Gas Networks Ireland

Network Implementation Plan

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Ove Arup & Partners Ireland Ltd

Arup
50 Ringsend Road
Dublin 4
D04 T6X0
Ireland
www.arup.com

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		Name	Ailsa Doyle	Sinead Whyte	Sinead Whyte
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		Name	Ailsa Doyle	Sinead Whyte	Sinead Whyte
		Signature			
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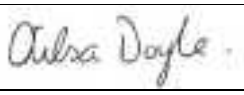
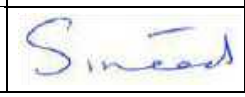
		Name	Ailsa Doyle	Sinead Whyte	Sinead Whyte
		Signature			
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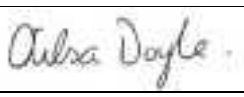
		Signature			
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Appendix A

Figures

Non-Technical Summary

Introduction

This non-technical summary has been prepared to support the Strategic Environmental Assessment (SEA) of the Gas Network Ireland (GNI) Network Implementation Plan (NIP) for the period 2020-2023. This document has been prepared in accordance with relevant EU and national legislation to summarise the Environmental Report for the SEA of the draft NIP. It draws attention to the most important issues outlined in the SEA Environmental Report and describes the key outcomes in non-technical language.

Draft Network Implementation Plan

GNI prepares an annual rolling Network Development Plan (NDP) each year, which provides a view of how the gas network may develop over a ten-year period. The NDP outlines a number of capital investment projects which will be delivered over the coming years (in the short, medium and long-term), including future proposed large capital projects and proposed new technologies. The NDP is a strategic plan which is high-level in nature.

GNI is currently preparing a second plan, the NIP. Refer to Figure NTS 1 for the relationship between the NDP and NIP.

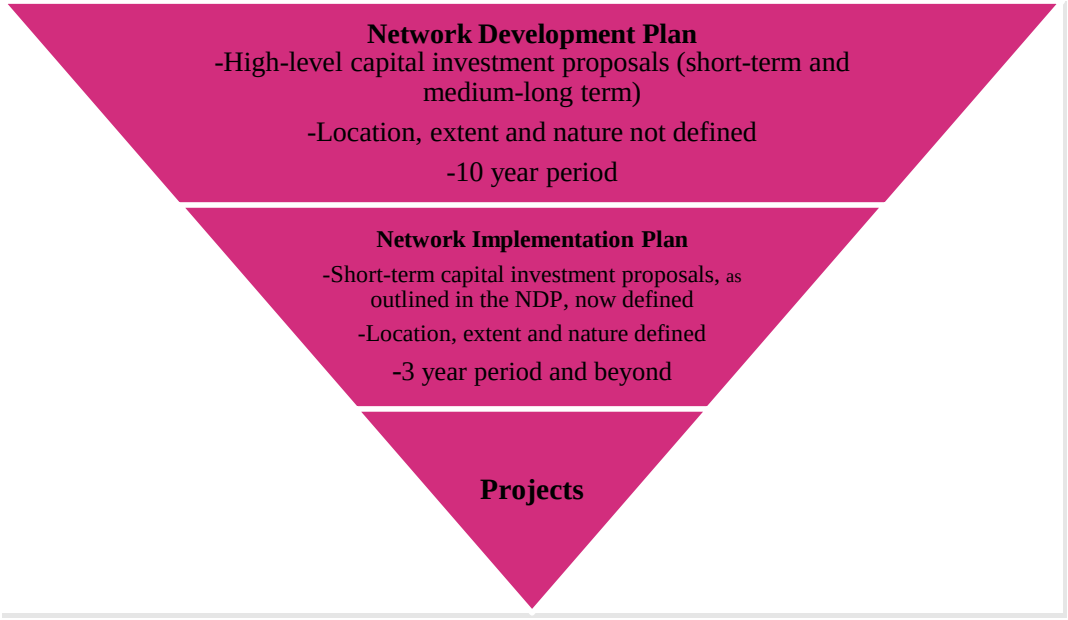

Figure NTS 1: Plan Hierarchy (relationship between the NDP and NIP)

The purpose of the NIP is to set out in more detail, the manner in which the short-term capital investment proposals identified in the NDP may be developed in the Plan area over the three-year plan period 2020 - 2023. This will include greater detail on the capital investment proposals included in the NDP, including their locations, nature, extent etc. The Plan provides for short term capital investment

projects including the provision of AGI (Above Ground Installation) upgrade works, new AGIs, CGI (Centralised Gas Injection) and CNG (Compressed Natural Gas) facilities.

As the NIP is more project-specific than the higher-level NDP, it is subject to SEA, under the provisions of the SEA Directive.

The Plan area for the NIP is outlined in Figure NTS 2:

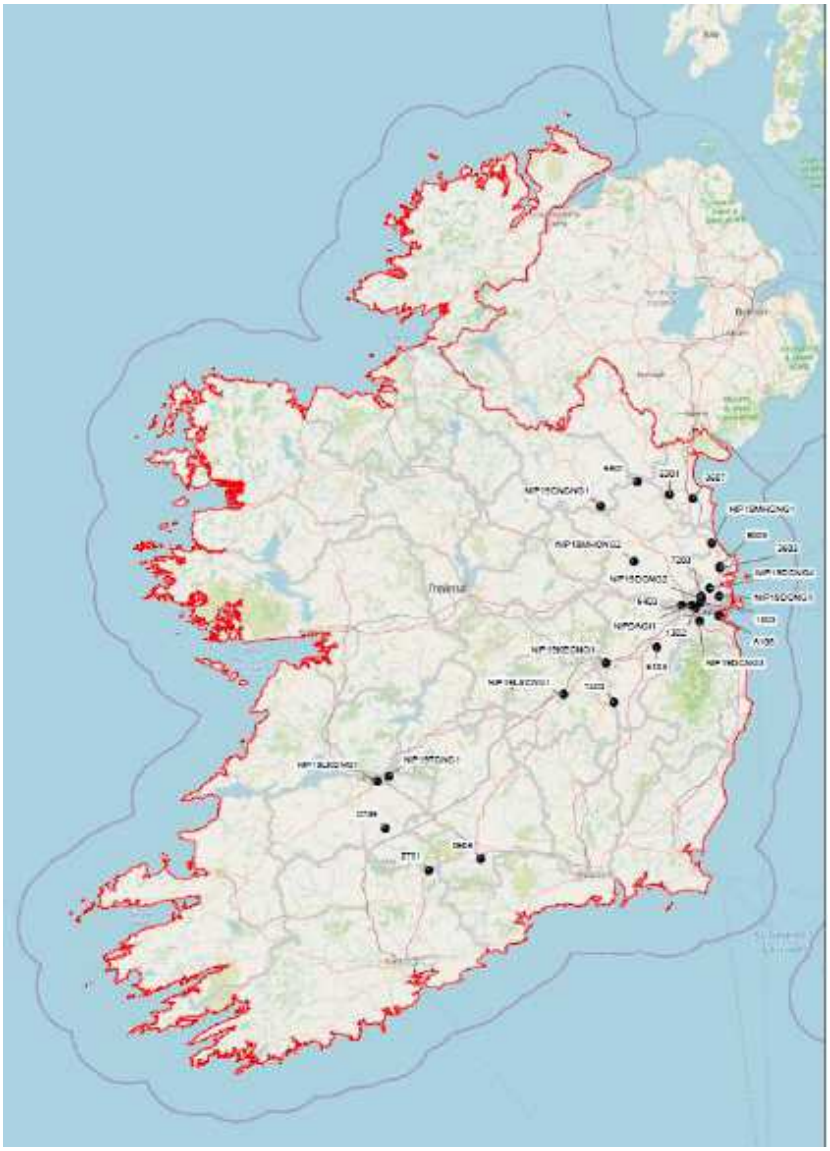

Figure NTS 2: NIP Plan Area

Current State of the Environment

The SEA considers the current environmental conditions, hereafter referred to as the baseline. This description of the baseline considers the local level nature of the plan and is cognisant of the pressures and interrelationships between environmental topics within the plan area.

The baseline considers the following environmental aspects:

- Biodiversity;
- Population and Human Health;
- Land and Soils;
- Water;
- Air and Noise;
- Heritage;
- Landscape and Visual
- Climate and Resilience; and
- Material Assets.

The NIP is a national plan and as such, the general state of the environment in Ireland was considered in order to inform the NIP, and any updates to the same over its lifetime, as well as this assessment. In doing so, the recently published State of the Environment Report (EPA, 2020) was reviewed to determine a baseline environment.

The evidence from this report shows that existing national measures have not been successful in addressing several environmental issues.

Continuing high carbon emissions results in a 'very poor' current assessment of climate change in Ireland, despite progress on renewable energy, ambitious climate action and adaptation plans and strategies, and new governance structures (e.g. the Climate Action Regional Offices). 2020 emissions reductions targets will not be met without relying on purchasing credits or allowances.

While overall air quality in Ireland is good, there was an exceedance of nitrogen dioxide at one Dublin monitoring site in 2019.

Overall, the current assessment of water quality is poor. Just over 50% of surface water is in a satisfactory ecological condition. This means that almost half fails to meet the legal requirements of the Water Framework Directive (2000/60/EC).

Deteriorating trends in biodiversity dominate, especially for protected habitats, with 85% of EU protected habitats having an unfavourable status. The picture for EU protected species is mixed, but 15% are in decline, with freshwater species most at risk. Agricultural practices are a key pressure. Habitat changes point towards a deteriorating trend in overall biodiversity. Some species, such as the curlew and some freshwater species, are under threat; measures are needed to halt their decline.

While Ireland is meeting current targets, recycling rates have levelled off for municipal waste and packaging and in some cases declined. Waste generation remains high and linked to economic activity, while circular use of material remains very low.

The Environmental Characteristics of Areas Likely to be Significantly Affected

As the precise locations of the capital investment proposals outlined in the NIP have not yet been decided upon, no specific areas have been identified at this time as being likely to be significantly affected by the implementation of the NIP. The NIP outlines a range of capital investment proposals in the Northern and Eastern, Southern and Western Regions. The environmental characteristics of the areas likely to be affected are therefore described on a national and regional level.

Existing Environmental Problems Relevant to the NIP

As the NIP relates to the development of the gas network in Ireland, the issue of climate change is considered to be of particular relevance to the NIP.

As noted in the 2020 State of the Environment Report, Ireland's climate is changing. Observations show that Ireland's climate is changing in terms of sea level rise, increases in average temperature, changes in precipitation patterns and weather extremes. The observed scale and rate of change is consistent with regional and global trends and these changes are projected to continue and increase over the coming decades. Climate change will have diverse and wide-ranging impacts on Ireland's environment, society and economic development, including managed and natural ecosystems, water resources, agriculture and food security, human health and coastal zones.

Section 5.6 of the ER describes the current state of the Irish climate environment. The following are some of the key issues identified on the issue of climate change as it relates to the NIP:

- Increasing population and a growing economy will result in in increased demand on energy and travel, and subsequently increased GHG emissions;
- Temperature changes may lead to increased energy demand over time (e.g. for heating and cooling); Gas transmission and distribution networks need to have enough capacity available to ensure that extreme cold weather events can be accommodated without restricting the supply of gas;
- Risks to this infrastructure both from extreme weather events (such as flooding) and gradual climate change could have significant economic and social consequences and it is important therefore to future proof the efficient functioning of our energy system;
- Local air quality, particularly in small Irish towns with a high dependence on coal, turf and wood for home heating, can be poor at times, and communities need much better local-level air quality information. The move to a low-carbon and resource-efficient economy should also lead to better air quality, provided that there is strong regulation and control of the burning of renewable fuels, such as wood and biomass, which in themselves can give rise to air pollution problems.

Consideration of Alternatives

Alternative development scenarios were considered in the preparation of the draft NIP. These options primarily related to:

- The Do-Nothing Scenario
- Alternative Capital Investment Proposals
- Capital Investment Projects as outlined in the NIP

The capital investment proposals, as outlined in the draft NIP are considered to be the most environmentally sound and technically feasible solutions which allow GNI to achieve their overall aims for the gas transmission network over the plan period. The NIP as it is proposed will allow for the demand and future growth of Ireland to be catered for. This scenario therefore aligns with the provisions for the National Planning Framework and Regional Spatial and Economic Strategies.

Objectives, Targets and Indicators

The SEA is designed to assess the potential environmental impact of the draft NIP and its associated policies and objectives against the established baseline. The policies and objectives outlined in the draft NIP are assessed against a range of established environmental objectives and targets. The Strategic Environmental Objectives identified relating to the draft NIP are outlined in the table below.

Indicators recommended in this Environmental Report are utilised over the lifetime of the draft NIP to quantify the level of impact that the policies and objectives may have on the environment. This enables the measurement of whether GNI was successful in promoting the sustainable development of the gas network.

Table NTS 1 Strategic Environmental Objectives

Objectives
SEO 1.1 Protect, conserve, enhance where possible and avoid loss of diversity and integrity of the broad range of habitats, species and wildlife corridors. **SEO 1.2** To support achievement of the conservation objectives of European Sites (SACs and SPAs) and other sites of nature conservation. **SEO 1.3** Conserve and protect other sites of nature conservation including NHAs, pNHAs,National Parks, Nature Reserves, Wildfowl Sanctuaries as well as protected species outside these areas as covered by the Wildlife Act. **SEO 1.4** To minimise and, where possible, eliminate threats to biodiversity including invasive species.
SEO 2.1 Protect, enhance and improve people's quality of life through energy provision. **SEO 2.2** Protect human health from hazards or nuisances arising from incompatible development. **SEO 2.3** Provide all of the energy services required to sustainably meet future housing demands. **SEO 2.4** To minimise the proximity of development to concentrations of population and to mitigate potential effect of development in order to reduce actual and perceived environmental effects.
SEO 3.1 Conserve, protect and avoid loss of diversity and integrity of designated habitats, geological features, species or their sustaining resources in designated ecological sites.
SEO 4.1 Maintain or improve the quality of surface water and groundwater (including estuarine) to status objectives as set out in the WaterFramework Directive (WFD).

Objectives
SEO 4.2 Support achievement of the requirements of the Water Framework Directive and implementation of the National River Basin Management Plan'
SEO 5.1 To support the protection of ambient environment through the implementation of European, national and regional policy and legislation relating to air quality, greenhouse gases, climate change, light pollution noise pollution and waste management.
SEO 6.1 Comply with relevant national climate change targets e.g. Ireland's Climate Action and Low Carbon Development Act 2015, the and EU 2030 and 2050 Emissions and Renewable Energy Targets and the Paris Agreement Targets. **SEO 6.2** To support implementation of the National Climate Action Plan 2019
SEO 7.1 Promote the protection and conservation of archaeological, architectural and cultural heritage, specifically those buildings identified on the Record of Protected Structures, and Recorded Monuments in Ireland.
SEO 8.1 Ensure no significant disruption of historic/cultural landscapes and features. **SEO 8.2** Ensure no significant visual impact from developments/installations. **SEO 8.3** Ensure no significant disruption of high landscape values. **SEO 8.4** To support achievement of the objectives of the National Landscape Strategy
SEO 9.1 Make best use of existing infrastructure and phase the significant future growth of Ireland in line with the capacity and delivery of the sustainable development of new physical infrastructure. **SEO 9.2** Promote use of renewable energy sources and support energy conservation initiatives including the development of low carbon business practices and buildings. **SEO 9.3** Minimise effects upon the existing and planned infrastructure.

Assessment of Likely Significant Effects

The policies and objectives in the draft NIP were assessed with respect to the existing environmental baseline and the environmental objectives and targets.

As the policies included in the draft NIP have been designed to promote sustainability and to protect the environment, the majority of recommendations have positive impacts. Matrices were prepared to identify potential impacts across the plan area and those likely impact relevant to specific portions of the plan area.

Capacity Upgrades to Existing AGIs

The capital investment projects outlined in the Draft NIP include 12 No. capacity upgrade projects, to existing AGIs. Capacity upgrades of this nature generally involve limited development at already established AGI sites. All of the existing AGI's listed above have already been subject to environmental assessment at project level; by means of EIA, AA or indeed GNI's EnviroPlan and EnviroKit. As such, potential negative effects on the environment are assumed to have already been mitigated in these locations.

Should development be required outside the boundary of the existing AGI however, there is potential for negative effects on biodiversity, land and soil, water, and landscape, heritage and visual. Refer to mitigation measures.

Continued or increased supply/ use of natural gas will have an overall negative effect on air quality and climate. Further, any development of, or works to, gas infrastructure has health and safety implications.

The security of energy supply in Ireland is likely to have an overall positive effect on the population, as well as material assets.

New AGI Stations

The capital investment projects outlined in the Draft NIP include the development of 2 No. new AGIs; all in Dublin.

The development of new AGIs has the potential to generate adverse impacts on biodiversity, with key potential impacts relating to disturbance, disruption, fragmentation and loss of habitats.

A potential negative effect is identified with regards landscape and visual, due to the development of the proposed new facilities, in particular should the sites of the proposed new AGIs be a greenfield sites.

Further, any new development has the potential to give rise to negative effects on land, soil and groundwater, due to the excavations required to facilitate this development, and the risk of leaks from pipes and infrastructure. Measures should be put in place to ensure no risk of soil contamination during construction or operation.

The site selection process should therefore have regard to the proximity of the site to existing water features and protected views/prospects, the underlying groundwater bodies and their subsequent vulnerability, soil conditions, existing land-use etc.

Designated sites should be afforded protection in the undertaking of this new development, in compliance with legislation. All areas of heritage significance/designated sites should be afforded strict protection, in compliance with legislation, and should be avoided during site selection of the new AGI stations.

The focus on brownfield lands or pre-developed sites during site-selection of the new CNG station will offset many potential effects on biodiversity, land and soil, water, heritage and landscape and visual.

A positive effect on the population and material assets is identified, through security of supply. However, a potential negative effect on human health is also identified, in that the development of new gas infrastructure can carry risk of fire or explosion, if unmitigated. Increased use of natural gas is also likely to result in an overall negative effect on air quality and climate.

New CNG Stations

The capital investment projects outlined in the Draft NIP include the development of 11 No. new CNG stations.

The development of new CNG stations has the potential to generate adverse impacts on biodiversity, with key potential impacts relating to disturbance, disruption, fragmentation and loss of habitats.

A potential negative effect is identified with regards landscape and visual, due to the development of the proposed new facilities, in particular should the sites of the proposed new CNG stations be a greenfield sites.

Further, any new development has the potential to give rise to negative effects on land, soil and groundwater, due to the excavations required to facilitate this development. Measures should be put in place to ensure no risk of soil contamination during construction or operation.

The site selection process should therefore have regard to the proximity of the site to existing water features and protected views/prospects, the underlying groundwater bodies and their subsequent vulnerability, soil conditions, existing land-use etc.

Designated sites should be afforded protection in the undertaking of this new development, in compliance with legislation. All areas of heritage significance/designated sites should be afforded strict protection, in compliance with legislation, and should be avoided during site selection of the new CNG stations.

The focus on brownfield lands or pre-developed sites during site-selection of the new CNG stations will offset many potential effects on biodiversity, land and soil, water, heritage and landscape and visual.

A positive effect on the population and material assets is identified, through increased access to fuelling stations and the subsequent security of supply. However, a potential negative effect on human health is also identified, in that the development of new gas infrastructure can carry risk of fire or explosion, if unmitigated. Increased use of natural gas is also likely to result in an overall negative effect on air quality and climate. However, as outlined in GNIs Vision 2050 document, converting Ireland's Heavy Goods Vehicles (HGVs) from diesel to CNG can yield near-term emissions reductions in the transport sector. This ultimately will aid GNI in achieving the emission reduction targets relevant to the gas sector, as set both by Ireland and the EU.

Five of the proposed new CNG stations offer particular vulnerability to significant negative effects:

- New CNG Station at NIP19LSCNG1- The River Trogue, which is a nutrient sensitive river runs through Portlaoise town, as does the Ridge of Portlaoise NHA and a number of geological heritage sites.
- New CNG Station at NIP19MHCNG1- The entire area of Gormanstown is a Geological Heritage Site. Further, the area is generally limited in its extent of existing development, meaning greenfield development is likely.
- New CNG Station at NIP19TCNG1- The indicative site of the proposed new CNG station in Birdhill is in immediate vicinity of the Ratheen and Mountshannon tributaries which flow directly to the River Shannon SAC.
- New CNG Station at NIP19MHCNG2- The indicative site of the proposed new CNG station in Trim is located in immediate vicinity of the Whitehall

tributary, which flows directly into the River Boyne and River Blackwater SAC and SPA.

- New CNG Station at NIP19CNCNG1- The indicative site of the proposed new CNG station at Maghera is located approximately 500m from Lough Ramon which is hydrologically linked to the River Boyne And River Blackwater SAC and SPA.

Renewable Gas Injection Facility

The capital investment projects outlined in the Draft NIP include the development of 1 No. new renewable gas injection facility. Planning permission has been sought, and the project has been subject to project level environmental assessment.

AGI Bypass

The capital investment projects outlined in the Draft NIP include the development of 1 No. AGI bypass project. Planning permission has been sought, and the project has been subject to project level environmental assessment.

Mitigation Measures

This Environmental Report has highlighted some potential negative environmental impacts that may arise from the implementation of the draft NIP. A number of mitigation measures have been identified to prevent, reduce and as fully as possible offset any significant adverse impacts on the environment associated with the implementation of the draft NIP.

It is envisaged that all planning applications for new developments in the plan area will be environmentally assessed, as required, and specific mitigation proposed, where appropriate.

Monitoring Measures

Article 10 of the SEA Directive requires that monitoring should be carried out to identify (at an early stage) any unforeseen adverse impacts associated with the implementation of the plan or programme.

