project by establishing their location, hydrologically connective to the Project site and the assessments undertaken for each individual application. Based on the assessment in Table 7.12 it can be concluded that there is no potential for cumulative effects with the Project and these developments.

The likely route of the new pipeline will require crossing a number of watercourses within the Liffey_050, Liffey_100 and Liffey_110 river water bodies, including the Grand Canal, Naas River, Bluebell Stream and numerous land drainage ditches. The method of constructing this crossing (and other watercourses along the likely route) will typically consist of either open excavation (from smaller watercourses and ditches) or directional drilling / pipe jacking as appropriate. GNI will determine the best crossing method for all watercourses as part of their environmental assessment. The final design will be subject to consultations with Waterways Ireland / Inland Fisheries Ireland and Kildare Co. Council Water Services and Environment departments.

GNI will use the standard construction corridor for pipelines on agricultural lands which will usually require a working width that will be fenced off and stripped of topsoil to allow the installation of the pipeline in a trench. The excavated subsoil will be stored separately from the topsoil in the working width to ensure there is no cross contamination.

An GNI Infrastructure Upgrade Outline Report has been used to assess the potential for cumulative effects with the Project.

In terms of water and hydrology, there is the potential for elevated suspended solids in the surface water run-off from the working areas, however pre-construction drainage and a dedicated haul route will ensure that the run off generated will be reduced to a minimum by ensuring on rainfall incident on the working area will have the potential to generate run-off. In addition the best practice measures for pipeline construction as outlined in the CIRIA guidance document C648, Control of water pollution from linear construction projects will be followed by the GNI contractors who will be contractually required to ensure pollution form the working area and the water course crossings do not impact on the water bodies and water courses traversed by the pipeline.

On the basis of the likely route of the pipeline and the minor nature of the water courses traversed, including the selection of the most appropriate crossing technique in consultation with the relevant statutory authorities and the application on best practice it is reasonable to assume that the cumulative effects of the main Project with the GNI gas transmission line connection will not be significant and will not compromise the environmental objectives of the water bodies affected.

17.3.1.5 Air Quality

During construction, dust emissions to air from other committed developments and cumulative emissions sources in the area around the site are not close enough or significant enough to generate cumulative impacts should they occur at the same time, aside from the GNI gas connections project.

In essence, cumulative impacts are those which result from incremental changes caused by other past, present or reasonably foreseeable developments, together with those generated by the planned development. Therefore, the potential impacts of the Project cannot be considered in isolation but must be considered in addition to impacts already arising from existing or planned future development.

After an assessment of potential adverse effects produced by the development, it was concluded that there would be no significant adverse air quality effects for both human and ecological receptors which cumulatively would not hinder the developments proceeding (the Project and the GNI gas connection).

Overall, the effects of the GNI gas connection on air quality are considered to be not significant after the implementation of mitigation measures. For example, as detailed in the IAQM guidance, there may be a provision to hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised.

17.3.1.6 Noise and Vibration

An GNI Infrastructure Upgrade Outline Report has been used to assess the potential for cumulative effects with the Project.

The construction works associated with the proposed gas pipeline will take place during Phase 1 of the construction programme for the Project, as the gas connection will be required in order to bring Data Centres online.

The cumulative construction noise impact of the Project construction programme and the GNI Gas Connection has been reviewed, considering the concurrent Phase 1 construction and Gas Connection construction at the relevant noise-sensitive receptors.

As noted in the GNI Infrastructure Upgrade Outline Report, a large portion of the construction works for the GNI Gas Connection will likely take place across agricultural lands. Works will likely involve a construction corridor of 14m width, centred on the pipeline.

Access to the works on agricultural lands will typically be provided at public road crossing locations. It is not expected that construction traffic for the Gas Connection will be significant in the context of existing traffic flows (see Section 9.5.1.4).

The predicted sound pressure levels, assuming operation of single items of plant and equipment, are at least 60 dBA in all phases/stages of construction. The combination of multiple construction noise sources and concurrent construction activities, stages and phases is likely to give rise to an increase of 5 dB at receptors, therefore exceeding the criterion level of 65 dBA at time during construction.

Significant cumulative construction effects could arise from combinations of noise sources throughout the construction programmes, if works take place concurrently, however these are expected to impact receptors in the short-term only. Combined construction noise effects should be taken into consideration when developing the construction noise management plan for both the Project and the GNI Gas Connection, with mitigation employed as necessary, as discussed in Section 9.5.5 Mitigation.