A monitoring programme has been developed as part of this SEA (based on the relevant indicators) to track progress towards achieving strategic environmental objectives and reaching targets. As previously described, indicators have been developed to show changes that would be attributable to implementation of the draft NIP, therefore enabling positive and negative impacts to be measured.

This SEA Environmental Report has ensured that any potential significant environmental impacts have been identified and given due consideration.

1 Introduction

1.1 Introduction

Gas Networks Ireland (GNI) has prepared the draft Network Implementation Plan (referred to hereinafter as the NIP) for the period 2020 - 2023. The NIP sets out the proposed capital investment projects to be developed over this period, while also setting out the aims and commitments of GNI.

Arup has been appointed by GNI to prepare the Strategic Environmental Assessment (SEA) documentation for the draft NIP.

This SEA Environmental Report (ER) presents the findings of the environmental assessment of the likely significant effects on the environment as a result of implementing the draft NIP. A Scoping Report was previously prepared which provided information to allow consultation with defined statutory bodies on the scope and level of detail to be considered in the environmental assessment.

The purpose of this SEA Environmental Report – which should be read in conjunction with the draft NIP – is to provide a clear understanding of the likely environmental consequences of decisions arising from the draft NIP.

1.2 Background to the NIP

GNI prepares an annual rolling Network Development Plan (NDP) each year, which provides a view of how the gas network may develop over a ten-year period. The NDP outlines a number of capital investment projects which will be delivered over the coming years (in the short, medium and long-term), including future proposed large capital projects and proposed new technologies. The NDP is a strategic plan which is high-level in nature.

GNI is in the process of preparing a second plan, the NIP. The purpose of the NIP is to set out in more detail, the manner in which the short-term capital investment proposals identified in the NDP will be developed in the Plan area over the three-year plan period 2020 - 2023. This will include greater detail on the capital investment proposals included in the NDP, including their locations, nature, extent etc. Refer to Section 2 for further detail on the NIP.

As the NIP is more project-specific than the higher-level NDP, it is subject to SEA, under the provisions of the SEA Directive (Refer to Section 1.3.4 for information on SEA Screening).

1.3 SEA Process and Legislative Context

1.3.1 Legislative Background

Directive 2001/42/EC of the European Parliament and of the Council on the Assessment of the Effects of Certain Plans and Programmes on the Environment, (also known as the Strategic Environmental Assessment Directive), was transposed into Irish Law by the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (S.I. No. 435 of 2004) as amended by S.I. No 200 of 2011. It provided a statutory basis for the making of the Planning and Development (Strategic Environmental Assessment) Regulations 2004 (S.I. No. 436 of 2004) as amended by S.I. No. 201 of 2011. These Planning and Development Regulations, S.I. No. 436 of 2004 and S.I. No. 201 of 2011, amended articles and schedules to the Planning and Development Regulations, (S.I. 600 of 2001).

Under the Directive (2001/42/EC) SEA is required on plans and programmes which are likely to have significant effects on the environment, in the following eleven sectors:

- Agriculture;
- Forestry;
- Fisheries;
- Energy;
- Industry;
- Transport;
- Waste Management;
- Water Management;
- Telecommunications; and
- Tourism, Town and Country Planning or Land-use.

The objectives of the Strategic Environmental Assessment (SEA) Directive is ‘to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans … with a view to promoting sustainable development’ (Article 1 SEA Directive). It is a systematic, on-going process for evaluating, at the earliest possible stage, the environmental quality and consequences of implementing certain plans and programmes on the environment.

The requirements for SEA in Ireland are set out in the national legislation as follows:

- European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations (S.I. No. 435 of 2004) as amended by European Communities (Environmental Assessment of Certain Plans and Programmes) (Amendment) Regulations (S.I. No. 200 of 2011); and
- Planning and Development (Strategic Environmental Assessment) Regulations (S.I. No. 436 of 2004) as amended by the Planning and Development (Strategic Environmental Assessment) (Amendment) Regulations (S.I. No. 201 of 2011).

1.3.2 SEA Process

The objective of the Strategic Environmental Assessment (SEA) Directive is 'to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans … with a view to promoting sustainable development' (Article 1 SEA Directive). It is a systematic, on-going process for evaluating, at the earliest possible stage, the environmental quality and consequences of implementing certain plans and programmes on the environment.

The SEA process is comprised of the following steps:

- Screening: Decision on whether or not SEA of a Plan or Programme is required. This stage has been completed;
- Scoping: Consultation with the defined statutory bodies on the scope and level of detail to be considered in the assessment.;
- Environmental Assessment: An assessment of the likely significant impacts on the environment as a result of the Plan or Programme. This is the current stage of the SEA process to which this report relates;
- Preparation of an Environmental Report (this report);
- Consultation on the Draft Plan or Programme and associated Environmental Report;
- Evaluation of the submissions and observations made on the Draft Plan or Programme and Environmental Report; and
- Issuance of an SEA Statement identifying how environmental considerations and consultation have been integrated into the Final Plan or Programme.

SEA is intended to inform decision-making and needs to 'test' systematically the performance of the plan as a whole and its individual objectives and policies against SEA criteria.

It is noted that under EIA and Planning and Development legislation, certain projects taking place within the plan area arising during implementation of the Plan may require an Environmental Impact Assessment.

1.3.3 SEA Guidance

The SEA methodology for the Draft NIP is based on legislative requirements and Department of Environment, Heritage and Local Government (DoEHLG) / Environmental Protection Agency (EPA) guidance. The EPA's SEA Pack (Version 21/02/2020) was also used as a source of information during the scoping process along with published EPA SEA Scoping Guidance.

2 Draft Network Implementation Plan

2.1 Background

As outlined in Section 1.2, GNI prepares an annual rolling NDP each year, which provides a view of how the gas network may develop over a ten-year period.

The publication of this NDP satisfies the requirements of Article 22 of EU Directive 2009/73/EC, Article 11 of the EC (Internal Market in Natural Gas and Electricity) (Amendment) Regulations 2015, Section 19 of the Gas (Interim) (Regulations) Act 2002, as amended, and Condition 11 of its Transmission System Operator (TSO) and Distribution System Operator (DSO) licences.

The purpose of the NDP is to assess the gas network's capacity based on existing and forecast supply and demand in order to guarantee the adequacy of the gas transmission system and security of supply. The NDP outlines, at a high level, a number of capital projects which may be delivered over the coming years, including future proposed large capital projects and proposed new technologies. The NDP is a strategic plan which is high-level in nature.

The purpose of the NIP, which is the subject of this SEA, is to set out in more detail, the manner in which the short-term capital investment proposals identified in the NDP may be developed in the Plan area over the three-year plan period 2020-2023. This will include greater detail on the capital investment proposals included in the NDP, including their locations, nature, extent etc. The Plan provides for short term capital investment projects including the provision of AGI (Above Ground Installation) upgrade works, new AGIs, new pipelines, CGI (Centralised Gas Injection) and CNG (Compressed Natural Gas) facilities. **Figure 2.1** provides an overview of the Plan hierarchy and key differences between the NDP and NIP, and relationship between the same.

The NIP presents the planned capital investment projects that GNI has progressed to the point where they are the preferred projects to meet the changing system requirements in the context of the long-term development of the network.

In this context therefore, it is important to understand that any NIP is a "point-in-time" understanding of gas network development. The long-term development of the network is under continuous review by GNI. The NIP is clear in acknowledging the possibility that changes will occur in the need for, scope of, project phase, and timing of gas network development.

GNI has identified some 27 capital investment projects for inclusion in the NIP, to meet the changing system requirements in the short to medium term development of the network.

A number of capital investment projects are currently in the statutory planning consents process, and thus have not been included within the scope of the SEA (although they are included in the list of all capital investment projects in Section 3 of the NIP). Rather, they are all separately subject to specific environmental and other assessment, in accordance with Statutory procedure and best practice.

The SEA Directive requires that reasonable alternatives be assessed in order to demonstrate how the preferred strategy performs against other forms of action. Refer to Section 7 for information on the alternatives considered.

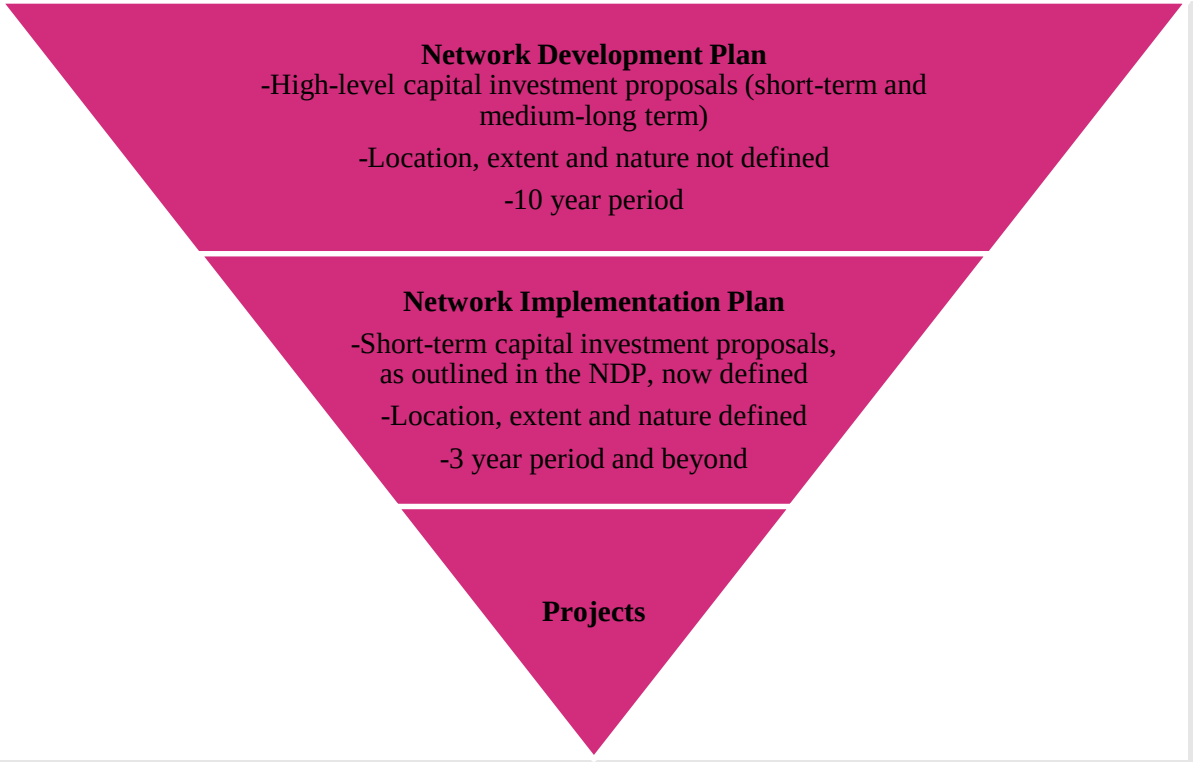

Figure 2.1: Plan Hierarchy (relationship between the NDP and NIP)

2.2 Extent of Plan Area

GNI maintains over 14,390 km of gas pipelines and two sub-sea interconnectors.

The GNI transmission network includes onshore Scotland, interconnectors and the onshore ROI network. The interconnector (IC) sub-system comprises of two subsea interconnectors between ROI and Scotland; and compressor stations at Beattock and Brighouse Bay. The interconnector system connects to Great Britain's (GB) National Transmission System (NTS) at Moffat in Scotland. It also supplies gas to the Northern Ireland (NI) market at Twynholm and the Isle of Man (IOM) market via the second subsea interconnector (IC2).

The NIP Plan area is identified in **Figure 2.2.**

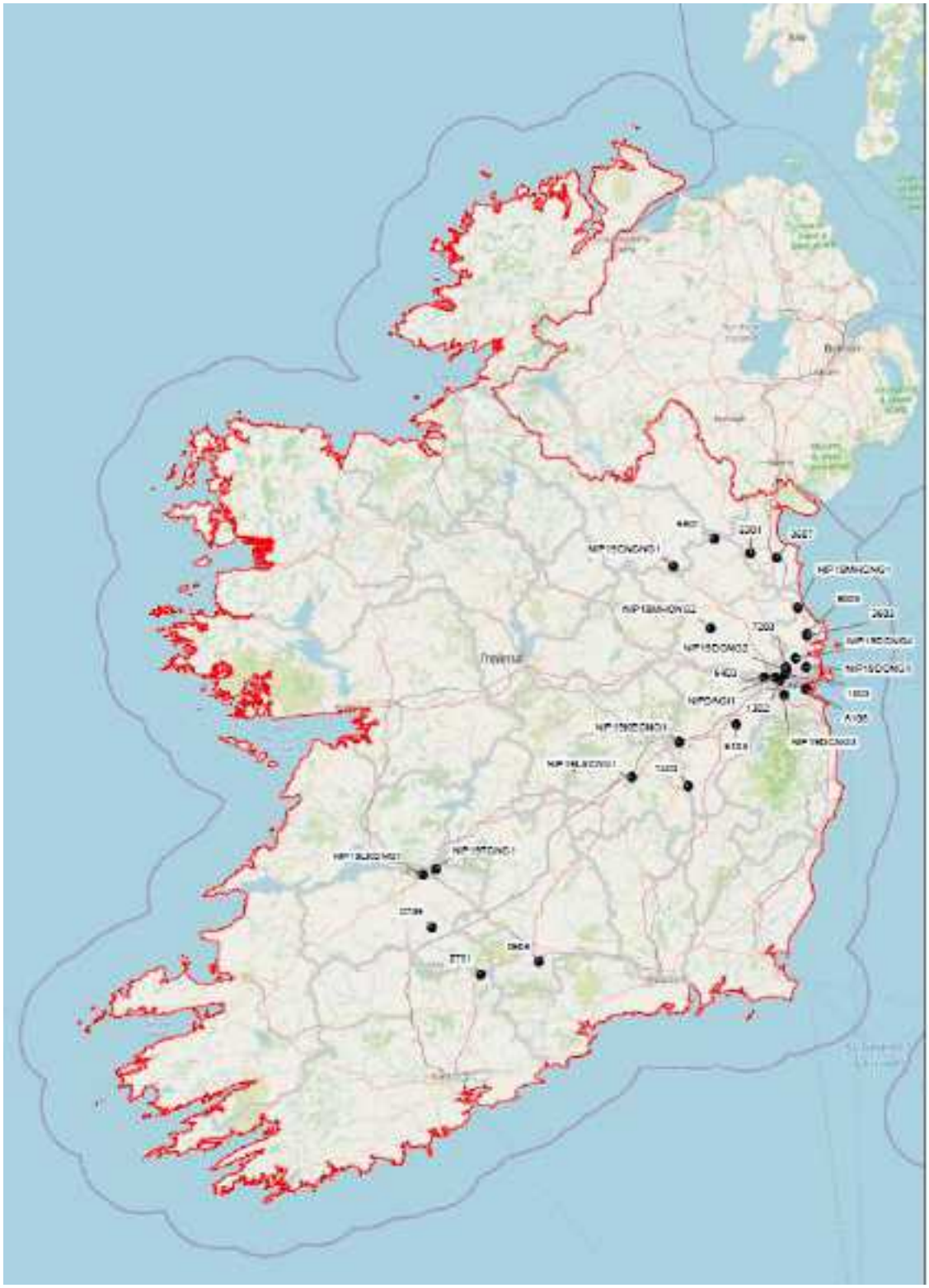

Figure 2.2: NIP Plan Area

3 Relationship with Other Relevant Plans and Programmes

3.1 Introduction

As part of the SEA process the context of the Draft NIP must be established with regard to other plans and programmes that have been adopted at international, national, regional and local level. Specifically, the interaction of the Draft NIP with the environmental protection objectives and standards included within these other plans and programmes must be considered.

A wide range of legislation, plans and programmes are of relevance to the Draft NIP and are outlined in Section 3.2-3.12.

3.2 Ireland's Climate Action Plan 2019, DCCAE 2019

The Climate Action Plan sets out an ambitious course of action over the coming years to address the issue of climate disruption on Ireland's environment, society, economic and natural resources. The plan builds on the policy framework, measures and actions set out in Project Ireland 2040 and the draft National Energy and Climate Plan.

The Plan outlines the current state of key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and charts a course towards ambitious decarbonisation targets.

With regards to renewable electricity, the plan cites the need for natural gas in the renewable mix in order to sustain electricity supply when intermittent renewable electricity supplies are low (e.g. wind/solar).

3.3 Electricity & Gas Networks Sector Climate Change Adaptation Plan, DCCAE 2019

This first Adaptation Plan for the energy networks (electricity and gas) sector was prepared under the National Adaptation Framework in 2019. This Plan is the first step towards reducing vulnerability and building resilience in this sector.

The Plan discusses a number of the measures to be put in place in order to ensure the sector is less vulnerable to climate change in the future. GNI will play a role in this Adaptation Plan. A number of adaptation measures are to be adopted, including, but not limited to:

- Natural gas in transport (e.g. via the Causeway Project); and
- Renewable gas (e.g. biomethane production and injection into existing gas network).

GNI will contribute towards the Climate Change Adaptation Plan through the facilitation of the measures above. In the event of an incident, GNI has a Business Continuity Plan, and a Severe Weather Contingency Plan. These Plans, as discussed in the Electricity & Gas Networks Sector Climate Change Adaptation Plan will ensure the gas and electricity network sector will be more resilient to severe weather incidents caused by climate change.

3.4 Strategic Plan 2019 – 2020, CRU 2019

The Commission for the Regulation of Utilities (CRU) have developed a Strategic Plan for the 2019 - 2021 period as a guiding framework for the CRU's planning, resourcing, prioritisation, monitoring and reporting activities.

The 2019 - 2021 Strategic Plan documents the CRU's commitment to deliver a secure, low carbon future at least cost.

It demonstrates our commitment to a co-operative approach with our stakeholders to ensure safe outcomes, sustainability (including environmental and economic), reliability and efficiency across the sectors we regulate.

In accordance with the Energy Act 2016 and the Water Services (No.2) Act 2013, a copy of the CRU 2019 - 2021 Strategic Plan was submitted to the Minister for Communication, Climate Action and Environment and the Minister for Housing, Planning and Local Government.

As outlined in the Strategic Plan, it is an objective of the CRU to:

- *"Ensure utility network policies and infrastructure development deliver a low carbon future whilst supporting competitiveness and security of supply; and*
- *Deliver market policies that support a low carbon future whilst supporting competitiveness and security of supply."*

3.5 Network Development Plan 2018 and 2019, GNI 2018, 2019

The GNI Network Development Plan (NDP) 2018 and 2019 provides a view of how the gas network will develop over a ten-year period. The Plans sets out the assessment of the future demand and supply position for the natural gas industry in the Republic of Ireland.

The Plan provides an overview of the planning and development of the gas network, which can involve long lead times in the delivery of infrastructure projects.

3.6 National Energy and Climate Plan 2021 – 2030, DCCAE (2019)

In accordance with the Governance of the Energy Union and Climate Action Regulation, Ireland's draft National Energy & Climate Plan (NECP) 2021-2030 was submitted to the European Commission in December 2018. The draft NECP took into account energy and climate policies developed up to that point, the levels of demographic and economic growth identified in the Project 2040 process and included all of the climate and energy measures set out in the National Development Plan 2018-2027.

Following a period of consultation, the NECP was finalised and published in 2019. The 2019 NECP was prepared to incorporate all planned policies and measures that were identified up to the end of 2019 and which collectively deliver a 30% reduction by 2030 in non-ETS greenhouse gas emissions (from 2005 levels).

Under the Programme for Government, Our Shared Future, Ireland is committed to achieving a 7% annual average reduction in greenhouse gas emissions between 2021 and 2030. The NECP was drafted in line with the current EU effort-sharing approach, before the Government committed to this higher level of ambition, and therefore does not reflect this higher commitment. Ireland is currently developing those policies and measures and intends to integrate the revision of the NECP into the process which will be required for increasing the overall EU contribution under the Paris Agreement.

The NECP regularly refers to GNI's NDPs and Section 4.5.2 of the NECP describes the existing gas transmission system in Ireland. Section 4.5.3 of the NECP describes the existing and projected gas market and energy prices,

Section 5 of the NECP discusses projections of the energy system and associated GHG emissions, and notes that '*the overall total primary energy demand for natural gas is projected to grow from 2020 to 2030*.'

The NECP stresses the need to "*ensure the resilience of the gas network to a long-duration supply disruption, in the context of EU and national climate objectives*."

3.7 National Planning Framework, DHPLG 2018

The Department of Housing Planning and Local Government (DHPLG), on behalf of the Government, has prepared and published the National Planning Framework under Project Ireland 2040, the overarching policy and planning framework for the social, economic and cultural development of our country.

The National Planning Framework states that "*In order to support the National Planning Framework, additional electrical grid strengthening will be required for parts of the border subject to the necessary planning consents to enhance energy security through further reductions in dependence on fossil fuels, moving towards wind, gas with carbon capture and sequestration, biomass and other renewable sources.*"

National Policy Objective (No. 47) of the NDP states:

"*In co-operation with relevant Departments in Northern Ireland, strengthen all-island energy infrastructure and interconnection capacity, including distribution and transmission networks to enhance security of electricity supply.*"

3.8 National Energy Efficiency Action Plan for Ireland #4 2017–2020, DCCAE 2017

Article 24 of the EU Energy Efficiency Directive requires Member States to submit a National Energy Efficiency Action Plan (NEEAP) every three years. Ireland's 4th NEEAP was produced in early 2017. It provides a comprehensive overview on

- The progress made towards the above targets;
- The measures in place to ensure the targets are met; and
- The strategies and policies in place across the residential, commercial, transport and public sector.

According to the National Energy Action Plan for Ireland, *"a number of projects (undertaken and planned) by Gas Networks Ireland will further improve energy efficiencies and reduce emissions. These include replacement of Waterbath heaters and boilers with high efficiency boilers and new control technology; a pilot project to install a CHP unit (at a Pressure Reduction Installation) and the feasibility of the installation of CHP will be determined based on the outcome of this pilot."*

3.9 National Policy Framework on Alternative Fuels Infrastructure for Transport in Ireland - 2017 to 2030, DTTAS 2017

The National Policy Framework on Alternative Fuels Infrastructure for Transport in Ireland: 2017 to 2030 represents a first step in communicating a longer-term vision for the Irish transport sector. It sets an ambitious target that by 2030 all new cars and vans sold in Ireland will be zero emissions (or zero emissions capable) with the use of fossil fuels vehicles rapidly receding.

The Framework outlines the main fuel options that could provide alternatives to oil in transport namely: electricity, hydrogen, biofuels, and natural gas, in the forms of compressed natural gas (CNG), liquefied natural gas (LNG), and liquefied petroleum gas (LPG). It is likely that electricity will fuel the majority of passenger cars, commuter rail and taxis; while, natural gas and biofuels will play an increasingly important role for larger vehicles such as heavy goods vehicles and buses. Hydrogen use is also anticipated to increase its penetration across the entire fleet spectrum in the coming decades but not in the short-term.

The Framework strongly advocates for a switch to natural gas use in Ireland, stating: "*in Ireland, making a transition to gas would be beneficial for a number of reasons:*

- *Natural gas vehicles (NGVs) produce up to 20% lower carbon emissions per unit of energy produced than diesel in terms of kilometres travelled;*
- *Natural gas could provide greater long-term competitiveness in the freight sector. The use of domestically sourced lower price natural gas would be more economically sustainable;*
- *The price of gas continues to be cheaper than diesel or petrol for similar energy outputs, providing considerable scope for reducing fuel costs and improving transport cost efficiency;*
- *There is considerable health benefits associated with the use of gas as a propellant through improved air quality and significantly reduced local pollutants (NOx, SOx and PMs) in cities;*
- *There would be considerable energy security benefits through the use of indigenous gas supplies, particularly biogases; and*
- *The use of natural gas in transport could lead to greater use of the gas network, which could impact positively on gas network charges."*

3.10 White Paper on Energy: Ireland's Transition to a Low Carbon Energy Future 2015 – 2030, DCCAE 2015

The Government's energy White Paper sets out a vision and a framework to guide Irish energy policy between 2015 and 2030 and outlines a transition to a low carbon energy system for Ireland by 2050. Its objective is to guide a transition to a low carbon energy system, which provides secure supplies of competitive and affordable energy to our citizens and businesses.

The White Paper states that "oil and natural gas will remain significant elements of Ireland's energy supply between now and 2035". However, the White Paper recognises that there is a clear link between oil and gas production and consumption and global climate change.

The White Paper commits Ireland to radically reducing our GHG emissions by 2050. Ireland has embarked on a firm course to sustainability, mindful of the need to balance competitiveness and security of supply. Oil and gas will contribute to security of supply through the period of transition, on a declining basis over time. This curtailment (and, in the longer term, elimination) of oil and gas in our energy mix will be accomplished gradually in the coming decades through a range of reduction and substitution measures using more sustainable alternatives.

As outlined in the paper, "*providing natural gas and electricity network infrastructure is essential for the proper functioning of the markets and for the*

provision of secure supplies. These networks will play an important role in the transition".

3.11 National Renewable Energy Action Plan. DCCAE 2010

Article 4 of Directive 2009/28/EC on renewable energy requires each Member State to adopt a national renewable energy action plan (NREAP). Ireland's NREAP sets out our national targets for the share of energy from renewable sources to be consumed in transport, electricity and heating and cooling in 2020. The plan demonstrates how the Member State will meet its overall national target established under the Directive.

Ireland published the NREAP in July 2010. Following on from the NREAP, all Member States must submit a report on progress to the European Commission every two years. The latest report was published in February 2018, and the final report must be submitted by 31 December 2021.

3.12 Other Relevant Plans and Programmes

In addition to those plans and programmes which are outlined in Section 3.2-3.11, the plans and programmes outlined in **Table 3.1** below are also of relevance to the Draft NIP and have been considered in this SEA.

Table 3.1: Other relevant Plans and Programmes

Climate Action and Air Quality
International:
UN Framework Convention on Climate Change (1992)
Paris Agreement (2016)
Kyoto Protocol (1997)
European Directives and Policies
EU Green Deal (2019)
2020 Climate and Energy Package
2030 Climate and Energy Framework
EU Strategy on Adaptation to Climate Change (2020)
Draft/in preparation:
EU Climate Law National Policies/Plans
Climate Action Plan (2019)
National Mitigation Plan (2017)
National Adaptation Framework (2018)
National Policy Position on Climate Action and Low Carbon Development (2013)
Sectoral adaptation and mitigation plans (various)
National Energy and Climate Plan (2021-2030)
Local/regional plans:
Local authority Adaptation Plans (2019) and LowCarbon Roadmaps
Flood Risk Management Plans Objectives
EU Green Deal (2019)
National Air Pollution Control Programme (2019)
Draft/in preparation:

National Clean Air Strategy (Draft)
Local/regional plans (Draft)
Low Smoke Zones (Draft)
Biodiversity
International
Convention on Biological Diversity and associated Strategic Plan for Biodiversity 2011-2020
Bonn Convention (1983)
Ramsar Convention on Wetlands of International Importance (1971)
Convention on International Trade in Endangered Species of Wild Fauna and Flora European Directives and Policies
EU Green Deal (2019)
EU Biodiversity Strategy for 2030
National
Marine Strategy Framework Directive National Policies/Plans
National Biodiversity Action Plan (2017-2021)
All-Ireland Pollinator Plan (2015-2020)
National Peatlands Strategy 2015
National Raised-Bog SAC Management Plan 2017
Local/regional plans
Local authority Biodiversity Action Plans and Green Infrastructure Strategies
Water Quality
International
OSPAR Convention (1992)
MARPOL Convention (1973)
National Policies/Plans
River Basin Management Plan (RBMP) (2018-2021)
Nitrates Action Programme (2017)
Marine Strategy Framework Directive Programme of Measures (2008)
Local/regional plans
Priority areas for action (under the RBMP)
Waste and Circular Economy
International
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989)
EU Green Deal (2019)
Circular Economy Action Plan (2020)
Individual producer responsibility directives on Packaging, WEEE, End-of-life Vehicles, Batteries and Accumulators, etc.
National Policies/Plans
Climate Action Plan (2019)
National Waste Prevention Programme (2014)
National Hazardous Waste Management Plan (2014- 2020)
Local/regional plans
Regional Waste Management Plan 2015-2021
Litter management plans
Environmental Assessment
International
UN Sustainable Development Agenda 2030
Landscape Convention (2000)

EU Green Deal (2019)
National Policies/Plans
National Implementation Plan for the Sustainable Development Goals (2018-2020)
Our Sustainable Future (2012)
Project Ireland 2040
National Landscape Strategy 2015-2025
Local/regional plans
Local authority Landscape Character Assessments
Built Environment
National
National Energy and Climate Plan (2021-2030)
Offshore Renewable Energy Development Plan (2014)
Electricity and Gas Networks Sector Climate Change Adaptation Plan (2019)
Regional
Regional Spatial and Economic Strategy for the Northern and Western Region 2020-2032
Regional Spatial and Economic Strategy for the Eastern and Midlands Region 2019-2031
Regional Spatial and Economic Strategy for Southern Region
Draft/in preparation
Renewable Electricity Policy and Development Framework County
Local authority renewable energy strategies

4 SEA Methodology

4.1 Introduction

This section highlights how the SEA has been undertaken for the Draft NIP. The SEA methodology is based on legislative requirements and relevant Environmental Protection Agency (EPA) guidance and will ensure compliance with the SEA Directive and associated legislation. The EPA's SEA Pack (Version 18/02/2020) was also used as a source of information during the scoping process.

The NIP (GNI), the SEA Environmental Report and the Appropriate Assessment (Arup) were prepared in an iterative manner whereby multiple revisions of each document were prepared, each informing subsequent iterations of the others. To facilitate this iterative approach, numerous discussions were held between GNI and Arup.

The key stages outlined in **Figure 4.1** were identified and are discussed in the following sections.

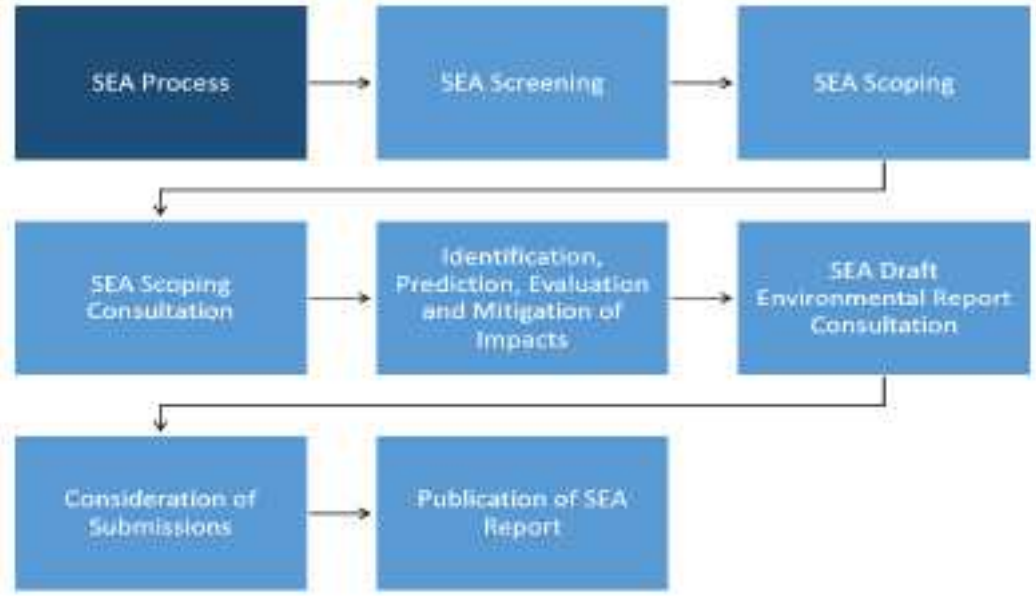

Figure 4.1: Key Stages of the SEA Process

4.2 Screening

Screening is the process for deciding whether a particular plan would warrant SEA. The screening process allowed GNI to identify at the earliest possible opportunity whether the development of the NIP required an SEA and facilitated the assessment findings to be factored into the plan development process.

The NIP was screened for SEA (refer to the SEA Screening Report, Arup (2020)) in accordance with the SEA Directive.

Following this assessment, it was concluded that the Draft NIP falls within the requirements of the SEA Directive in that:

- The NIP is subject to preparation and adoption by a National Authority;
- The NIP is required by legislative, regulatory or administrative provisions;
- The sole purpose of the NIP is not to serve national defence or civil emergency nor is it a financial/budget Plan or co-financed by the current Structural Funds/Regional Development Funds Programme;
- The NIP is prepared for the energy sector;
- The NIP is considered to provide a framework for development consent for projects listed in the EIA Directive; and
- The NIP is a national level plan which is not restricted to the use of small areas at a local scale only, nor is it a modification of a Plan/Policy.

In accordance with the EPA methodology, it was determined that SEA is required, in accordance with the SEA Directive and that the NIP should be taken forward to Stage 2 - SEA Scoping, and subsequent environmental assessment.

4.3 Scoping

The main objective of the Scoping Stage is to identify the key environmental issues that may arise as a result of the Draft NIP, so they may be addressed appropriately in the Environmental Report. There are a number of tasks at this stage:

- Determine the key elements of the draft NIP to be assessed;
- Determine the environmental issues to be assessed;
- Collect and report on relevant international, national and local plans, objectives and environmental standards that may influence or impact on the draft NIP;
- Develop draft environmental objectives, indicators and targets to allow the evaluation of impacts; and
- Identify reasonable alternative means of achieving the strategic goals of the draft NIP.

A Scoping Report was prepared in July 2020 in relation to the draft NIP, which provided information to allow consultation with defined statutory bodies on the scope and level of detail to be considered in the environmental assessment. The draft NIP was issued to the statutory consultees on 7th July 2020, and the consultees were given a period of four weeks to respond with any observations or submissions on the content of the SEA Scoping Report. The responses to scoping received from stakeholders were addressed in the preparation of this Environmental Report. An outline of the responses received is included in Table 4.1.

Table 4.1 Scoping Responses Received on SEA Scoping Report

Consultee/Stakeholder	Scoping Response	Considered in SEA ER?
Geological Survey of Ireland	We are pleased to see our previous comments have been taken into account with the consideration of Geological Heritage Sites and the use of our online mapping resources within the SEA scoping report. Following on from our previous response dated 11 December, (Our Ref 19/265), and we would welcome the opportunity to make some additional comments.	Noted
	Groundwater	
	We would like to draw your attention to the newly released groundwater flooding maps and live turlough data service which will provide important information to benefit Gas Networks Ireland Network Implementation Plan.	Noted
	With regard to Flood Risk Management, there is a need to identify areas for integrated mitigation and management. Our GWFlood project is a groundwater flood monitoring and mapping programme aimed at addressing the knowledge gaps surrounding groundwater flooding in Ireland. The project is providing the data and analysis tools required by local and national authorities to make scientifically-informed decisions regarding groundwater flooding. This is primarily focused on karst areas, which will provide vital information to benefit the Network Implementation Plan. We recommend using the GSI's GWFlood tools found under our programme activities to this end.	Noted
	With regards to Climate Change, there is a need to improve the monitoring capacity of groundwater levels in Ireland so that the potential impacts of climate change can be monitored and assessed. In this context Geological Survey Ireland has established the GWClimate project in January 2020.	Noted. The GW monitoring which will be carried out by GSI as part of the GWClimate project has been incorporated into the monitoring programme in the SEA ER.

	GWClimate will 1) establish a long-term strategic groundwater level monitoring network and 2) develop modelling and analytical approaches for evaluating the impacts of Climate Change to Irish groundwater systems. Further information can be found on the Groundwater flooding page of the Groundwater Programme. This data may be of benefit in dealing with concerns raised in Section 4.4.3 Key Issues, with regard to the karstification of limestone, Section 4.5 Groundwater, and Section 4.5.2 Key Issues, with regard to extreme flooding events. Geological Mapping Geological Survey Ireland (GSI) maintains online datasets of bedrock and subsoils geological mapping that is reliable, accessible and meets the requirements of all users including depth to bedrock and physiographic maps. These datasets include depth to bedrock data, soil and subsoil classifications. We would encourage you to use these data which can be found here, in your future assessments. This data may be useful in dealing with concerns raised in Section 4.4.3 Key Issues, disturbance to soils and geology during new development or infrastructure installation and managing the construction and development on soil functions. Marine and Coastal Unit Geological Survey Ireland's Marine and Coastal Unit manages programmes, projects and partnerships aimed at increasing our knowledge of the marine and coastal realm, developing new methods and tools for understanding coastal processes and taking action on climate change. Geological Survey Ireland’s Marine and Coastal Unit in partnership with the Marine Institute, jointly manages INFOMAR, Ireland's national programme focused on seabed mapping; providing key baseline data for Ireland’s marine sector. The Marine and Coastal Unit also manage coastal monitoring programmes providing data on coastal erosion and sea level rise including the Climate,	Noted. Noted. Noted.

	Heritage and Environments of Reefs, Islands and Headlands (CHERISH) and the Coastal Vulnerability Index (CVI) mapping projects. We would therefore recommend use of our Marine and Coastal Unit datasets available on our website and Map Viewer. This data may be of use in dealing with concerns raised in Section 4.5.2 Key Issues, with regard to coastal erosion risk and interconnector transmission pipelines coming onshore.	
EPA	Given the extent of the Plan area, the level of transboundary consultation to be undertaken should also be considered and described.	In accordance with the SEA Contacts page on the EPA website, transboundary authorities are to be consulted with "Where the Plan or Programme (or modification) may significantly affect the environment" in that location. Having regard to the nature of the NIP; its aims, commitments and capital investment proposals it was not considered that the implementation of the same would significantly effect the environment in any transboundary regions.
	The relevant objectives and policy commitments of the National Planning Framework and the Regional Spatial and Economic Strategies should be aligned with and considered, as appropriate.	Noted and incorporated into SEA ER.
	Consider the relevant aspects of the Offshore Renewable Energy Development Plan, in terms of offshore and onshore infrastructure (or proposed infrastructure) and the National Marine Planning Framework. The equivalent plans in adjoining jurisdictions should also be considered.	Noted and incorporated into SEA ER.
	Section 4.1 refers to S.I. No. 436 of 2004, while in the context of the Plan, this should instead be changed to refer to S.I. No 435 of 2004, as amended by S.I. 200 of 2011.	S.I No 435 referred to in this SEA ER.

	There is merit in considering the Draft National Marine Planning Framework and associated SEA ER, in the context of obtaining updated marine related environmental baseline.	Noted and incorporated. The seascape character is now described in the baseline section of the SEA ER, and the Marine Planning Framework referred to
	Regarding the key issues described in subsection 4.2.3, we acknowledge the potential impacts from construction work of new developments or installations. Additionally, other aspects include potential for disturbance to designated habitats and protected species, ecological connectivity, hydrological connectivity, air quality impacts, landscape impacts, contaminated soil etc.	Noted key issues have been expanded on in the SEA ER.
	In Subsection 4.3 Biodiversity including Flora & Fauna, the last paragraph on page 21 refers to the NPWS, 2013 report on the status and trends in Habitats protected under the EU Habitats Directive between 2007 and 2013. This should be updated to refer to the latest report produced in 2019.	Noted. The SEA ER has had regard to the most recent available data.
	In Subsection 4.5 Water Resources, we recommend referring to and incorporating the relevant aspects of the National River Basin Management Plan.	Noted and incorporated into SEA ER.
	We also recommend taking account of the most recent water quality reports available on the EPA's website. These can be consulted at: http://www.epa.ie/pubs/reports/water/. Additionally, as referred to previously, the SEA Environmental Report for the Draft National Marine Planning Framework would be worth reviewing in the context of aligning relevant marine environmental baseline, as relevant and appropriate.	Noted and incorporated into SEA ER. The Marine Planning Framework is referred to in the SEA ER.
	Subsection - 4.6 Air and Noise should consider including the most recently published air quality information:	Noted. The SEA ER has been prepared having regard to the most up to date environmental information.
		Noted and incorporated into SEA ER.

	In Subsection - 4.7 Climate Change and Resilience, there is merit in referring to and aligning with the relevant actions of the National Climate Action Plan 2019.	Noted and incorporated into SEA ER.
	Additionally, the inclusion of a description of the adaptability / vulnerability to climate change impacts of existing infrastructure, to inform future new development, upgrading/replacing existing infrastructure should be considered. These aspects could be examined further in the SEA ER.	Noted
	Any proposed upgrading, new development should be informed by potential risks to key environmental sensitivities.	Noted and incorporated into SEA ER.
	Section 4.9 – Landscape and Visual aspects should include a reference to the National Landscape Strategy. Additionally, CORINE 2018 data is now available and should be taken into account.	Noted and incorporated into SEA ER.
	In Section 4.10 Water Supply, the latest EPA drinking water reports are available	
	We note in Section 4.11 Sensitivity Mapping, the reference to having taken account of the EPA GISEA Manual Improving the Evidence base in SEA. We also bring your attention to the Environmental Sensitivity Mapping Webtool. This tool should assist in identifying areas of greater environmental sensitivity in order to focus the scope of the assessment, establish appropriate mitigation measures and objectives/commitments to protect more sensitive areas and in implementing the Plan. There is merit in reviewing the output of the existing environmental sensitivity mapping and the output of the ESM webtool to compare the findings. This may help in identifying more sensitive areas.	Noted- the ESM sensitivity map was referred to in the preparation of the SEA ER.
	Where Key Issues are described for the specific environmental topics they should be set in the context of the Plan's remit.	Noted Noted and incorporated into SEA ER.