17.3.1.7 Cultural Heritage

A desktop review of the likely high pressure gas pipeline route was undertaken to assess potential impacts on recorded archaeology and built heritage. Much of the proposed pipeline route will follow existing gas and other service. All existing services will have a zone of disturbance associated with previous construction works in the areas immediately adjacent to the services. However, any undisturbed areas across the proposed pipeline working area that will be impacted by the proposed pipeline construction have the potential to contain previously unrecorded archaeology sub-surface and as such will require archaeological mitigation. The proposed pipeline route as currently understood will run close to a small number of recorded archaeological and built heritage sites, including Hilltop enclosure (KD024-271----) at Tipperkevin. Jigginstown House and associated features (KD019-033001- (Protected Structure NS19-058), KD019-033002-, KD019-033003-, KD019-033004-, KD019-033005-) and Jigginstown Bridge (Protected Structure NS19-060, NIAH11901906). Careful design and micro-routing of the proposed pipeline will ensure that these sites are not directly impacted.

There is no predicted negative significant cumulative effects on cultural heritage as a result of these two associated projects.

17.3.1.8 Landscape and Visual

The methodology for assessment of cumulative impacts has been derived from Guidelines for Landscape and Visual Impact Assessment, Third Edition (The Landscape Institute and Institute of Environmental Management & Assessment, 2013) (GLVIA3).

The significance of any identified cumulative landscape and visual effect has been assessed as per the main LVIA methodology. These categories have been based on the same combination of receptor sensitivity and predicted magnitude of impact in order to identify the residual significance of effects.

As identified in Chapter 1 of the EIAR (Section 1.4), there are a number of other projects which have been identified for consideration in terms of their potential for cumulative effects. These projects with which the Project may possibly have cumulative effects have been considered in order to identify the likely cumulative landscape and visual effects, if any.

These projects, that include Solar Farms, Battery Storage projects and a Data Centre, has established that the nearest project to the Project site is a solar farm located approx. 5km. At these large distances and with substantial buildings and strong vegetation located between the Project sites there is no potential for any cumulative landscape and visual effects. The potential cumulative projects are all to remote from the Project to have any potential for cumulative landscape and visual effects.

Overall, when potential construction and operational stage cumulative landscape and visual effects are considered for the Project in combination with permitted and planned projects they will not result in any significant cumulative landscape and visual effects due to a combination of separation distance, intervening development and the nature and setting of the proposals. Construction stage activities involve an increase in construction traffic for all cumulative projects. HGV traffic is frequent feature of this landscape, and the existing wider Dublin road network consists of very busy roads with low potential for significant cumulative visual impacts as a result. The operational stage activities as part of the Project are sufficiently separated from any permitted or planned projects in the area surrounding the Project to avoid potential cumulative effects while permitted or planned developments within the surrounding area or so similar in character that they are difficult to discern from the existing busy context.

The GNI Infrastructure Upgrade Outline Report, identifying the specification and most likely route for the connection and a description of the works required to provide same, is included in Volume II, Appendix 1.2. The report provides sufficient detail and information to allow a robust cumulative impact assessment to be conducted.

The GNI Infrastructure Upgrade Outline Report indicates that the most likely route for the new high-pressure gas distribution pipeline will be from the location of the existing GNI above ground installations (AGIs) at Glebe West and Naas Town to the Project site following a combination of the existing road network and the route of existing utilities. A large portion of the gas pipeline will likely cross agricultural / open lands will likely require a construction corridor for the works that consists of a 14m wide strip that is normally reinstated to the existing land use. Once constructed and with reinstatement complete a pipeline of this nature will have no cumulative landscape and visual effects as it is below ground. The construction stage will result in activities that will be noticeable but temporary. Construction traffic while visible will blend with existing traffic on the busy road network found in the local landscape with no significant effect. Pipeline work along roads is a common feature in this landscape and temporary and transient in nature and no significant cumulative landscape and visual effects are predicted. Pipeline works on agricultural lands will result in temporary disturbance but will all be reinstated. Overall, when the potential for cumulative landscape and visual impacts are considered there will be no significant cumulative effects for the Project and the GNI Gas Connection.