	We suggest that in Section 6.2 - Statutory Consultation that you consider amending the text in the first paragraph to refer to the relevant SEA Regulations, (S.I. No. 435 of 2004) rather than S.I. No 436 of 2004. The EPA's "Ireland's Environment - An Assessment 2016"1 has been published. The description of the current state of Ireland's environment in this report will be a useful source of information for the development of the Plan and the parallel Strategic Environmental Assessment (SEA) process in the context of key environmental policies and considerations. Key Environmental Actions for Ireland are identified in Chapter 13 - "Environmental Challenges and Emerging Issues for Ireland". Each of the above Key Actions has relevant sub actions which will contribute to the delivery of the overall action. The integration and implementation of these actions, many of which are linked, across these 7 key areas will be an important factor in the delivery of environmental protection and sustainable development in Ireland. They are also linked to a number of the UN's Sustainable Development Goals. The Plan and SEA should consider and take into account the relevant aspects of the 7 Key Actions and the related sub actions. The key issues identified in the Executive Summary and the Chapter on "Environmental Challenges and Emerging Issues for Ireland" will also be relevant in this context. The relevant aspects of these Key Actions and the SDGs should be taken into account in preparing the Plan and the SEA and should be reflected in the principles/objectives/measures in the Plan. This will ensure that the Plan aligns with and contributes to achieving Ireland's sustainable development and environmental protection ambitions. The EPA is currently preparing the next iteration of Ireland's Environment for 2020 which, once published,	The SEA ER has been updated so that the description of the baseline environment now aligns with the data outlined in the recently published 2020 State of the Environment Report. Noted. The SEA ER has been updated to aligns with the provisions of the recently published 2020 State of the Environment Report. Noted. The SEA ER has been updated to aligns with the provisions of the recently published 2020 State of the Environment Report.

	should be taken into account in implementing the Plan and in future reviews of the Plan. Contaminated soil, while highlighted in Table 5.1 Objectives and Targets, merits further consideration in the context of the Plan. This is relevant to unearthing of contaminated material in new build, remedial works and the disposal / treatment of any contaminated material unearthed. By setting the environmental objectives and baseline at the appropriate level, it may be easier to consider whether specific environmental criteria may be scoped in or out, as appropriate. In Section 5, Table 5.1 Draft Objectives and Targets, some of these would benefit from being made more specific to the Plan being prepared. The Objectives and targets should be reviewed with respect to the following aspects: • Consistency between the key issues identified for the individual environmental topics under Baseline Description and the proposed topic specific environmental objectives and targets, • Relevance to the Plan. The Objectives and Targets should be set in the context of what the Plan can achieve and/or contribute to. For example, consider under Biodiversity, Flora and Fauna: • Contribute to the protection, conservation, enhancement… • Contribute to the conservation and protection of other sites of nature conservation value … • Under ‘biodiversity, flora and fauna’, the second objective, as currently written, would seem outside the remit of the Plan to achieve. It could	Noted. Contaminated soil is referenced in the SEA ER. Noted. The SEA objectives, indicators and targets have all been reviewed and updated to ensure they are appropriate and relevant to the NIP. Noted and incorporated into the SEA ER. Noted and removed.

	however be re—written “support achievement of the conservation objectives of sites of nature conservation”.	
	• In finalising the environmental objectives, these should be practical and achievable within the scope of the Plan. For example, under Water: Implement appropriate sustainable drainage systems in the county is unlikely to be achievable through implementation of the Plan. In addition, this objective refers to ‘County’ whereas the Plan is being prepared at a national level	Noted. The SEA objectives, indicators and targets have all been reviewed and updated to ensure they are appropriate and relevant to the NIP.
	• Each Environmental Objective should be aligned with the relevant Environmental Target(s) and Indicator(s).	Noted
	Consideration should be given to the use of indicators that can monitor progress in Plan implementation and progress towards achieving the relevant environmental objectives and targets. For ease of reference and to assist in monitoring and reporting, the final Environmental Objectives, Targets and Indicators should be assigned specific codes. For example, under Biodiversity: BO 01. BT 01, BI 01.	Noted. The SEA objectives, indicators and targets have been codified and reviewed for appropriateness and relevance to the NIP.
	Under Water, we suggest including an overall objective to ‘support achievement of the requirements of the Water Framework Directive and implementation of the National River Basin Management Plan’.	Noted and incorporated into the SEA ER.
	Under Air and Noise, the objective could be re-written “support protection of air quality in accordance with national and European legislation."	Noted and incorporated into the SEA ER.
	Under Climate and Resilience, a specific reference to “support implementation of the National Climate Action Plan 2019” should be included.	Noted and incorporated into the SEA ER.
	Landscape and Visual Objectives could include “support achievement of the objectives of the National Landscape Strategy”.	Noted and incorporated into the SEA ER.

4.4 Baseline Data

Gathering relevant information relating to the state of the environment for a plan area is an integral part of the SEA process. The SEA Directive requires that certain information relating to the relevant environmental baseline is presented in order to help test the performance of the plan's implementation, as well as helping establish how the environment would change if the plan were not to implemented.

Baseline information has been collected from readily available sources, and a Geographical Information System (GIS) was used to graphically present relevant information. The baseline information is reported in Section 5 of this report.

4.5 Consideration of Alternatives

The SEA Directive requires that reasonable alternatives be assessed in order to demonstrate how the preferred strategy performs against other forms of action. Alternatives must be developed, described and assessed within the SEA process, with the results presented in the Environmental Report.

Section 7 of this report identifies, describes and evaluates different scenarios for the development of the gas transmission network, taking into account national energy planning, economic development policy, and the SEOs identified in Section 6.

4.6 SEA Sensitivity Mapping

Environmental Sensitivity Mapping was prepared in order to provide relevant information on environmental constraints so that environmental issues could be taken into consideration from the earliest possible stages of the SEA.

The Environmental Sensitivity Mapping has been used to inform the environmental baseline description provided in Section 5 of this Report and certain mitigation measures identified in Section 9.

4.7 Environmental Assessment of the Draft NIP

The environmental assessment process ran in parallel to the development and preparation of the draft NIP.

The environmental assessment process was undertaken in accordance with best practice SEA principles and guidance. This included desk reviews of all of the available GIS data, specialist investigation into the likely effects associated with the draft NIP and recommendations for suitable mitigation measures along with monitoring.

4.8 SEA Statement

On adoption of the NIP, the SEA Statement will be made public and will include information on how environmental considerations were integrated into the NIP – highlighting the main changes to the NIP which resulted from the SEA process, how the Environmental Report and consultations were taken into account – summarising the key issues raised in consultations and in the Environmental Report indicating what action was taken in response, and the reasons for choosing the NIP in the light of the other alternatives, identifying the other alternatives considered, commenting on their potential effects and explaining why the NIP was selected.

4.9 Consultations

Further to the SEA Scoping consultation outlined in Section 4.3, this SEA Environmental Report will be issued to the relevant statutory stakeholders for comment. The responses received will be addressed in the finalisation of the Environmental Report. An outline of the responses received will be included in the SEA Statement.

4.10 Technical Difficulties Encountered

No major technical difficulties were encountered during the preparation of this Environmental Report.

5 Current State of the Environment

5.1 Introduction

Being consistent with the high level, strategic provisions of the draft NIP, this section provides a high- level, strategic description of environmental factors which have the greatest potential to be affected by implementation of the draft NIP. GIS is used extensively to provide regional information.

The baseline environment is assessed under the following headings:

- Biodiversity including Flora & Fauna;
- Population and Human Health;
- Land and Soils;
- Water;
- Air and Noise
- Climate change and resilience;
- Archaeological, Architectural & Cultural Heritage;
- Landscape and Visual; and
- Material Assets.

5.2 Population and Human Health

5.2.1 Population Baseline

Population Distribution

This section provides an overview of the population dynamics and socio-economic characteristics of the draft NIP area. Census 2016 results showed that the population of the Republic of Ireland stood at 4,761,865 in April 2016, an increase of 173,613 since April 2011. This represents an increase of 3.8% over the five years or 0.8% on an annual average basis.

Figure A2 in the Appendix illustrates the population density in the Republic of Ireland (RoI).

In 2016, there were 2,985,781 people in Ireland living in urban areas. As can be seen in **Figure 5.1**, this represents 62.7% of Ireland's population.

Population growth between 2011 and 2016 was centred around cities, including Dublin, Cork and Galway. The population of Dublin city and suburbs increased by 5.6% between 2011 and 2016, the population of Cork city and suburbs grew by 5.1% and the population of Galway city and suburbs grew by 4.1%. In contrast, the population of rural areas grew by 2%, compared to 4.9% in urban areas. **Figure 5.1** illustrates the level of urbanism in Ireland from 1966-2016.

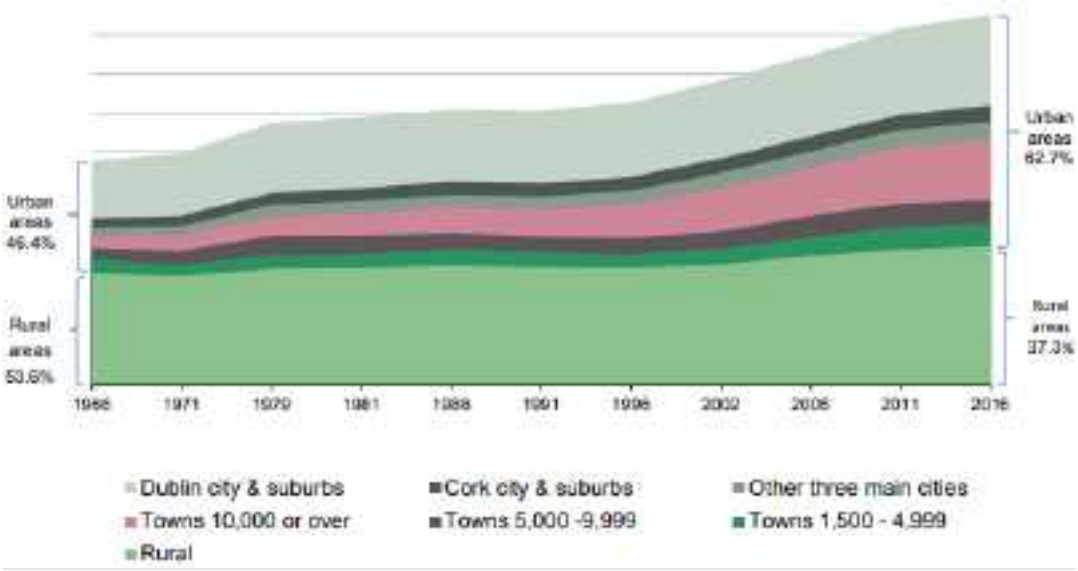

Figure 5.1: Urbanisation 1966 - 2016 (CSO 2016)

Energy Demand

Between 1990 and 2018 energy consumption across Ireland increased substantially as population growth, technologies advanced, and economic activity increased. Energy consumption data (1990-2018) show that peak energy consumption occurred in 2008, at 190,116 megawatt-hours (MWh). Fossil energy, including coal, oil and peat combustion, made up 96% of the energy consumed and renewable energy contributed just 4% of the energy consumed (SEAI, 2019a).

Energy demand dropped significantly during the financial crisis but increased again since 2014. In 2018, energy consumption in Ireland was 170,414 MWh and combustion of fossil fuels made up 89% of Ireland's total energy use while renewable energy, including biomass, made just 10%, with the residual 1% being non-renewable waste.

This percentage of renewable energy has increased significantly relative to 2008 but remains low compared with the European average of just under 20%.

Figure 5.2 illustrates the energy consumption (MWh) according to the main fuel types in Ireland from 1990 – 2019.

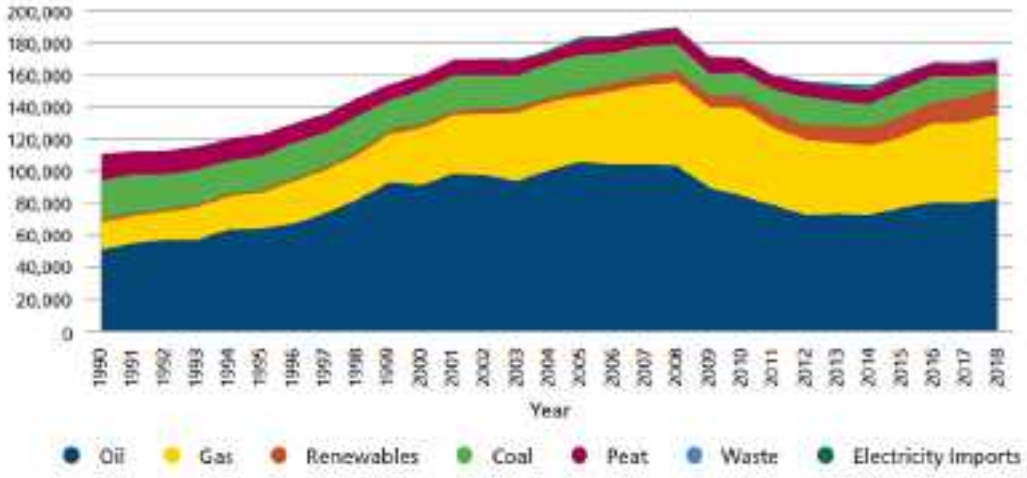

Figure 5.2: Energy consumption (MWh) according to the main fuel types, Ireland 1990 - 2019 (SEAI).

Energy Use for Heat

The residential sector/buildings in Ireland accounted for approximately 19% of energy consumption in 2018 and produced 22% of carbon dioxide emissions and 24% of PM2.5 emissions. Residential energy use peaked in 2010 with consumptions over 35.000 MWh. **Figure 5.3** illustrates energy (MWh) used for residential heating from 1990-2018. Energy sources changed significantly from the 1990s (coal and peat to oil and natural gas), particularly in large urban areas.

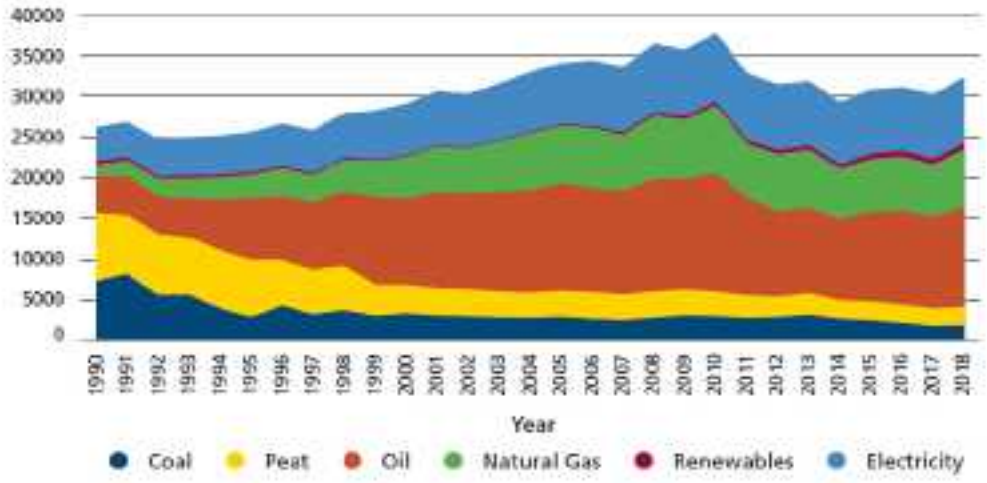

Figure 5.3: Energy (MWh) used for residential heating, Ireland 1990 – 2018 (SEAI).

Central heating used by occupied permanent housing units at the time of the 2018 Census reveals that oil, electricity and natural gas topped the responses being used to heat Irish homes respectively at 38%, 25% and 22%. Refer to **Figure 5.4** for residential energy use profile in 2018 (data remained relatively stable since 2000).

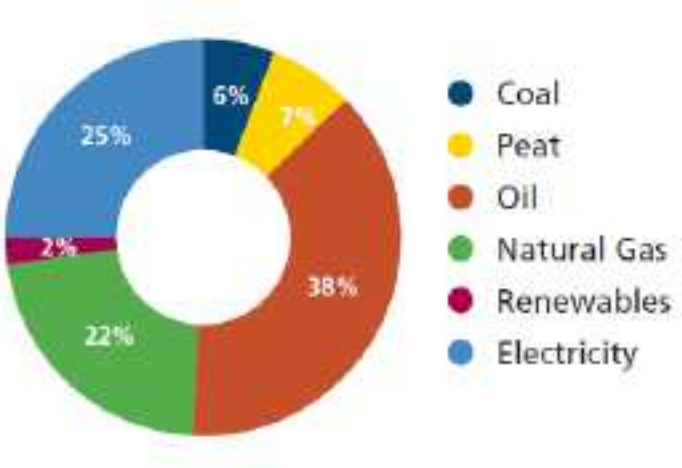

Figure 5.4: Energy Use for Heat- Ireland 2016 (SEAI).

Gas Demand

GNI has over 688,000 natural gas customers in 175 population centres, in 21 counties throughout Ireland. Of the 668,000 customers, GNI supplies gas to 30,000 businesses. GNI is responsible for connecting all customers to the network, regardless of their supplier.

Figure A3 in the Appendix illustrates residential gas consumption in the RoI and **Figure A4** in the Appendix illustrates non-residential gas consumption in the RoI.

Already, analysis from SEAI has shown that since 1990, the share of high carbon content fuels in electricity generation, such as coal and oil, has been reducing with a corresponding rise in the relatively lower carbon natural gas and zero carbon renewables.

As renewable gas is injected into the network, the heating sector can be decarbonised at scale and without relying on customer behaviour change. The Low Carbon Energy Roadmap for Ireland has noted that *'Fossil fuels are incompatible with a low carbon economy and, while their use will be greatly diminished, natural gas may still be required in electricity generation.'*

5.2.2 Human Health Baseline

Life Expectancy

Ireland is within the top 10 countries in Europe for life expectancy, as can be seen below in **Figure 5.5**. Life expectancy in Ireland is continuing to increase, currently standing at 83.6 years for women and 79.9 years for men. Male life expectancy in Ireland has increased by 3 years and female life expectancy by almost 2 years since 2006. This improvement is largely due to lower mortality and better survival from conditions such as heart disease and cancer affecting older age groups. The contribution of modern health services to this achievement, while difficult to quantify, has been of unquestionable significance.

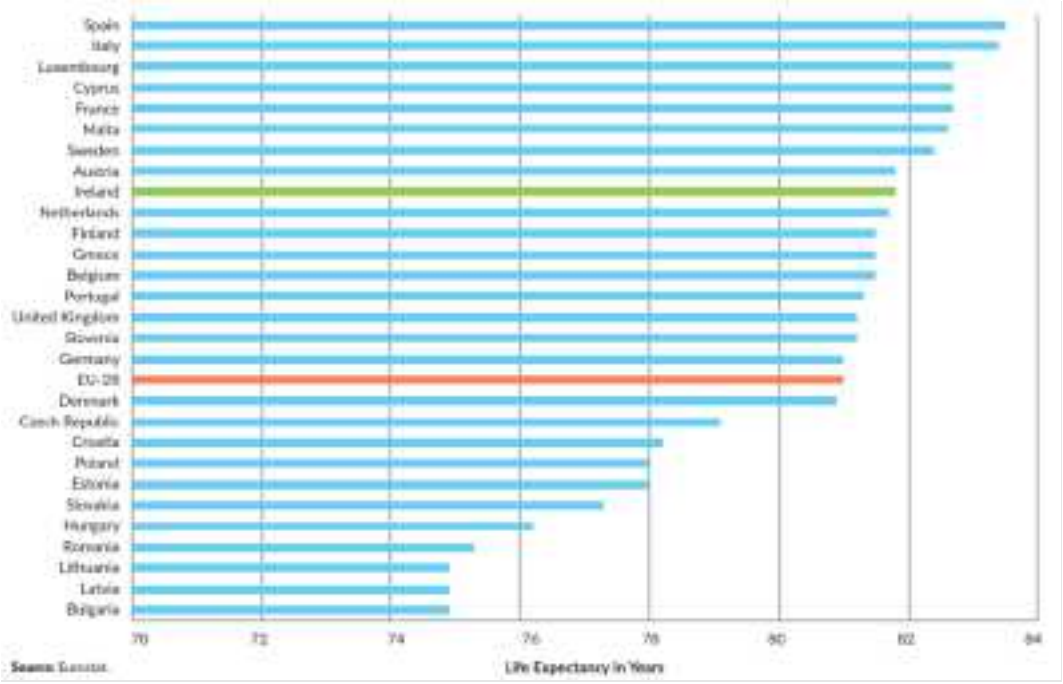

Figure 5.5: Life Expectancy at Birth for EU-28 Countries, 2016 (Eurostat 2016)

National Trends

Population health at the national level presents a picture of decreasing mortality rates and high self-perceived health over the past ten years.

Mortality rates across all major causes have declined since 2008. Age-standardised death rates for cancers and circulatory system diseases, the major causes of deaths in Ireland, have declined by 11% and 32% respectively over the past ten years. Lifestyle factors such as smoking, drinking, levels of physical activity and obesity continue to be issues which have the potential to jeopardise many of the health gains achieved in recent years. However, inequalities in health are closely linked with wider social determinants including living and working conditions, issues of service access, and cultural and physical environments.

The 2016 Census records data on the self-perceived health status of the population. The results show that 87% of the population felt they had ‘good’ or ‘very good’ health.

Individual Health

Individual health is determined predominantly by the conditions in which people are born, grow, work, live, and age. According to the World Health Organisation there are a ‘wider set of forces and systems shaping the conditions of daily life. These forces and systems include economic policies and systems, development agendas, social norms, social policies and political systems.’

Disabilities in Ireland

The number of people with a disability increased by 47,796 between 2011 and 2016 and stood at 643,131 in April 2016, accounting for 13.5% of the population.

There were 331,551 females (51.6%) and 311,580 males (48.4%) with a disability.

Radon Levels

Radon is a naturally occurring radioactive gas formed in the ground by the radioactive decay of uranium, which is present in all rocks and soils. It is the greatest source of exposure to ionising radiation for the general public in Ireland and the leading cause of lung cancer after smoking. It is estimated that exposure to radon accounts for approximately 13% of all lung cancers in Ireland, which equates to some 250 lung cancer cases each year.

High radon concentrations can be found in any part of the country; however, as can be seen in **Figure A5** in the Appendix, certain areas have been identified which are more prone to radon as High Radon Areas.

5.2.3 Key Issues

- Increase in demand for electricity supply due to future predicted increases in population and economic growth;
- Increased urbanisation will result in population clusters and resulting disproportionate demands on energy infrastructure and consumption;
- Continuity of supply re. availability of resources and increased demand;
- Switch to renewable energy use; and
- Impacts of pollution from construction work or from the operation of new developments or installations.

5.3 Biodiversity including Flora & Fauna

5.3.1 Baseline

As the National Implementation Plan area reaches across the entire land and waters of Ireland, the subject area supports a wide range of habitat types.

Ireland lies on the western edge of the European continental shelf. Ireland's territorial waters extend to the outer edge of the continental margin, covering an area of 880,000km^2. The territorial area of Ireland covers an area of 84,421km^2 comprised of low central plains surrounded by coastal mountains.

Ireland has a rich diversity of ecosystems and wildlife in its terrestrial, freshwater and marine environments. According to the Irish Wildlife Trust, Ireland is host to over 50 species of mammals, 400 species of birds, 4,000 plant species and 12,000 insect species.

Ireland is required under the terms of the EU Birds Directive (2009/147/EC) to designate Special Protection Areas (SPAs) for the protection of endangered species of wild birds. Ireland's SPA Network encompasses 154 sites, over 5,700km^2 of marine and terrestrial habitats.

Ireland is also required under the terms of the EU Habitats Directive (1992/43/EEC) to designate Special Areas of Conservation (SACs) for the protection of certain habitats and species. Ireland's SAC Network encompasses an area of 13,500km^2 across more than 400 sites.

Natural Heritage Area (NHA) are designated sites, protected under the Wildlife Amendment Act (2000). These areas are considered important for the habitats present or which holds species of plants and animals whose habitat needs protection. In addition, there are 630 proposed NHAs (pNHAs), which were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. These sites are of significance for wildlife and habitats and are subject to limited protection

Figure A6 in the Appendix illustrates the Designated sites in the RoI.

Current Status & Trends

Red Lists identify species in most need of protection and conservation interventions. Red lists are coordinated by the NPWS and Northern Ireland Environment Agency (NIEA). Species are categorised into nine groups under an international system (IUCN): extinct; extinct in the wild; critically endangered; endangered (present a very high risk of extinction into the wild); vulnerable; near threatened; least concern; data deficient; and not evaluated.

In Ireland just over 14% of species assessed are under threat of extinction, these include the European eel, Arctic char and natterjack toad. New Red List assessments have been undertaken in Ireland since 2016, namely for vascular plants, cartilaginous fish, plecoptera (stonefiles) and mammals.

Refer to **Figure 5.6** for Red List assessment details presented in Ireland's '6th National Report on the Convention on Biological Diversity'.

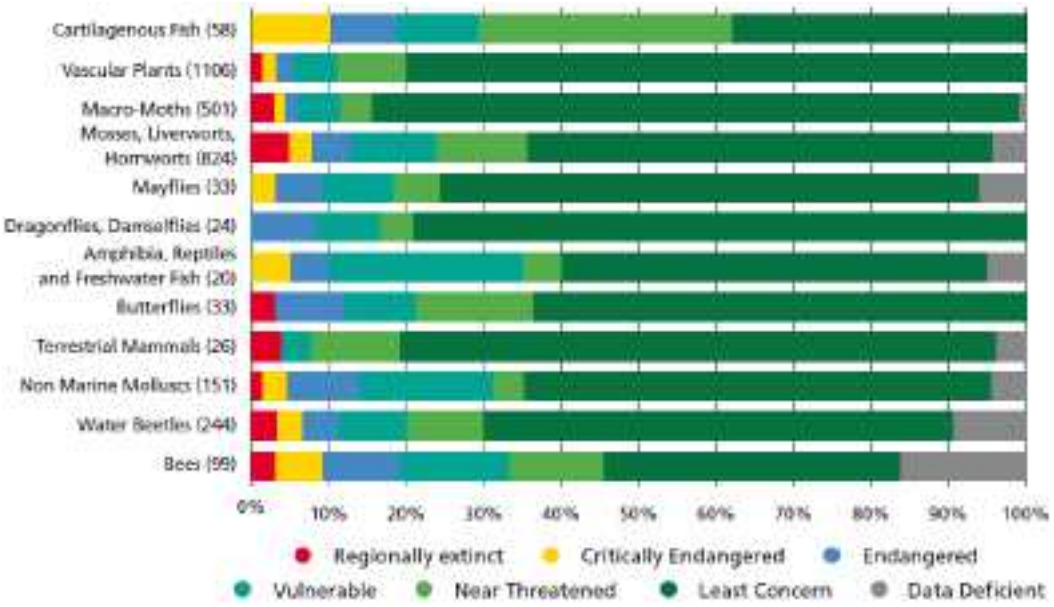

Figure 5.6: National Biodiversity Indicator: Proportion of total species assessed under various IUCN Red List threat categories (NPWS)

Member States are required to monitor habitats and species that are considered threatened across Europe and are listed in the Habitats Directive (92/43/EEC). The conservation status of habitats and species is assessed at a national level, not just in Special Areas of Conservation (SACs). The most recent report of the National Parks and Wildlife Service (NPWS, 2019) provides an overview of the status of Ireland's 59 protected natural habitats and 60 protected species.

The current status and trends of Ireland's habitats are presented in **Figure 5.7.** (NPWS, 2019). As indicated in **Figure 5.7** some 85% of habitats in Ireland are of 'bad' or 'inadequate' status**.** The habitats of most pressing concern are those that have reduced range and/or area, notably raised bogs and species-rich grasslands.

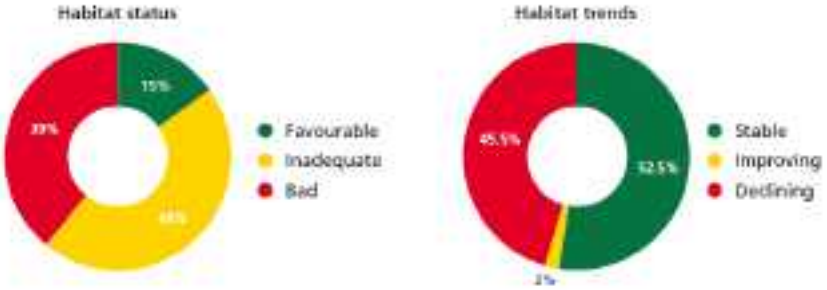

Figure 5.7: Overall Assessment Results for the Status and Trends in Habitats protected under the EU Habitats Directive in Ireland (NPWS 2019).

The current status and trends of Ireland's species are presented in **Figure 5.8** (NPWS, 2019). As indicated in **Figure 5.8** some 57% of species in Ireland are of 'favourable' status.

One of the species of greatest concern is the pollution-sensitive freshwater pearl mussel, as only a few rivers have populations with even near-adequate recruitment.

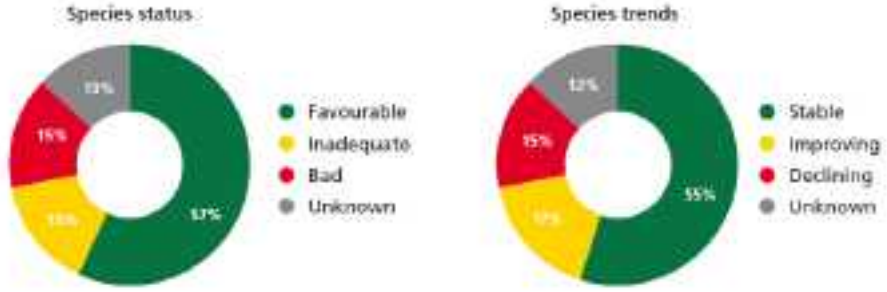

Figure 5.8: Overall Assessment Results for the Status and Trends in Species protected under the EU Habitats Directive in Ireland (NPWS 2019).

5.3.2 Key Issues

- Habitat removal or degradation due to development/installation of gas network infrastructure, or habitat fragmentation due to linear infrastructure;
- Water pollution due from development or installation works including run-off from construction vehicles etc. The continuing deterioration of high-quality rivers is of great concern, particularly as species such as salmon, trout and the declining freshwater pearl mussel require and depend on high quality water and river habitat;
- Changing land use, direct impact and unsustainable exploitation pressures evident across different habitats;
- Climate change is also likely to have some effect on Irish species and habitats;
- Infrastructure upgrades and development works which take place within protected sites will need to be cognisant of habitats and species present, in order to mitigate potential negative impacts; and
- Infrastructure upgrades and development works which take place within the Irish sea or Northern Ireland will need to ensure compliance with relevant legislation, in order to mitigate any potential transboundary impacts on biodiversity.

5.4 Soils and Geology

5.4.1 Soil Baseline

There are ten main Great Soil Groups occurring in Ireland. These soils include Podzols, Brown Podzolics, Brown Earths, Grey Brown Podzolics and Blanket Peats (zonal soils), the Gleys and Basin Peats (hydromorphic soils) the Rendzinas, (calcimorphic soils), Regosols and Lithosols.

Podzols are generally poor soils with high lime and fertiliser requirements. They form in hill and mountain areas where reclamation and cultivation are not feasible. As a result, they are often used for forestry.

Brown Podzolic soils are similar to podzols, however they are less depleted than podzols. Due to their desirable physical characteristics, Brown Podzolics are often devoted extensively to cultivated cropping and pasture production.

Brown Earth soils are relatively mature, well-drained, mineral soils possessing a rather uniform profile, with little differentiation into horizons. These are amongst the most extensively cultivated soils.

Grey Brown Podzolic soils are usually formed from a calcareous parent material, which counteracts the effects of leaching. The lighter textured Grey Brown Podzolics are good all-purpose soils, while the heavier textured members are highly suited to pasture production, responding well to manurial and management practices.

Gleys are soils in which the effects of drainage impedance dominate and which have developed under the influence of permanent or intermittent waterlogging. Most gleys have poor physical conditions which make them unsuitable for cultivation or for intensive grassland farming. Their productive capacity is also affected by restricted growth in spring and autumn.

Rendzinas are shallow soils, usually not more than 50 cm deep, derived from parent material containing over 40% carbonates. The use range of Rendzinas is often limited by their shallow depth. They are suited mostly to extensive grazing but where sufficiently deep they can also be excellent tillage soils.

Regosols and Lithosols are formed mostly from the alluvial deposits of rivers and from shallow stony deposits respectively. Regosols can have a wide use range but they are often subject to flooding hazards. For this reason, they are mostly used for grazing. Lithosols generally have bare rock outcropping at frequent intervals and many also have steep slopes. Their use-range is usually limited to rough grazing.

An overview of the soil types in the RoI can be seen below in **Figure A7** in the Appendix**.**

There are six key degradation processes that can impact on soils in general. This includes soil sealing, erosion, organic matter decline, compaction, salination and landslides. EPA research has shown that the main soil quality pressures in Ireland appear to relate to surface sealing (urbanisation). Human activity is also a significant driver of degradation through poor (or inappropriate) land management practices. However, in Ireland, the overall area of artificial surfaces remains low compared with that in other EU Member States.

5.4.2 Geology Baseline

The geology of Ireland is relatively diverse, when considering the land surface area.

The bedrock of Ireland contains a wide variety of rock types which have originated at different periods of geological time.

The counties Cavan and Monaghan are mainly underlain by Lower Palaeozoic shales, grits and greywackes, whilst counties Louth and Meath are mainly underlain by limestones or marginally younger shales and siltstones.

The South East of Ireland consists predominantly of Lower Palaeozoic sedimentary (mudstones, siltstones and greywackes) and igneous rocks (rhyolites, andesites and basalts). These have been intruded and metamorphosed during the Caledonian Orogeny by the Leinster Granite, which dominates the area's topographic elevation (Wicklow Mountains).

The South and South West are dominated by Old Red Sandstone and some shales in the west, whilst the easternmost part is more variable with sandstones, shales and limestones occurring in a series of gentle synclines and anticlines formed during the Hercynian Orogeny. North of these, in northern Kerry, western Limerick and western Clare there are a series of Upper Carboniferous sediments, mainly shales and grits, sitting on top of comparatively pure limestones.

West Galway and West Mayo are characterized by granite in the South (Caledonian Orogeny) and a combination of Lower Palaeozoic and late Pre-Cambrian metamorphic rocks north of this. In the North, most of county Donegal is underlain by a complex series of rocks comprising schists (metamorphosed from mudstones and muddy sandstones), and quartzites (from sandstones). These have been intruded by a series of granites during the Caledonian Orogeny.

The centre of Ireland is dominantly underlain by carboniferous limestones, which vary from very pure to impure shaley varieties. Within this large area there are two types of rock giving rise to pronounced topographic relief. The first and more frequent consist of Lower Palaeozoic shales and sandstones and Old Red Sandstones. The second consist of younger Carboniferous rocks, predominantly shales, siltstones and sandstones.

Figure A8 in the Appendix provides an overview of the geology of Ireland.

The Irish Geological Heritage (IGH) Programme of the Geological Survey of Ireland (GSI) aims to identify, protect and promote the best of this heritage, along with its partners in the National Parks and Wildlife Service (NPWS).

Figure A9 in the Appendix illustrates the site of geological heritage in Ireland.

5.4.3 Key Issues

- Disturbance to soils and geology during new development or infrastructure installation;
- Development or installation that takes place without sufficient surveying and assessment of the potential for the presence of karsified limestone under or adjacent to the site has the potential to give rise to problems both for the structures and for the receiving environment, particularly if storage or piping infrastructure is caused to leak by a geological collapse;
- Impacts of pollution from construction work or from the operation of new developments or installations; and

- Managing the impact of construction and development on soil functions, such as absorbing rainwater is vital. Climate change has the potential to increase soil erosion rates through hotter, drier conditions that make soils more susceptible to wind erosion, coupled with intense rainfall incidents that can wash soil away. Soil erosion can also have off-site effects which result from the movement of sediment and agricultural pollutants into watercourses. This can result in increased silting of watercourses, disruption to ecosystems and contamination of drinking water supplies.

5.5 Water Resources

5.5.1 Baseline

Ireland has abundant surface water resources, with over 70,000km of river channel, 12,000 lakes, 850km^2 of estuaries and 13,000km^2 of coastal waters. Groundwater is also abundant, occurring almost everywhere and supplying 20-25% of water supplies nationally. The quality of Irish groundwater and surface waters is among the best in Europe. Refer to **Figure A10** and **Figure A11** in the Appendix for the river and lake features in Ireland.

The latest assessment of water quality in Ireland (2013-2018) underline a continuing decline in high status water bodies (cleanest water category), and an increase in the number of water bodies in poor ecological health. Even more stark is the reduction in the number of Irish most pristine rivers, which has fallen from over 500 sites to only 20 sites in 30 years.

Ireland's latest assessment of water quality shows that, while just over two-thirds of water bodies (1825) had not changed status since the last assessment (2010-2015), 483 water bodies declined in status and 368 improved (**Figure 5.9**). This resulted in an overall net decline in 115 surface water bodies or 4.4 per cent.

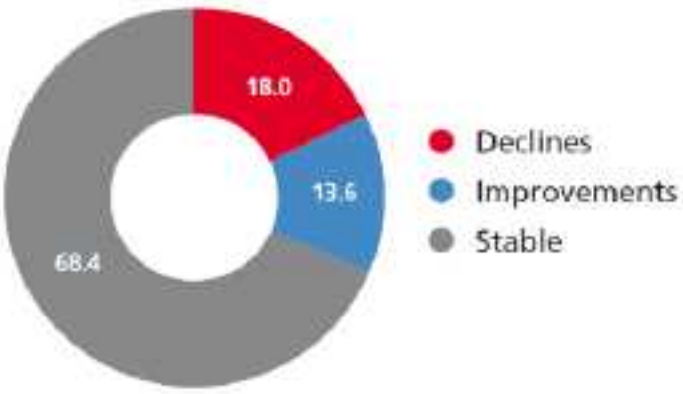

Figure 5.9: Percentage change in ecological status of surface waters between the assessment periods 2010-2015 and 2013-2018 (EPA).

Rivers

Results from the most recent EPA water quality report indicate that between 2013 and 2018, 53% of the river water bodies were in high (8%) or good (45%) biological quality (**Figure 5.10**). The remaining 37% river water bodies were of moderate (28%), poor (19%) or bad quality (0.4%).

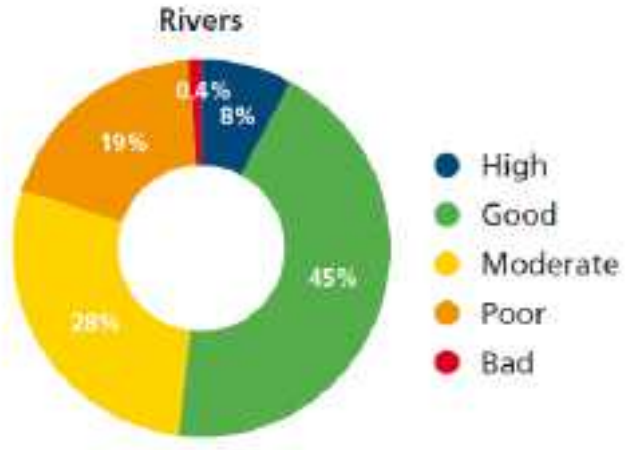

Figure 5.10: Rivers ecological status, 2013-2018 (EPA)

Refer to **Figure A12** in the Appendix for the existing water quality status of rivers in Ireland. **Figure A13** in the Appendix illustrates the Water Framework Directive risk status of rivers in Ireland.

Lakes

Of the total lakes that were monitored, 51% were in high (8%) or good (43%) ecological quality and the remaining 49% lakes were of moderate (32%), poor (12%) or bad quality (5%). **Figure 5.11** illustrates the lake ecological status between 2013 and 2018.

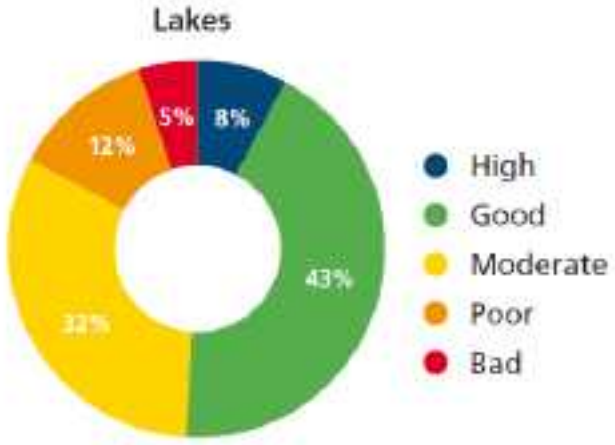

Figure 5.11: Lakes ecological status, 2013-2018 (EPA)

Refer to **Figure A14** in the Appendix for the existing water quality status of lakes in Ireland. **Figure A15** in the Appendix illustrates the Water Framework Directive risk status of lakes in Ireland.

Groundwater

Ireland's groundwater resource accounts for approximately 25% of drinking water nationally. Furthermore, it is also a contributor to many rivers, lakes and estuaries around the country. As such, impacts on groundwater can have significant ecological and social implications. There is a total of 513 groundwater bodies in Ireland. Refer to **Figure A16** in the Appendix for groundwaters features in Ireland.

Groundwater Vulnerability is a term used to represent the natural ground characteristics that determine the ease with which groundwater may be contaminated by human activities. Groundwater vulnerability exhibits a range of vulnerability ratings classified by Low risk up to Moderate, High and Extreme, where the rock is exposed near the surface or comprised of karst. Refer to **Figure A17** in the Appendix for the groundwater vulnerability in Ireland.

Groundwater Quality is generally of 'good' quality, 92% of groundwater water bodies have good chemical status (**Figure 5.12**) and water bodies that failed to meet their objectives (38 water bodies in total) are typically associated with historical contamination from industrial sites and, although significant, this pollution is generally very localised.

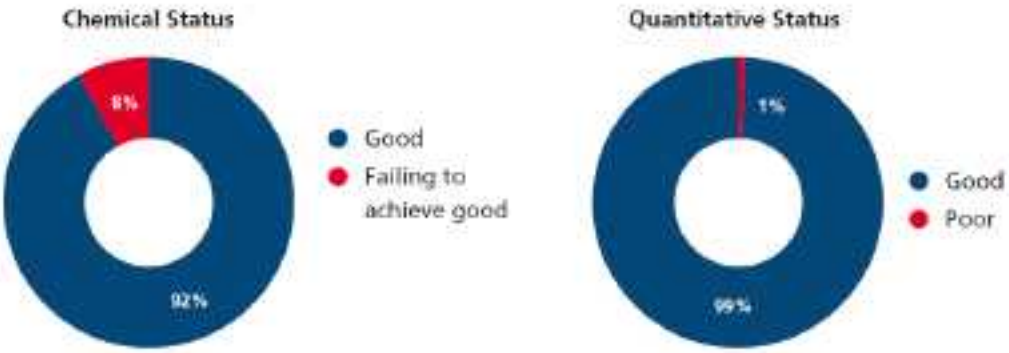

Figure 5.12: Chemical and quantitative status of groundwater, 2013-2018 (EPA)

Groundwater quality is considered good also in accordance with the Water Framework Directive Status. Refer to **Figure A18** in the Appendix for the groundwater quality status in Ireland.

Refer to **Figure A19** in the Appendix for the Water Framework Directive groundwater risk status in Ireland.

Marine

As can be seen below in **Figure 5.13,** Ireland's marine environment is one of the largest in the European Union (EU) and is nearly 10 times its land area. The coastline is at the interface between the land and sea, with shallow estuaries that

extend into the coastal zone and out to the continental shelf to the west, which plunges to depths of over 4,000 metres.

The temperate waters that surround Ireland are highly productive and provide a sustaining foundation for a rich mosaic of marine life, including hundreds of species of invertebrates and fish, 24 species of whales and dolphins, breeding colonies of both the common and grey seal and some of the largest breeding populations of seabirds in western Europe.

Ireland's transitional waters (including estuaries and coastal lagoons) and coastal waters (up to 1 nautical mile from the shore) contain respectively 194 and 110 water bodies. These areas are assessed under the WFD (latest 2013-2018), which indicates that only 30 (38%) of the transitional waters monitored in Ireland are of good or high ecological status, with 49 (62%) being of moderate, poor or bad ecological status. Coastal waters are in a better condition, with 36 (80%) of those monitored being of high or good status, which corresponds to 93% of the surface area of coastal water bodies. Eight coastal water bodies (20%) are of moderate ecological status and a single water body is of bad status (**Figure 5.14**).