17.3.1.9 Traffic and Transportation

Overall, when potential construction and operational stage cumulative landscape and visual effects are considered for the Project in combination with permitted and planned projects they will not result in any significant cumulative landscape and visual effects due to a combination of separation distance, intervening development and the nature and setting of the proposals. Construction stage activities involve an increase in construction traffic for all cumulative projects. HGV traffic is frequent feature of this landscape, and the existing wider Dublin road network consists of very busy roads with low potential for significant cumulative visual impacts as a result. The operational stage activities as part of the Project are sufficiently separated from any permitted or planned projects in the area surrounding the Project to avoid potential cumulative effects while permitted or planned developments within the surrounding area or so similar in character that they are difficult to discern from the existing busy context

Many of these projects are associated with the commercial and industrial complexes located to the north and south of the Project site. It is not likely that the Project will result in any negative significant cumulative effects on cultural heritage in combination with these external plans/projects.

The GNI Infrastructure Upgrade Outline Report, identifying the specification and most likely route for the connection and a description of the works required to provide same, is included in Volume II, Appendix 1.2.

The report provides sufficient detail and information to allow a robust cumulative impact assessment to be conducted.

In terms of the construction impacts of the proposed gas pipeline.

a. Works within the agricultural land will not result in any significant impacts upon traffic progression on the sounding road network. Access to the works on the agricultural lands will be taken from the public road network in the general location of where the pipeline will cross the public road. During the construction phase a Traffic Management Plan will be agreed with the Council's Roads Department.

b. Works within / along public roads are likely to result in a short term low impact upon existing traffic progression, prior to commencement of the construction phase Traffic Management Plans will be agreed with the Council's Roads Department to identify traffic management proposals including safety and signage requirements.

c. Construction period is likely to be 7-12 months, however, a considerable portion of the construction period will be working within existing agricultural lands, which will not result in any significant impact upon existing traffic progression.

17.3.1.10 Material Assets – Built Services

The GNI Infrastructure Upgrade Outline Report notes that the proposed works will likely include the construction of a new circa 300mm dia. high pressure gas pipeline which is likely to follow the existing pipeline route from the Glebe West AGI to the Naas Town AGI. From there it will most likely closely follow the existing low-pressure distribution network around the Southern Link Road to the junction with the R445 Newbridge Road, cross the Grand canal and follow the existing public foul sewer network wayleave across agricultural lands in a north-westerly direction towards the Project site.

A desktop review of the likely pipeline route was undertaken to assess potential impacts on existing built services along the route. This included a review of known public drainage and utility services via service provider online mapping systems. There are extensive drainage and utility services located along the most likely route of the pipeline. Normal best practice techniques for avoiding danger from underground and overhead services and extensive planning and survey works will be required to ensure the proposed pipe avoids clashing with local infrastructure and that adequate separation distances from adjacent and proximate services are maintained. The following key items of services infrastructure have been identified along the most likely route of the new pipeline:

- Running alongside existing 150mm dia. high-pressure gas pipeline from Glebe West AGI to Naas Town AGI.
- Crossing 1270mm dia. watermain in agricultural lands west of Glebe West
- Crossing beneath High Voltage Electrical services in agricultural lands west of glebe west
- Crossing 1600mm dia. watermain in agricultural lands west of Glebe West and south of Punchestown racecourse
- Crossing 450mm dia. watermain along L2023 West of Punchestown Racecourse
- Crossing 1200mm surface water sewer at Ballymore Eustace Road Roundabout
- Running adjacent to existing low pressure gas pipeline in verge of Naas Southern Ring Road from Ballymore Eustace Road Roundabout to Newbridge Road.
- Running adjacent to 600mm dia. foul sewer in verge of Naas Southern Ring Road from Ballymore Eustace Road Roundabout to Newbridge Road.
- Running adjacent to 900mm dia. foul sewer in through agricultural lands from Grand Canal to Caragh Road Roundabout

In conclusion, much of the likely pipeline route will follow existing gas pipelines and other services. It is considered that the new pipeline can be delivered along this route without the need to divert or relocate significant existing infrastructure.

There are no predicted negative significant cumulative effects on Material Assets - Built Services as a result of these associated projects.

17.3.1.11 Population

The GNI Infrastructure Upgrade Outline Report, identifying the specification and most likely route for the connection and a description of the works required to provide same, is included in Volume II, Appendix 1.2. The report provides sufficient detail and information to allow a robust cumulative impact assessment to be conducted.