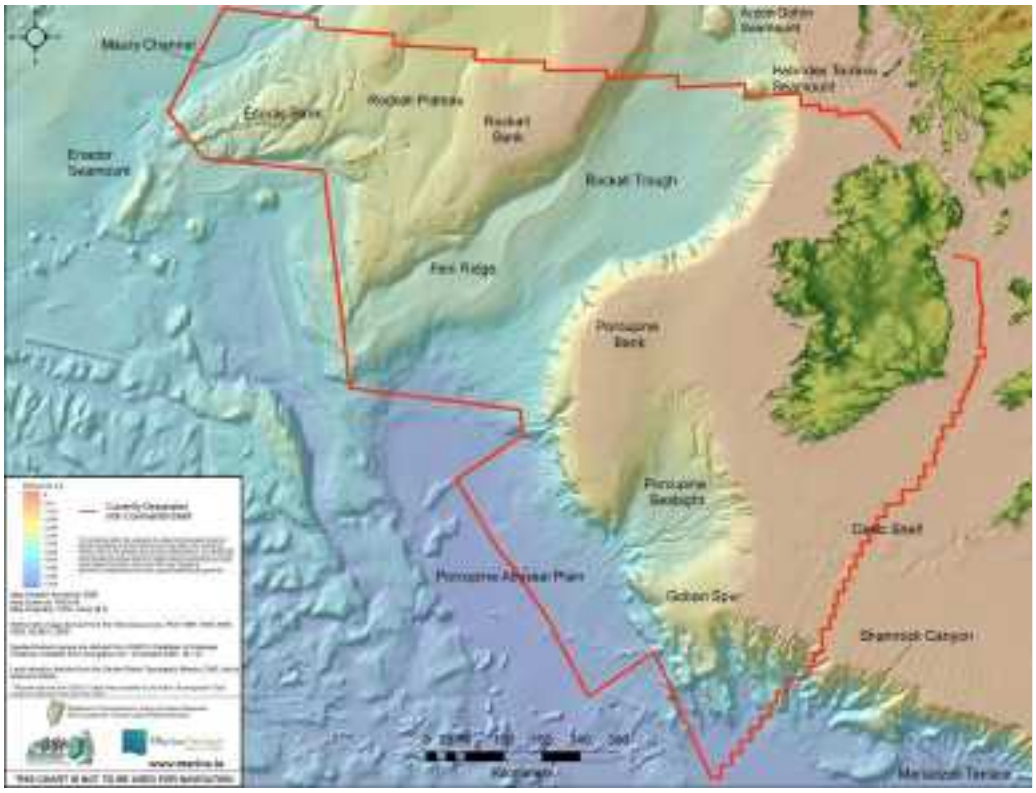

Figure 5.13: Irish Continental Shelf (Marine Institute 2014)

Figure 5.14: Status of transitional (left) and coastal (right) waters during 2013-2018 by number (EPA)

Flooding

The Eastern & Midland Region is affected by fluvial, coastal and pluvial flooding. In both urban and rural areas there is a significant fluvial risk along the main river catchments and their tributaries including the Liffey, Boyne, Broadmeadow, Barrow and Shannon. The expansion of the greater Dublin area over the last two decades has left drainage infrastructure under pressure and the integrated nature of flooding emanating from the hydraulic connectivity between rivers, storm drainage and the coastal interface is a known issue in many parts of the city.

Agricultural land along the main rivers has also been impacted by flooding most notably along the banks of the Shannon where due to the flat terrain flooding can propagate inland up to 1km in some locations. Coastal settlements along the Irish Sea have also been impacted by tidal flooding and wave overtopping.

The fluvial flood risk in the Southern Region is characterised by the substantial river catchments including the Shannon, Nore, Barrow, Slaney, Blackwater, Suir and Lee as well as smaller steeper catchments draining to various points of the coastline. Historically these have caused widespread fluvial flooding to urban and agricultural areas in this region. The southern region coastline has also been impacted by coastal flooding including Cork City and Waterford City and coastal erosion is also an issue particularly along the Wexford coast. Combined fluvial, pluvial and coastal flooding is an issue in Cork City and other coastal communities.

The main river catchment in the Northern & Western Region is the Shannon and its tributaries which cause significant flooding to urban areas along its length and the surrounding rural landscape. The remaining river catchments drain from upland rural areas to the Northern and Western coasts affecting urban areas and agricultural lands. Coastal flooding and erosion affects a number of coastal communities along the Atlantic Coastline. Pluvial flooding is a risk in urban areas but to a lesser extent than other regions. Groundwater flooding is also most prevalent in the west of Ireland in karst limestone areas with rural and urban communities in South Galway, Mayo and Roscommon most affected.

5.5.2 Key Issues

The gas transmission network is, in the main, very resilient to weather events as it is an underground network. However, an increase in extreme flooding events may impact transmission pipelines traversing flood plains. Interconnector transmission pipelines may, as they come onshore, be subject to the effects of the projected rise in sea levels and the associated increased risk of coastal erosion which may result in a requirement to install additional coastal defences. Increased river bank erosion where a pipe traverses a river can cause depth of cover and exposure issues for transmission pipelines which require remediation works to reinstate the appropriate depth of cover over the pipeline. In very extreme cases of summer drought there may be a potential risk that soil compaction and ground movement may occur that could impact both transmission and distribution pipelines.

5.6 Air and Noise

5.6.1 Air Quality Baseline

Ireland Air Quality

Air pollution impacts human health, contributes to climate change and damages ecosystems.

Ireland's air quality currently is good, relative to other European Union (EU) Member States, but maintaining this standard is a growing challenge. Despite Irelands monitored air quality being within EU limit values, the levels of particulate matter is of growing concern, especially during the winter months when domestic solid fuel burning can directly impact on air quality and on our health. In larger urban areas, the country is facing potential exceedances of nitrogen dioxide limit values unless we reduce our dependence on the private motor car.

The World Health Organisation (WHO) estimates show that more than 400,000 premature deaths are attributable to poor air quality in Europe annually. In Ireland, the number of premature deaths attributable to air pollution is estimated at 1,180 people and is mainly due to cardiovascular disease. The WHO has described air pollution as the 'single biggest environmental health risk'.

The ambient air quality pollutants of most concern on an EU-wide level are nitrogen dioxide, particulate matter (PM), ozone and PAHs. They can impact on human health, ecosystems and vegetation and monitoring is carried out to determine their concentration levels.

Nitrogen Oxides (NOx)

NOx is the collective term for the gases nitric oxide (NO) and nitrogen dioxide (NO2). Emissions from traffic are the main source of nitrogen oxides (NOx) in Ireland, along with electricity generating stations and industry. The NO2 concentrations in Ireland were static for the period 2008-2015.

Particulate Matter (PM10 and PM2.5)

There are many sources of particulate matter (fine particles) including domestic solid fuel burning, diesel fuelled vehicle emissions, agriculture and even natural sources such as sea salt and wind-blown dust. These small particles can penetrate the lungs and cause health effects. There are two main types - PM10 (diameter less than 10µm) and PM2.5 (diameter less than 2.5µm). In Ireland, levels for both PM10 and PM2.5 are above the WHO air quality guidelines values. Bringing the PM levels down below the WHO guideline values will be a challenge, requiring co-operation across a number of sectors.

Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs are organic compounds predominantly originating from solid fuel burning, particularly wood burning and, to a lesser extent, vehicle emissions. A reduction in the use of solid fuel as a home-heating source across Ireland would mitigate PAH impact on air quality into the future.

Ground Level Ozone (O3)

At ground level, higher concentrations of ozone in the air have adverse implications for human health, for crops and other vegetation. With respect to human health, high concentrations of ozone affect the functioning of the respiratory system. Levels in Ireland are highly influenced by transboundary sources but are low in comparison with those in mainland Europe. In Irish urban areas, ozone is depleted through reactions with traffic-emitted pollutants; therefore levels of ozone are higher in rural areas than in urban areas. Average concentrations in Ireland are generally below the thresholds for effects on human health and vegetation set down in the Clean Air for Europe (CAFE) Directive, but can exceed the WHO air quality guideline values for ozone.

Dioxins and PCBs

"Dioxins" is a collective term for over 200 chemical compounds, of which 17 are considered to be of toxicological significance. These compounds arise mainly as unintentional by-products of incomplete or poorly controlled combustion (e.g. backyard burning of waste) and from certain chemical processes. To maintain surveillance of dioxins, the EPA conducts surveys based on levels found in cows' milk. All dioxin levels recorded in these surveys have been well below legislative limits and compare favourably with those from previous surveys and from other EU countries.

5.6.2 Noise Baseline

According to WHO, noise is the second greatest environmental cause of health problems (after air quality). Excessive noise can seriously harm human health, including mental health, and interfere with people's daily activities at school, at work, at home and during leisure time. It can disturb sleep, cause cardiovascular and psychophysiological effects, reduce performance and provoke annoyance responses and changes in social behaviour.

In Ireland, noise issues are typically considered across four main categories: complaints about entertainment (i.e. loud music), domestic/neighbourhood noise, industrial/commercial activities that cause noise and transport-related noise sources. Most of the complaints about noise are received by local authorities from urban areas, with Dublin local authorities receiving the most complaints. The number of noise complaints received by local authorities, as well as the number of noise complaints overall, increased from 2016 to 2018, the last 3 years for which data are available. Almost one-third of all complaints received by the EPA about EPA-licensed sites related to noise issues. Refer to **Figure 5.15** for number of noise complaints received (2016-2018).

Figure 5.15: General noise complaints received by local authorities (LAs) and noise complaints received by the EPA about EPA-licensed sites, 2016-2018 (EPA)

Transport Infrastructure Ireland is responsible for mapping all national roads, including the Luas network and along with local authorities is responsible for dealing with road- and rail-related noise complaints.

Quiet Areas

It is important to identify and protect quiet areas. In addition to controlling excess noise, it is also important to identify and protect those areas which are substantially unaffected by man-made noise. Accessibility to quietness is highly important to the health of both wildlife and humans. This is particularly so in urban environments, leading to the concept of Relatively Quiet Areas. These are areas, such as local parks, green and blue areas, which are characterised by their proximity to areas with high noise levels and are valued by the public as a perceived area of tranquillity. A recent report from the EEA on quiet areas in Europe provides a first assessment of potential quiet areas in Europe's open country (EEA, 2016a).

The key messages from the report are that noise pollution is having a major adverse impact on human health across Europe, and that protecting those areas

that are not yet affected by noise will bring significant health and wellbeing benefits.

5.6.3 Climate Change and Resilience

Observed and Projected Impacts

Climate Change is the universal challenge which will impact on our future environment, economy and the way our communities' function.

Observations show that Ireland's climate is changing in terms of sea level rise, increases in average temperature, changes in precipitation patterns and weather extremes. The observed scale and rate of change is consistent with regional and global trends and these changes are projected to continue and increase over the coming decades. Climate change will have diverse and wide-ranging impacts on Ireland's environment, society and economic development, including managed and natural ecosystems, water resources, agriculture and food security, human health and coastal zones. **Table 5.1** outlines the observed and predicted climate change impact in Ireland (National Climate Adaptation Framework).

Table 5.1: Observed and Predicted Climate Change Impacts

	Observed Impact	Predicted Impact
Temperature	Temperatures have increased by 0.8ºC since 1990; an average of 0.075ºC per decade.	Average temperatures will rise by between 1 ºC and 3ºC by 2100 compared to the 1961- 2000 average.
Precipitation	An increase in average annual rainfall, especially in the West with regional sessional differences.	Wetter winters in the west, drier summers in the south- east with between 5-25% less rainfall in 2021 to 2060 compared with 1961-2000 period.
Extreme Events	A decrease in storm frequency but increased storm intensity.	Slightly fewer storms but more intense with a northward shift in storm tracks.
Sea Levels	During the satellite era, a sea level rise of 3.5cm per decade	A rise of 60cm to 2100; however, considerable melting of land ice could intensify this impact.

Irish per capita Green-house Gas (GHG) emissions are among the highest in Europe and the extent of the challenge to reduce greenhouse gas emissions in line with our international commitments under the Paris Agreement as well as to meet our more immediate EU obligations is well understood by Government (National Adaptation Framework, 2019). The EPA is responsible for compiling inventories and projections of GHG emissions for Ireland and for reporting the data to the EU and UN.

In 2019, Ireland's greenhouse gas emissions were 59.9 million tonnes of carbon dioxide equivalent, with an increase of 10.1% since 1990 (when emissions were 54.4 million tonnes of carbon dioxide equivalent), as can be seen in **Figure 5.16** Agriculture accounted for 35.3% of the overall emissions, being the largest contributor. Transport accounted for 20.3%, Energy Industries for 15.8% and the Residential sector for 10.9% being the next largest contributors (**Figure 5.17**).

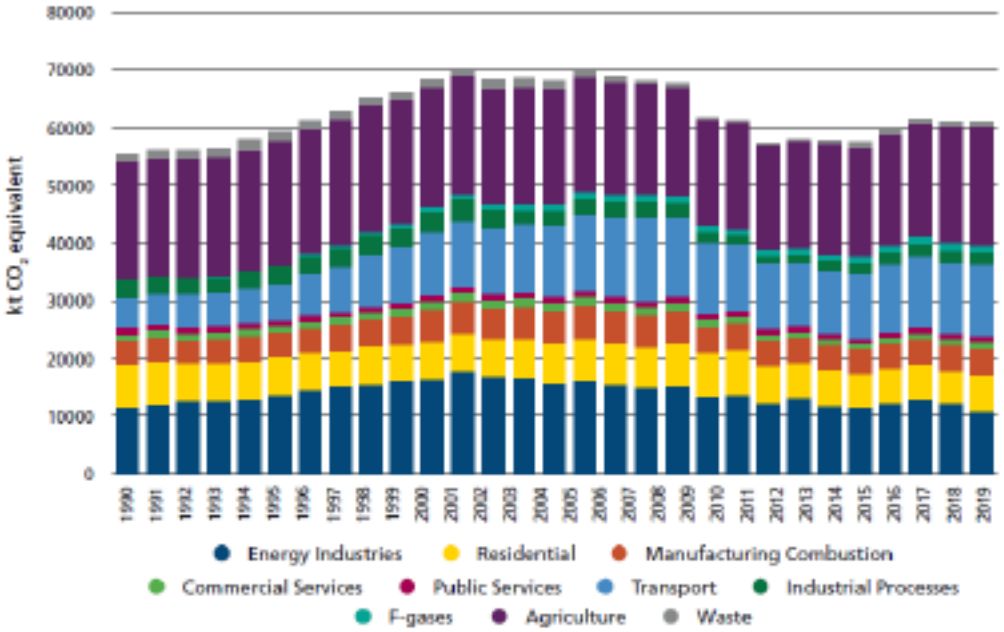

Figure 5.16: Trends in GHG emissions from 1990 to 2019 (EPA, 2020)

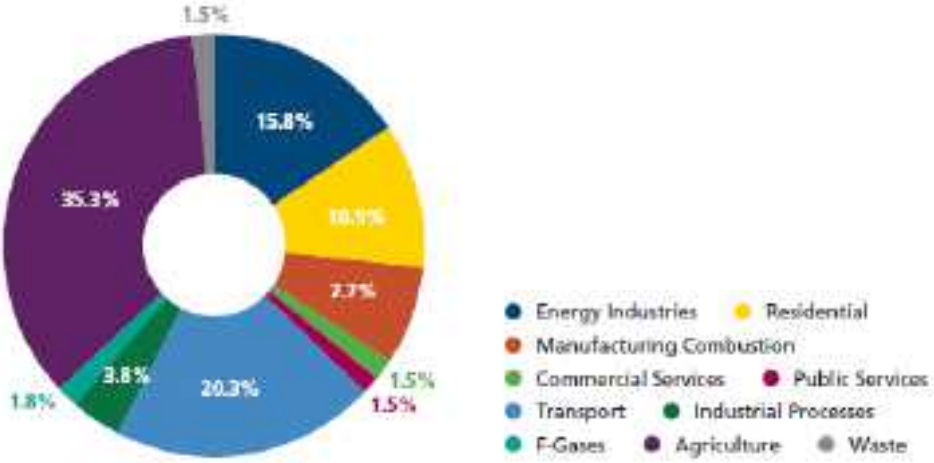

Figure 5.17: Sectoral contribution to overall GHG emissions in 2019 (EPA, 2020)

The share of carbon dioxide in total GHG emissions increased to 62.2 % in 2019 compared with in an increase of 1.6% (60.6%) from 1990. In contrast, methane and nitrous oxide emissions, primarily from the agriculture sector, fell from 39.4% of total GHG emissions in 1990 to 36.0% in 2019.

Ireland's latest projections under the 'with existing measures' scenario show an emission decreasing of 6% by 2030; while under the 'with additional measures' scenario, emissions are estimated to decrease by 25% by 2030.

5.6.4 Key Issues

- Critical infrastructure: water, energy, communications, transport and emergency services are at risk from a range of projected changes, including

sea-level rise, increasing temperatures, changing rainfall patterns and extreme weather events;

- Increasing population and a growing economy will result in in increased demand on energy, and subsequently increased GHG emissions;
- The agri-food sector is forecast to continue to grow and decarbonising it is very difficult. The heating and transport sectors are also challenging to decarbonise;
- Emerging and new clean energy technologies in Ireland will require support to become economically mature and self-sustaining. Similar to other clean energy technologies, a variety of measures will be required to enable the gas network and networked gases to maximise their contribution towards meeting the decarbonisation challenge;
- Temperature changes may lead to increased energy demand over time (e.g. for heating and cooling); Gas transmission and distribution networks need to have enough capacity available to ensure that extreme cold weather events can be accommodated without restricting the supply of gas;
- Other gradual changes such as increased or more frequent rainfall may increase wear and tear on infrastructure;
- Extreme weather events may have immediate impacts such as electricity blackouts with associated social and economic consequences;
- Infrastructure such as electricity and gas networks play an essential role in ensuring social and economic wellbeing. Risks to this infrastructure both from extreme weather events (such as flooding) and gradual climate change could have significant economic and social consequences and it is important therefore to future proof the efficient functioning of our energy system;
- Climate change may have an impact on the level of degradation of critical gas assets that are above ground. This would reduce the life of assets and therefore increase the required frequency of refurbishment and replacement of the affected assets; and
- The gas transmission network is, in the main, very resilient to weather events as it is an underground network. However, an increase in extreme flooding events may impact transmission pipelines traversing flood plains. Interconnector transmission pipelines may, as they come onshore, be subject to the effects of the projected rise in sea levels and the associated increased risk of coastal erosion which may result in a requirement to install additional coastal defences. Increased river bank erosion where a pipe traverses a river can cause depth of cover and exposure issues for transmission pipelines which require remediation works to reinstate the appropriate depth of cover over the pipeline. In very extreme cases of summer drought there may be a potential risk that soil compaction and ground movement may occur that could impact both transmission and distribution pipelines.
- Local air quality, particularly in small Irish towns with a high dependence on coal, turf and wood for home heating, can be poor at times, and communities

need much better local-level air quality information. The move to a low-carbon and resource-efficient economy should also lead to better air quality, provided that there is strong regulation and control of the burning of renewable fuels, such as wood and biomass, which in themselves can give rise to air pollution problems;

- Radon – a naturally occurring radioactive gas – is a risk to human health which also needs to be highlighted and brought more to people's attention. Some of our citizens are living in houses that may be making them sick, although they are not aware of it. Householders, institutions and businesses need to investigate and remediate building stock where a radon risk is determined;
- Localised air pollution and noise pollution are both likely to occur when construction takes place if suppression techniques are not introduced, and when traffic is queuing for long periods of time; and
- After poor air quality, noise nuisance is the second largest environmental source of human health morbidity and mortality in the EU. National planning for infrastructure and urban spaces must factor in appropriate protections for the population against noise impacts.

5.7 Archaeological, Architectural & Cultural Heritage

5.7.1 Archaeological Baseline

The Irish landscape is one of the oldest man-made landscapes in the world, dating back to 3500 B.C. when megalithic tombs were constructed. These include dolmens and passage graves such as Newgrange, Co. Meath. During the Iron Age (after 500 B.C.), large circular stone forts were built, usually on hilltops such as Dun Aengus on the Aran Islands. In early Christian times, Ireland's architecture once more flourished – for example in the Round Towers, which are considered unique to Ireland and formed part of important monastic sites such as Glendalough or Clonmacnoise. The most spectacular surviving early Christian site is Skellig Michael (c. 6th-8th c A.D.), on the Great Skellig Island in the Atlantic Ocean, which was inhabited by Irish monks.

Record of Monuments and Places

A record of archaeological heritage is maintained on the 'Record of Monuments and Places' which was established under Section 12 of the National Monuments (Amendment) Act, 1994 (No. 17 of 1994). Structures, features, objects or sites listed in this Record are known as Recorded Monuments.

The Record of Monuments and Places (RMP) comprises a list of recorded monuments and places and accompanying maps on which such monuments and places are shown for each county. Refer to **Figure A20** in the Appendix for the Recorded Monuments and Places in Ireland.

The National Monuments Service of the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs will advise on the protection applying to any particular monument or place under the National Monuments Acts by reason of it being entered in the Record of Monuments and Places and should be consulted if there is any doubt as to the status of the site.

Archaeological Survey of Ireland

The Archaeological Survey of Ireland (ASI) is a unit of the National Monuments Service. The ASI was established to compile an inventory of the known archaeological monuments in the State. The information is stored on a database and in a series of paper files that collectively form the ASI Sites and Monuments Record (SMR)

Sites and Monuments Record

The SMR contains details of all monuments and places (sites) where it is believed there is a monument known to the ASI pre-dating AD 1700 and also includes a selection of monuments from the post-AD 1700 period. There are in excess of 138,800 archaeological monuments within the SMR.

5.7.2 Architectural Heritage Baseline

Irish architecture is world-renowned for its Georgian period (1714 - 1830), during which many architectural masterpieces were constructed such as the Palladian-style Castletown House (1729) in County Kildare and Dublin's neo-classical Custom House (1791). Dublin's elegant Georgian townhouses, generous squares and leafy parks also come from this period. Many masterpieces can be found on the university campus of Trinity College Dublin, such as the Old Library (1712) and the Provost's House (1759). Irish architects also made important international contributions in the 18th and 19th centuries. In 1792 James Hoban (1758-1831) won the competition to design The White House for U.S. President George Washington.

One of Ireland's most famous architects from the early 20th century is Eileen Gray (1878 - 1976). A pioneer of the Modern Movement, Gray lived in Paris where she designed furniture as well as her house E1027 in Roquebrune-Cap-Martin. The National Museum of Ireland holds many of Gray's iconic furniture designs and architectural models. Today, the work of Irish architects is transforming cities all over the world – from Europe to China and South America where Grafton Architects' design for a new university campus in Lima won them a 'Silver Lion' at the 2012 Venice Architecture Biennale.

Architectural Heritage

As defined by the Heritage Act, 1995, 'architectural heritage' includes all structures, buildings, traditional and designed, and groups of buildings including streetscapes and urban vistas, which are of historical, archaeological, artistic, engineering, scientific, social or technical interest.

The National Inventory of Architectural Heritage (NIAH) is a state initiative under the administration of the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs and established on a statutory basis under the provisions of the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous ProA1visions) Act 1999. Refer to **Figure A21** in the Appendix.

The purpose of the NIAH is to identify, record, and evaluate the post-1700 architectural heritage of Ireland, uniformly and consistently as an aid in the protection and conservation of the built heritage. NIAH surveys provide the basis for the recommendations of the Minister for Arts, Heritage, Regional, Rural and Gaeltacht Affairs to the planning authorities for the inclusion of particular structures in their Record of Protected Structures (RPS).

5.7.3 Cultural Heritage Baseline

The cultural heritage of Ireland includes a wide array of monuments, objects, landscapes and structures that were produced by the inhabitants of Ireland over the last nine to ten thousand years. The Heritage Act 1995 defines the national heritage of Ireland as including monuments, archaeological objects, heritage objects, architectural heritage, flora, fauna, wildlife habitats, landscapes, seascapes, wrecks, geology, heritage gardens and parks and inland waterways.

When we exclude the natural heritage categories such as flora, fauna, wildlife habitats, seascapes, geology and the natural inland waterways (but not the engineered examples) we are left with: archaeological objects, heritage objects, architectural heritage, landscapes, wrecks, heritage gardens and parks and engineered inland waterways such as canals. Landscapes are included because the landscape of Ireland, since the arrival of people in the Mesolithic and especially since the Neolithic farming revolution, has been totally altered by people and is now a cultural artefact.

5.7.4 Key Issues

- The installation or development of gas network infrastructure, in particular linear infrastructure increases the potential to interact with known or previously unknown archaeological sites and features. Cumulatively, this results in negative impacts on the overall cultural heritage environment; and
- Continued development resulting from the unprecedented economic growth of the past decade and increasing population has increased pressure on sites or features of heritage interest.

5.8 Landscape and Visual

5.8.1 Baseline

Irish Topography

The island of Ireland consists of a large central lowland of limestone with a relief of hills and several coastal mountains. The mountain ridges of the south comprise old red sandstone separated by limestone river valleys. Elsewhere granite predominates, except in the north east which is covered by a basalt plateau. The central plain contains glacial deposits of clay and sand. It is interrupted by low hills and has large areas of bog and numerous lakes.

Landscape Character

Landscape character is a distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape. Particular combinations of geology, landform, soils, vegetation, land use, field patterns and human settlement create character. Character makes each part of the landscape distinct and gives each its particular sense of place. Whether we value certain landscapes for their distinctiveness, or for other reasons, is a separate question.

Increasingly, it is recognised that the assessment of landscape character should also encompass coastal and seascape character, acknowledging the fact that the character of the coast and of marine areas affects the land and vice versa.

Seascape Character

Seascape is defined as *"an area of sea, coastline and land, as perceived by people, whose character results from the actions and interactions of land with sea, by natural and/or human factors"* (Donegal County Council 2016). Seascape character is a dynamic and changing space perceived by people with many interpretations and understandings. It can be described at different scales and with many local variations and nuances.

A draft report including the Regional Seascape Character Assessment has been prepared for the Marine Institute in 2020 with the aim to identify, classify and describe seascape character at a regional scale. The research has three main objectives:

- Understand different regional seascape character areas along the coast;
- Develop character assessment; and
- Spatially define and represent their distribution and qualitatively assess the socio -cultural value of each of the seascapes across their distribution.

There are distinct types of seascape (relatively homogeneous in character) identified in the country, for example, sheltered bays, rocky coves, sandy beaches or harbors are recognizable and distinct seascape character types. Refer to **Figure 5.18** below for Regional Seascape Character Types of Ireland.

Figure 5.18: Regional Seascape Character Types of Ireland (Marine Institute EMFF, 2020)

Irish Land Cover

CORINE is a pan-European land use and land cover (LULC) mapping programme and is the main source of national-scale LULC information.

The most recent LULC assessment in 2012 found that agriculture is the primary LULC type within Ireland (67% national land cover), followed by wetlands (16%) and forestry (9%).

The Irish landscape has experienced continual land cover changes for centuries, but there has been a relatively high rate of land use change by European standards since the early 1990s. For example, the area under forestry has by 2 per cent

between 1990 and 2012. The area of wetlands has also reduced by 3% from 1990 to 2012. Artificial surfaces (residential and industrial buildings, roads etc.) increased by 1% between 1990 and 2012. Refer to **Figure A22** in the Appendix which illustrates the CORINE land-use classifications of Ireland.

5.8.2 Key Issues

The following issues will be considered during the plan preparation:

- Impacts of proposed developments or installations on designated protected landscapes, heritage landscapes and protected views;
- Impacts of proposed developments or installations on landscape character; and
- Impacts of proposed developments or installations on the ecological components of the landscape.

5.9 Material Assets

The term 'Material Assets' refers to all infrastructure and local services including; transportation, water supply, wastewater treatment and discharge, waste management services, and energy supply, etc.

5.9.1 Transportation

Roads

The total length of the national road network in Ireland is 5,306km. National primary roads comprise 2,649km in length and national secondary roads comprise 2,657km and motorways comprise 916km. Other road infrastructure is comprised of local roads, minor roads and unclassified urban roads. Transport Infrastructure Ireland (TII) operates, maintains and improves the national primary and secondary road network in Ireland, while local authorities manage the urban and remote sections of dual carriageway, regional and local roads.

Vehicular traffic is by far the most common mode of travel in Ireland. In 2017, the national vehicle fleet was made up of 2,675,879 vehicles consisting of the mix presented in **Table 5.2**.

Private cars consist of the major share at 77% followed by goods vehicles at 13%. **Table 5.2** provides an overview of the national vehicle fleet.

Table 5.2: National Vehicle Fleet, at 31st December 2017 (DTTAS 2017).

Description	Number of Vehicles	Fleet Share (2016)
Private Cars	2,066,112	77%
Goods Vehicles	349,143	13%
Tractors & Machinery	89,366	3%
Motorcycles	39,873	2%

Description	Number of Vehicles	Fleet Share (2016)
Other Vehicles	131,385	5%
All Vehicle Types	2,675,879	100%

Rail

There are over 2,400km of railway lines across Ireland, of which 17% is either disused or dismantled. Iarnród Éireann is responsible for maintenance of the heavy rail intercity and regional network, which is used for both passengers and freight. Transport Infrastructure Ireland is responsible for the light rail Luas networks based in Dublin.

Airports

There are 10 main airports across Ireland: Cork Airport, Donegal Airport, Dublin Airport, Weston Airport, Galway Airport, Kerry (Farranfore) Airport, Ireland West Airport Knock, Shannon Airport, Sligo Airport and Waterford Airport. Cork, Dublin and Shannon are international airports.

Seaports

Twenty commercial ports exist nationwide; international ports include Shannon Foynes, Cork, Dublin Port and Drogheda. In addition, there are 15 international ferry ports, 99 local ferry ports and 48 fishing ports.

Public Transport

The Luas has experienced consistent passenger growth since 2009, with provisional figures indicating that 34.6 million passengers used this service in 2015, which is 9.2 million higher than in 2009.

Bus vehicle kilometres increased by 39% from 1998 to 2008, before falling back by 10% from 2008 to 2012. The total kilometres operated remained constant between 2013 and 2014 at 163.6 million vehicle km, with a small decline in both Dublin Bus and Bus Éireann public service obligation (PSO) services balanced by a small increase in other services.

Cycling

The number of journeys on the Dublin Bikes scheme, which began operations in Dublin in 2009, increased from 1.2 million in 2010 to 4.1 million in 2015. There are now similar schemes in operation in Cork, Limerick and Galway.

The number of journeys in 2015 was 289,426 in Cork, 40,118 in Limerick and 19,934 in Galway.

Environmental Pressures and Transport

The largest energy-consuming sector in Ireland is transport, with a 42% share of final consumption, most of which is imported oil. Transport represent a leading source of environmental pressures in Ireland, including greenhouse gas emissions, air pollution and noise emissions.

Irish emissions data from different transport modes shows that the private car was the largest contributor, at 48%, followed by international aviation, at 22%, and road freight (trucks), at 7%. The remaining emissions are predominantly from light goods vehicles (vans) and buses. Refer to **Figure 5.19** for Shares of Irish carbon dioxide emissions by mode of transport.

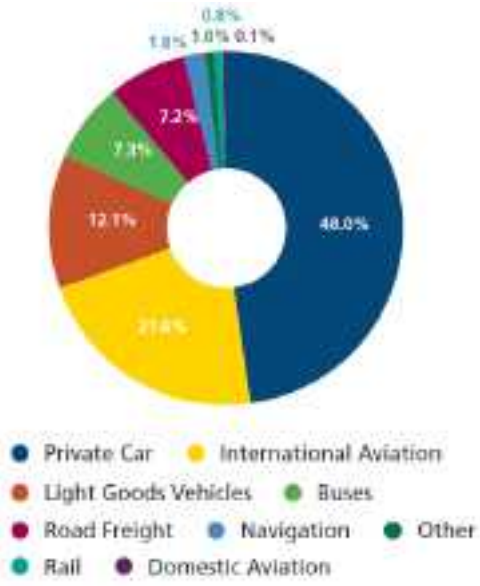

Figure 5.19: Shares of Irish carbon dioxide emissions by mode of transport (EPA, 2020)

Since 1990, carbon dioxide emissions from the private car fleet have grown by 139%, from international flights by 209% and from road freight by 104%, showing transport becoming more individualised and motorised, driving up emissions with a shift in freight away from the more sustainable mode of rail.

Greenhouse gas emissions in Ireland need to be eliminated by 2050, and yet the trends are not responding in the right direction, changing to a pathway to address these challenges will require fundamental transition and significant policy change.

5.9.2 Water Supply

Irish Water is the national water utility, as set up in July 2013, under the Water Services Act 2013. Irish Water is responsible for the production, distribution and monitoring of drinking water from Ireland's public water supplies.

The breakdown of drinking water supply types in Ireland is displayed in **Table 5.3** below. There are 973 public water supplies, which is a relatively large number for our population, but is reflective of our dispersed settlement patterns.

Irish Water is responsible for the monitoring of public water supplies and Local Authorities are responsible for monitoring of group water schemes and regulated small private supplies. **Table 5.3** outlines the drinking water supply types in Ireland.

Table 5.3: Drinking Water Supply Types in Ireland (EPA 2016).

Supply Type	Supplier/Supplying	No. of Supplies	Population %	Supervisory Authority
Public Water Supplies	Irish Water	973	81.9	EPA
Public Group Schemes	Local Group	512	1.9	Local Authorities
Private Group Schemes	Local Group	421	4.2	Local Authorities
Small Private Supplies	Commercial/ Public Activity	1,758	0.9	Local Authorities
Exempted Supplies	Individual Supplier	170,000	11.1	Exempted

The EPA publishes an annual Public Supply Drinking Water Report and Private Supply Drinking Water Report, which provide an overview of the quality of drinking water in public and private supplies. The reports are based on the assessment of monitoring results reported to the EPA by Irish Water and the Local Authorities.

Results from the 2019 Public Supply Drinking Water Report show 99.9% compliance with microbiological standards and 99.6% compliance with chemical standards, based on over 120,000 sample results. However, a number of issues have been identified that need to be addressed. There was an increase in detections of the parasite Cryptosporidium, the number of cases in 2018 (629 cases) was the highest reported since 2007. High levels of disinfection by-products were found in the sample results, there were persistent pesticide failures and there are a large numbers of lead pipe connections in properties.

Although these results show that the majority of public water supplies are safe, there are still a number of public water supplies which are in need of upgrade, replacement or improved operational control.

As of July 2020, 52 public water supplies were listed on the Remedial Action List. These public water supplies collectively supply water to 1,128,847 customers.

The 2018 Private Supply Drinking Water Report (EPA, 2019) analysed the drinking water quality of public group schemes, private group schemes, and small private supplies. The results showed 100% compliance with microbiological standards for public group schemes, 95.4% compliance for private group schemes and 95.4% compliance for small private supplies.

5.9.3 Wastewater Treatment & Discharge

Irish Water operates a network of wastewater treatment plants across Ireland, as can be seen in **Figure 5.20**. Irish Water has sole responsibility for operating and maintaining the public sewer network. The wastewater treatment plants vary in

size according to the population of the area they serve. Despite the variation in size, the processes used to treat wastewater are generally the same.

Figure 5.20: Irish Water, Wastewater Treatment Plants.

The EPA Report 'Urban Waste Water Treatment in 2019' provides an overview of urban waste water treatment in Ireland during 2019. It focuses on the most important issues that Irish Water needs to address to protect the Irish environment from the harmful effects of waste water discharges.

This report found that the number of priority areas where treatment needs to improve dropped from 120 to 113 in the past year (2019 to 2020). Improvements are needed at these 113 areas to eliminate raw sewage, prevent water pollution, protect freshwater pearl mussels, bathing waters and shellfish waters and meet EU standards. Treatment at 19 of the 172 large urban areas in Ireland failed to meet EU standards. These 19 areas produce over half of Ireland's urban waste water. Sewage from the equivalent of 35 towns and villages is released into the environment every day without treatment.

5.9.4 Waste Management Services

Ireland's waste management practices, infrastructure and regulation have matured significantly over the last 20 years. This change has been driven by EU and national legislation, national policy and economic initiatives. Government policy focusses on waste as a resource and the virtual elimination of landfilling.

The current and future focus is on circular economy - preventing waste, reuse, maximising recycling and using waste as a fuel in replacement of fossil fuels: all elements of the strategy to boost competitiveness, foster sustainable economic growth and generate new jobs.

More residual waste is now used as a fuel (energy recovery) than disposed to landfill. Segregation and separate collection of food waste from households has been legislated for since 2013 and municipal waste recycling at composting and anaerobic digestion facilities has increased as a result. Ireland is reliant on export markets for the treatment of residual and recyclable and hazardous wastes.

It is estimated that almost 14 million tonnes of waste were generated in Ireland in 2018 across all economic sectors and households, corresponding to 2.9 tonnes per person. Over 2.9 million tonnes were municipal waste generated in 2018 (53% from households and 47% from commercial sources). One-third of the waste, one million tonnes, was exported for treatment (729,000 tonnes for recycling and 287,000 tonnes for energy recovery).

Since 2012, municipal waste quantity disposed to landfill has decreased with a shift towards energy recovery rather than recycling. In general terms, municipal waste has increased by 15% and in 2018, 38% of municipal waste was recycled, 43% used for energy recovery and 14% disposed to landfill. Refer to **Figure 5.21** for Trends in municipal waste management from 2001-2008.

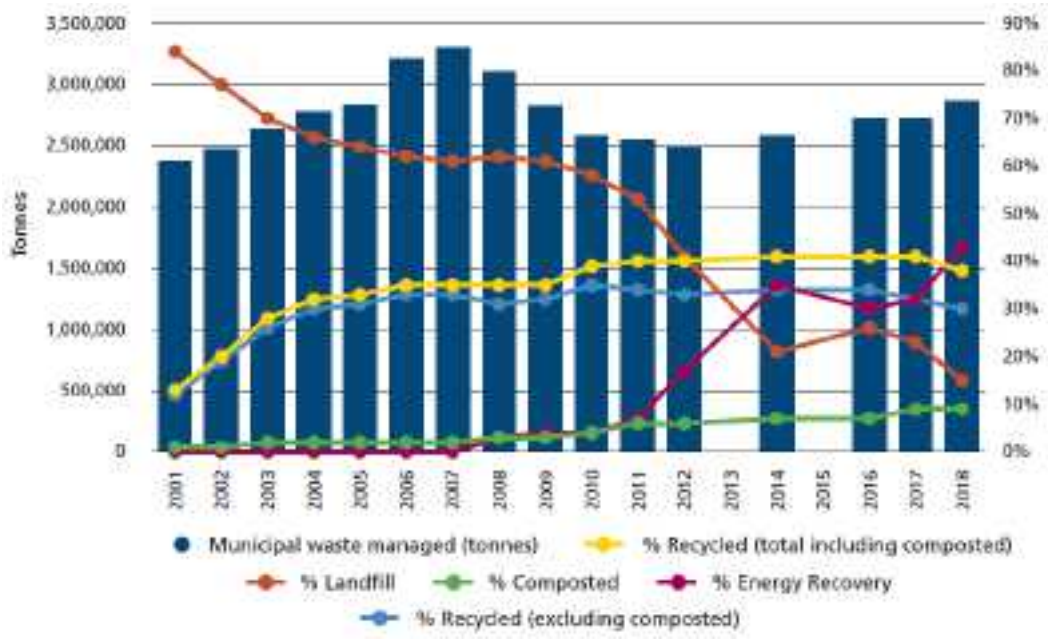

Figure 5.21: Irish Water, Wastewater Treatment Plants.

5.9.5 Energy Supply

Energy use in Ireland increased by 0.5% in 2017, while the gross domestic product (GDP) grew by 7.2% and gross national income (GNI) grew by 3%.

Indigenous energy production in Ireland reached a new record of 4,909 ktoe in 2017, driven by natural gas production from the Corrib gas field and to a lesser extent by increased renewables.

As can be seen below in **Figure 5.22**, the increase in indigenous energy production at Corrib has reduced Ireland's energy import dependency from 88% in 2015 to 66% in 2017.

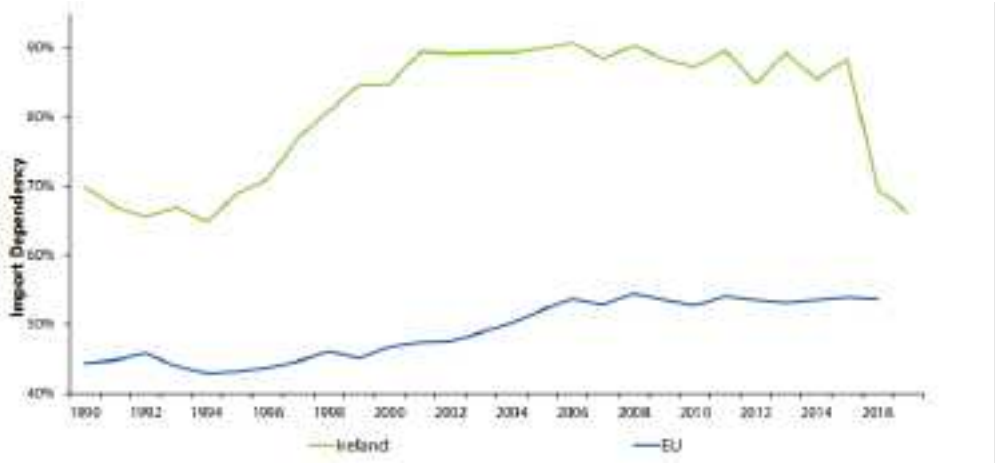

Figure 5.22: Import Dependency of Ireland and EU Average 1990 - 2016 (SEAI 2018)

After Corrib became operational, indigenous gas production met over 55% of Ireland's gas needs. Prior to that, over 95% of Ireland's natural gas needs were imported, via the two gas interconnectors from Great Britain.

Final energy use increased in all sectors with the exception of the residential sector. Transport continues to dominate as the largest energy-consuming sector, with a 43% share of final consumption. Transport energy use increased by 2%. Industrial energy use increased by 3.4% driven by a 7.6% increase in output as measured by value added. Residential energy use fell by 2.9%, however when adjusted for weather, it actually increased by 0.2%. Final energy use in the commercial and public services sector increased by 4.2%, however on a weather corrected basis the increase was 7.4%.

Final consumption of electricity increased by 1.1% to 26 TWh. At the same time, there was a 1.1% reduction in the fuels used in electricity generation. Renewable electricity generation accounted for 30.1% of gross electricity consumption. Wind generation account for 25.2% of the electricity generated making it the second largest source of electricity generation after natural gas.

5.9.6 Key Issues

The following issues will require consideration during the plan preparation:

- As the population increases and the economy grows, the demand on energy will increase;
- Increased urbanisation will result in population clusters and resulting disproportionate demands on energy infrastructure and consumption;
- Continuity of supply re. availability of resources and increased demand;
- Transition to low-carbon economy, including the injection of Biomethane into the Natural Gas Grid in Ireland;
- Achievement of a sustainable balance between public and private transport modes during the construction phase of planned developments;
- Ensuring the construction or operation of developments do not negatively impact drinking water supply; and
- Reduction waste production during the construction stages, recovering and reusing wastes rather than landfill.