The GNI Infrastructure Upgrade Outline Report indicates that the most likely route for the new high-pressure gas distribution pipeline will be from the location of the existing GNI above ground installations (AGIs) at Glebe West and Naas Town to the Project site following a combination of the existing road network and the route of existing utilities. The nature and extent of the required works indicate a likely construction programme of 7-12 months, during which there will be an increase in employment opportunities.

Once operational, there will no requirement for additional employment associated with the gas connection, therefore there will be no impacts associated with the gas connection. Due to the nature of the development, it is not anticipated that there will be any impacts on the social or demographic characteristics of the Population as a result.

17.3.1.12 Human Health

Cumulative health assessment extends the analysis of potential population health effects. This means a professional judgement is made as to the combined level of effect with other relevant projects and its implications for public health. Following IEMA 2022 guidance for human health, sensitivity of the relevant populations is unchanged from the main assessment in section 15.5, EIAR Chapter 15. Magnitude is however appraised in light of the combined effect of multiple projects.

As set out in IEMA 2022 guidance, a combined public health effect is most likely where a population is affected by multiple determinants of health and a large proportion of the same individuals within that population experience the combination of effects. Chapter 15 Human Health is informed by cumulative assessment conclusions set out in other chapters. The health assessment does not duplicate detail set out in those chapters. Of the chapters listed in section 15.1 and which inform the human health assessment, Chapter 7: Water and Hydrology; Chapter 12: Traffic and Transportation, Chapter 14: Population and Chapter 16: Climate Change provide an assessment of cumulative effects.

The conclusion are not repeated here rather in the subsection detailed with section 17.3 of this chapter.

17.3.1.13 Climate

As stated within the relevant guidance on assessing GHG emissions (IEMA, 2022), the consideration of cumulative effects for GHGs differs from that for many EIA topics where only projects within a geographically bounded study area would be included. This is because the atmospheric concentration of GHGs and their resulting effect on climate change is affected by all sources and sinks globally, not simply those in close proximity to the Project. All developments that emit GHGs have the potential to impact the atmospheric mass of GHGs as a receptor, and so may have a cumulative impact on climate change. Therefore, the effects of GHG emissions from specific cumulative projects should not be individually assessed, as there is no basis for selecting any particular cumulative project that has GHG emissions for assessment over any other.

Consequently, cumulative effects due to other specific local development projects are not individually predicted but are taken into account when considering the impact of the Project by defining the atmospheric mass of GHGs as a high sensitivity receptor, in line with relevant guidance.

However, in order for the Project to receive the gas required to power its generators, a high-pressure gas pipeline will be constructed. Emissions arising from the construction of the gas pipeline are likely to be minimal, given the relatively limited extent of the infrastructure proposed (i.e. carbon associated with the pipeline materials). By way of comparison to the emissions arising from the Project, which are extensive due to the scale of the proposed buildings, plant, and likely server capacity, emissions arising from the gas pipeline are likely to be negligible.

The provision of such a pipeline ensures the supply of gas to the Project, enabling operational emissions reductions through avoiding the use of grid electricity only to power the Project. The gas connection would also enable the Project to benefit from GNI's decarbonisation targets (through the increasing provision of biomethane, abated natural gas, and hydrogen), in turn resulting in the reduction of operational emissions resulting from the Project over its lifetime. Emissions avoided over the Project's lifetime as a result of this

(when compared to a scenario where the Project would be powered by grid electricity) will likely outweigh those emissions resulting from the construction of the pipeline, resulting in a payback.

As such, it is likely that the installation of a new gas pipeline by GNI will result in a minor adverse effect during the construction phase, which is not significant.

Table 17.2: Inter-relationship Matrix – Potential Interaction between Environmental Disciplines

	Biodiversity	Land and Soils	Water and Hydrology	Air Quality	Noise and Vibration	Cultural Heritage	Landscape and Visual	Traffic and Transportation	Material Assets – Built Services	Population	Human Health	Climate Change
Biodiversity		X	X		X		X					
Land and Soils	X		X	X	X							
Water and Hydrology	X	X										
Air Quality		X						X		X	X	
Noise and Vibration	X	X					X	X		X	X	
Cultural Heritage							X					X
Landscape and Visual	X	X			X	X			X			X
Traffic and Transportation										X	X	
Material Assets – Built Services		X					X					
Population				X	X			X				X
Human Health				X	X			X				X
Climate Change	X										X	