5.10 Sensitivity Mapping

In order to identify where most sensitivities within the Country occur, a number of the environmental sensitivities described above were weighted and mapped overlapping each other. The weighting system applied is adopted from the EPA report 'GISEA Manual Improving the Evidence Base in SEA', as follows:

- High Population Density: 10 points;
- Areas of High Radon Levels: 10 points;
- SACs and SPAs: 10 points;
- NHAS: 10 points;
- pNHAs: 5 points;
- Soils Peat and River Alluvium: 10 points;
- Protected Structures: 10 points;
- Recorded Monuments: 10 points;
- Geological Heritage Areas: 10 points;
- Surface Water Status Bad and Poor: 10 points;
- Surface Water Status Moderate, Good and High: 5 points;
- Ground Water Status Bad and Poor: 10 points;
- Ground Water Status Moderate, Good and High: 5 points;
- GSI Inner Source Protection Areas: 10 points;

- GSI Outer Source Protection Areas: 5 points;
- Groundwater Vulnerability Extreme or Rock: 10 points;
- Groundwater Vulnerability High: 5 points; and
- Groundwater Vulnerability Moderate or Low: 0 points.

The scores for each are added together in order to determine overall vulnerability as shown in **Table 5.4** below.

Table 5.4: Environmental Sensitivity Overlay Mapping Vulnerability Classes

Overlay Results	Category
0-5	No sensitivity (i.e. areas without any environmentally sensitive features)
10-15	Low-sensitivity areas
20-25	Moderate-sensitivity areas
30-35	Elevated-sensitivity areas
40-45	High-sensitivity areas
50-60	Extreme-sensitivity areas
>65	Acute-sensitivity areas (i.e. severe sensitivity due to a significant number of overlapping environmental aspects and a clear likelihood of cumulative effects)

This classification assumes that the sensitivity of an area increases significantly when two or more highly sensitive environmental factors overlap. A score of 5 represents one sensitive environmental factor occurring. A score of 10 indicates two sensitive or one highly sensitive factor; a score of 20 encompasses four sensitive, two highly sensitive or one highly sensitive and two sensitive environmental factors, and so on. In light of this categorisation, each pixel reflects a sensitivity score which determines the relative sensitivity to impact of those lands.

Refer to **Figure A23** in the Appendix for the environmental sensitivity of Ireland.

6 SEA Objectives, Targets and Indicators

6.1 Introduction

The SEA is designed to assess the potential environmental effect of the policies of the draft NIP against the environmental baselines established.

The policies and associated recommendations are assessed against a range of established environmental objectives and targets. Indicators that are recommended in the SEA are utilised over the lifetime of the draft NIP to quantify the level of impact that the policies and recommendations have on the environment.

6.2 Objectives and Targets

Strategic Environmental Objectives (SEOs) are methodological measures against which the environmental effects of the NIP can be assessed. If complied with in full, SEOs would result in an environmentally positive, or neutral impact from realisation of the NIP. The SEOs are set out under a range of topics and are used as standards against which the provisions of the NIP can be evaluated in order to help identify areas in which potential significant adverse impacts may occur. SEOs are distinct from the objectives of the NIP and are developed from international and national policies which generally govern environmental protection objectives. Such policies include those of various European Directives which have been transposed into Irish law and which are intended to be implemented across the country.

The SEA Directive requires that the evaluation of the NIP be focused upon the relevant aspects of the environmental characteristics of areas likely to be significantly affected. In compliance with this requirement the SEA will focus upon the most relevant aspects of the environmental characteristics. The SEOs are linked to indicators which can facilitate monitoring the environmental effects of the NIP, as well identifying targets which the NIP can help work towards.

Table 6.1: Objectives and Targets

Objectives	Targets
SEO 1 Biodiversity	
SEO 1.1 Protect, conserve, enhance where possible and avoid loss of diversity and integrity of the broad range of habitats, species and wildlife corridors. **SEO 1.2** To support achievement of the conservation objectives of European Sites (SACs and SPAs) and other sites of nature conservation.	**SET 1.1** Siting of development of infrastructure installation on non-sensitive sites. **SET 1.2** Maintenance of favourable conservation status for all habitats and species protected under the Habitat Directive. **SET 1.3** No loss of protected habitats and species during the lifetime of the Plan.

Objectives	Targets
SEO 1.3 Conserve and protect other sites of nature conservation including NHAs, pNHAs, National Parks, Nature Reserves, Wildfowl Sanctuaries as well as protected species outside these areas as covered by the Wildlife Act. **SEO 1.4** To minimise and, where possible, eliminate threats to biodiversity including invasive species.	. **SET 1.4** No significant ecological networks or parts thereof which provide functional connectivity for SAC/SPAs to be lost without remediation resulting from development provided for by the NIP**.**
SEO 2 Population and Human Health	
SEO 2.1 Protect, enhance and improve people's quality of life through energy provision. **SEO 2.2** Protect human health from hazards or nuisances arising from incompatible development. **SEO 2.3** Provide all of the energy services required to sustainably meet future housing demands. **SEO 2.4** To minimise the proximity of development to concentrations of population and to mitigate potential effect of development in order to reduce actual and perceived environmental effects.	**SET 2.1** Minimise population exposure to high levels of noise, vibration and air pollution. **SET 2.2** No significant deterioration in human health as a result of environmental factors. **SET 2.3** No spatial concentrations of health problems arising from environmental factors. **SET 2.4** Maintenance of gas supply to meet the energy needs of the population, while commencing a shift towards renewable energy use.
SEO 3 Land & Soil	
SEO 3.1 Conserve, protect and avoid loss of diversity and integrity of designated habitats, geological features, species or their sustaining resources in designated ecological sites.	**SET 3.1** Prevent pollution of soil through adoption of appropriate environmental protection procedures during construction, installation and maintenance works on site. **SET 3.2** No incidences of soil contamination. **SET 3.3** Ensure appropriate management of existing contaminated soil in accordance with the requirements of current waste legislation.
SEO 4 Water	
SEO 4.1 Maintain or improve the quality of surface water and groundwater (including estuarine) to status objectives as set out in the Water Framework Directive (WFD).	**SET 4.1** Support the achievement of "good" ecological and chemical status/potential of waterbodies by 2015 in accordance with the Water Framework Directive.

Objectives	Targets
SEO 4.2 Support achievement of the requirements of the Water Framework Directive and implementation of the National River Basin Management Plan'	. **SET 4.2** Not to cause deterioration in the status of any surface or ground water or affect the ability of any surface or ground water to maintain or achieve 'good' status.
SEO 5 Air & Noise	
SEO 5.1 To support the protection of ambient environment through the implementation of European, national and regional policy and legislation relating to air quality, greenhouse gases, climate change, light pollution noise pollution and waste management.	**SET 5.1** Maintain ambient air quality. **SET 5.2** Minimise air and noise emissions during construction and operation of new developments.
SEO 6 Climate and Resilience	
SEO 6.1 Comply with relevant national climate change targets e.g. Ireland's Climate Action and Low Carbon Development Act 2015, the and EU 2030 and 2050 Emissions and Renewable Energy Targets and the Paris Agreement Targets. **SEO 6.2** To support implementation of the National Climate Action Plan 2019	**SET 6.1** Achieve a reduction in greenhouse gas emissions. **SET 6.2** Increase the amount of gas from renewable sources that is introduced to the network. **SET 6.3** Growth in the level of fuel switching from high-carbon fuels to gas, in both heating and transport. **SET 6.4** Promote minimisation of greenhouse gas emissions to the atmosphere. **SET 6.5** To achieve a 30% reduction on GHG emission levels (compared with 2005 levels) by 2050.
SEO 7 Archaeological, Architectural and Cultural Heritage	
SEO 7.1 Promote the protection and conservation of archaeological, architectural and cultural heritage, specifically those buildings identified on the Record of Protected Structures, and Recorded Monuments in Ireland.	**SET 7.1** Maintenance and enhancement of archaeological heritage- including entries to the Record of Monuments and Places and unknown archaeology- and the context of the above within the surrounding landscape where relevant. **SET 7.2** Maintenance and enhancement of entries to the Record of Protected Structures and/or their context within the surrounding landscape where relevant.
SEO 8 Landscape and Visual	
SEO 8.1 Ensure no significant disruption of historic/cultural landscapes and features.	**SET 8.1** No avoidable significant impacts on the landscape resulting from development

Objectives	Targets
SEO 8.2 Ensure no significant visual impact from developments/installations. **SEO 8.3** Ensure no significant disruption of high landscape values. **SEO 8.4** To support achievement of the objectives of the National Landscape Strategy	provided for by the NIP. **SET 8.2** Ensure development and infrastructure installations are sensitive to its surroundings. **SET 8.3** Ensure no significant disruption of historic/cultural landscapes and features.
SEO 9 Material Assets	
SEO 9.1 Make best use of existing infrastructure and phase the significant future growth of Ireland in line with the capacity and delivery of the sustainable development of new physical infrastructure. **SEO 9.2** Promote use of renewable energy sources and support energy conservation initiatives including the development of low carbon business practices and buildings. **SEO 9.3** Minimise effects upon the existing and planned infrastructure.	**SET 9.1** High levels of energy demand growth are accommodated. **SET 9.2** Secure and competitive supplied of gas and are maintained. **SET 9.3** Increase in renewable energy developments. **SET 9.4** To achieve a 30% reduction on GHG emission levels (compared with 2005 levels) by 2050. **SET 9.5** Improve efficiencies of energy infrastructure.

6.3 SEA Indicators

The assessment of aims and commitments with respect to the Environmental Objectives and Targets is required to be measurable. The Environmental Indicators need to be capable of the following:

- Describing trends in the baseline environment.
- Demonstrating the likely significant effect of the implementation NIP.
- Being used in a monitoring programme.
- Providing an early warning of significant unforeseen adverse effects.
- Prioritising key environmental effects.
- Ensuring the number and range of environmental indicators are manageable in terms of time and resources.

Consequently, a range of Environmental Indicators required to assess the level of impact on the environment are outlined in **Table 6.2.**

Table 6.2: Draft SEA Indicators

Item	Draft SEA Indicator
Biodiversity	• **SEI 1.1** Number and extent of Designated Sites; • **SEI 1.2** Achievement of favourable conservation status of designated sites; • **SEI 1.3** Population and range of Designated Species; and • **SEI 1.4** Achievement of the Objectives of Biodiversity Plans and County Development Plans.
Population & Health	• **SEI 2.1** Census population data; • **SEI 2.2** % increase in housing (number and type); and • **SEI 2.3** Changes in trends in perceived health status.
Land & Soil	• **SEI 3.1** Incidences of soil contamination; • **SEI 3.2** Rates of re-use/recycling of construction waste; • **SEI 3.3** Rates of brownfield site and contaminated land reuse and development; and • **SEI 3.4** Rates of greenfield development.
Water Resources	• **SEI 4.1** Compliance of surface and ground waters with national and international standards; • **SEI 4.2** Achievement of the Objectives of the River Basin Management Plan;
Air & Noise	• **SEI 5.1** Air quality indicators- National and region-specific emission data; and • **SEI 5.2** Compliance with national standards.
Climate Change & Resilience	• **SEI 6.1** Levels of greenhouse gas emissions; • **SEI 6.2** Number of energy/renewable energy production facilities; and • **SEI 6.3** Rates of energy/renewable energy consumption.
Heritage	• **SEI 7.1** Achieving the objectives of development plans regarding heritage protection; and • **SEI 7.2** full or partial loss to entries to the RPSs/NIAHs
Landscape & Visual	• **SEI 8.1** Range and extent of Amenity Landscapes; • **SEI 8.2** Rates of development within designated landscapes; • **SEI 8.3** Rates of urban expansion; and • **SEI 8.4** % change of land use from rural to urban.
Material Assets	• **SEI 9.1** Location/level of infrastructure; • **SEI 9.2** Achievement of development plan objectives; and • **SEI 9.3** No. of renewable energy developments granted planning permission.

7 Alternatives Considered

7.1 Introduction

The SEA Directive requires that reasonable alternatives be assessed in order to demonstrate how the preferred strategy performs against other forms of action. Alternatives must be developed, described and assessed within the SEA process, with the results presented in the Environmental Report.

For the purposes of this assessment, three reasonable alternatives to the draft NIP were considered:

- The Do-Nothing Scenario
- Alternative Capital Investment Proposals
- Capital Investment Projects as outlined in the draft NIP

7.2 Do-Nothing Scenario

The 'Do-Nothing' Scenario is representative of a scenario whereby the NIP, and the capital investment projects outlined therein, are not implemented.

While reduced development of gas infrastructure in Ireland has some environmental benefits, it is deemed unsustainable and unfeasible from an economic and socio-economic perspective.

Without AGI upgrades or New AGIs in Ireland, additional growth- both in terms of population and development will be restricted throughout Ireland. This scenario is considered to be at variance with the policies and objectives of the National Planning Framework and Regional Spatial and Economic Strategies. Under the do-nothing scenario, existing customers would also likely suffer pressure/supply issues.

The do-nothing scenario is also representative of a scenario whereby there are no new CNG stations developed in Ireland. As outlined in GNIs Vision 2050 document, converting Ireland's Heavy Goods Vehicles (HGVs) from diesel to CNG can yield near-term emissions reductions in the transport sector. This ultimately will aid GNI in achieving the emission reduction targets relevant to the gas sector, as set both by Ireland and the EU.

Finally, the do-nothing scenario is representative of a scenario where no new CGI facility is developed in Ireland. CGI stations in Ireland offer a unique and important solution to greenhouse gas emissions.

7.3 Alternative Capital Investment Proposals

A number of alternative capital investment proposals were considered by GNI in the Plan making process, including the development of a number of new AGIs, instead of implementing capacity upgrades at existing AGIs, including:

- New AGI in Cavan instead of Capacity Upgrade to existing 5501 AGI
- New AGI in Louth instead of Capacity Upgrade to existing 3607 AGI
- New AGI in Louth instead of Capacity Upgrade to existing 5301 AGI
- New AGI in Kildare instead of Capacity Upgrade to existing 7403 AGI
- New AGI in Kildare instead of Capacity Upgrade to existing 6403 AGI
- New AGI in Kildare instead of Capacity Upgrade to existing 6103 AGI
- New AGI in Dublin instead of Capacity Upgrade to existing 1303 AGI
- New AGI in Dublin instead of Capacity Upgrade to existing A108 AGI
- New AGI in Dublin instead of Capacity Upgrade to existing 1302 AGI
- New AGI in Dublin instead of Capacity Upgrade to existing 7203 AGI
- New AGI in Limerick instead of New Pressure Reduction Skid at existing 0705 AGI
- New AGI in Tipperary instead of Capacity Upgrade to existing 0605 AGI
- New AGI in Carlow instead of Capacity Upgrade to existing 1800 AGI

The development of new gas infrastructure rather than the upgrade of existing infrastructure is likely to give rise to increased environmental effects. All of the existing AGI's listed above have already been subject to environmental assessment at project level; by means of EIA, AA or indeed GNI's EnviroPlan and EnviroKit. As such, potential negative effects on the environment are assumed to have already been mitigated in these locations. Should GNI instead seek the development of new AGIs on undeveloped, greenfield or indeed differently developed lands, potential for significant environmental effects are identified, including on biodiversity, population and human health, water, land and soil, air, noise and climate, heritage, landscape and visual and material assets.

GNI also considered the alternative of upgrading the existing AGI 8003, rather than the development of a new 85-70 Bar AGI at that location. While environmental effects of the capacity upgrade would have given rise to reduced environmental effects generally, the upgrade was deemed to be unfeasible from a technical perspective, due to the level of deep reinforcement that would be required at the existing AGI.

A final alternative was considered with regards the new renewable gas injection facility at the existing site of AGI 0701, whereby a new development site in proximity (Cork) would be sought. As previously described, the site of the existing AGI 0701 has already been subject to environmental assessment at project level; by means of EIA, AA or indeed GNI's EnviroPlan and EnviroKit. As such, potential negative effects on the environment are assumed to have already been mitigated in this location.

Should GNI instead seek the development of the renewable gas injection facility on undeveloped, greenfield or indeed differently developed lands in Cork, potential for significant environmental effects are identified, including on biodiversity, population and human health, water, land and soil, air, noise and climate, heritage, landscape and visual and material assets.

7.4 Capital Investment Proposals as outlined in the NIP

The capital investment proposals, as outlined in the draft NIP are considered to be the most environmentally sound and technically feasible solutions which allow GNI to achieve their overall aims for the gas transmission network over the plan period. The NIP as it is proposed will allow for the demand and future growth of Ireland to be catered for. This scenario therefore aligns with the provisions for the National Planning Framework and Regional Spatial and Economic Strategies.

The proposed new infrastructure, including the new CNG stations and new CGI facility will contribute to GNI's emission reduction targets.

8 Assessment of Significant Effects

8.1 Introduction

The approach used for assessing likely significant effects was objectives led. The assessment was primarily qualitative in nature, with some assessment based on expert judgement. This qualitative assessment compares the likely effects against the Strategic Environmental Objectives to see which aims and commitments of GNI meet the Strategic Environmental Objectives and which, if any, contradict these.

Particular reference was made to the potential for cumulative effects in association with other relevant plans and programmes.

Particular regard was also paid to the need for the sustainable development of ecological resources (including the conservation of fish and other species of fauna and flora, habitats and the biodiversity of water ecosystems and commercial and natural fisheries) as economic resources.

8.2 Assessment of Environmental Effects

The environmental effects of the draft NIP aims and commitments were assessed with respect to the existing environmental baseline as outlined in Section 5 and the environmental objectives listed in Section 6.

The assessment process categorised environmental effects using the ratings outlined in **Table 8.1** which is based on the impact assessment criteria defined by the EPA for environmental impact assessment.

Table 8.1: Significance Ratings

Significance of Effects	
	Neutral
	Positive
	Negative
	Uncertain

The matrix outlined in **Table 8.2** highlights these potential effects. It assesses all of the proposed capital investment projects outlined in the draft NIP. This assessment outlines an unmitigated scenario. Where potential effects are identified, it is expected that these can be mitigated through the implementation of the mitigation measures outlined in Section 9.

The environmental effects of the draft NIP aims and commitments were also assessed. The matrix outlined in **Table 8.3** highlights these potential effects.

Information contained in the plans and other relevant documents of local authorities including County Development Plans, Landscape Character Assessments, Heritage Plans and Biodiversity Plans was considered in the assessment of environmental effects as appropriate - including cumulative and in-combination effects. These documents will be taken into account as appropriate by lower tier decision making through, inter alia, route selection and lower tier assessments.

8.3 Principal Environmental Effects

The environmental effects of the Draft NIP projects were assessed, having regard to the baseline environmental assessment (Section 5). This assessment outlines an unmitigated scenario. The matrix outlined in **Table 8.2** highlights these potential effects.

Where potential effects are identified, it is expected that these can be mitigated through the implementation of the mitigation measures outlined in Section 9.

This Section also assesses all aims and commitments in the Draft NIP (**Table 8.3**).

Table 8.2: SEA of Proposed Capital Investment Projects outlined in the Draft NIP0

Capacity Upgrade to existing 5501 AGI The driver of this project is security of supply. A capacity upgrade is required at the existing 5501 AGI station in order to accommodate the projected future growth in demand in the local network. This project involves increasing the capacity of the existing Pressure Reduction Skid from 4kscmh to 5.2kscmh	
Biodiversity	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on biodiversity are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on biodiversity.
Population and Human Health	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified. However, a potential negative on human health effect is also identified as a result of the health and safety risks associated with the installation of, or works to, gas infrastructure. An uncertain effect is therefore identified, for the purposes of this assessment. Refer to mitigation measures.
Land and Soil	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on land and soil are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on land and soil.
Water	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on water are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on water.
Air, Noise, Climate	Continued or increased use/supply of natural gas is likely to result in an overall negative effect on air quality and climate. Refer to mitigation measures.
Heritage	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on heritage are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on heritage.
Landscape &Visual	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on landscape and visual are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on landscape and visual.
Material Assets	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified
New CNG Station at NIP19CNCNG1 The driver of this project is to facilitate the installation of a new CNG station at Maghera, Co. Cavan. The new CNG station is expected to connect to the existing low-pressure distribution gas network. The CNG station is expected to have a capacity of 0.562kscmh. The name of the CNG station NIP19CNCNG1 will change once GNI complete the design of this CNG station.	
Biodiversity	The development of new gas facilities has the potential to generate adverse impacts on biodiversity, with key potential impacts relating to disturbance, disruption, fragmentation and loss of habitats. However, the indicative location of the new CNG station is identified as an existing developed site in Maghera, where there is limited biodiversity. As such, the proposed development is expected to have no significant negative effects on biodiversity. Lough Ramor, which is hydrologically linked to the River Boyne and River Blackwater SAC and SPA, is located in proximity to the Maghera area. While no known hydrological pathways link the indicative development site with Lough Ramon, there could be a potential hydrogeological link by means of the underlying locally important aquafer. The aquafer is identified as being of high vulnerability at the indicative site of the proposed development. Should any spills or leaks enter the groundwater body and subsequently Lough Ramon, there is potential for negative effects on biodiversity.
Population and Human Health	A positive effect on the population in identified, through increased access to fueling stations and the subsequent security of supply. However, a potential negative effect on human health is also identified, in that release of natural gas into the atmosphere, or indeed inhaled by persons can be harmful to health. Further, CNG stations can carry risk of fire or explosion, if unmitigated. An overall 'uncertain' effect is therefore identified. Refer to mitigation measures.
Land and Soil	A potential negative effect is identified with regards land and soil, due to the excavations required to facilitate this development, and the risk of leaks from storage tanks and dispense pumps. Refer to mitigation measures.

Water	A potential negative effect is identified with regards water, due to the development of the proposed new facility. However, as the precise location is yet to be finalised, and the baseline environment of the development site unknown (i.e. proximity to watercourses); an uncertain effect is identified for the purposes of this assessment. The site selection process should have regard to the proximity of the site to existing water features, the underlying groundwater bodies and their subsequent vulnerability. Lough Ramor, which is hydrologically linked to the River Boyne and River Blackwater SAC and SPA, is located in proximity to the Maghera area. There could be a potential hydrogeological link to the same by means of the underlying locally important aquafer. The aquafer is identified as being of high vulnerability at the indicative site of the proposed development. Should any spills or leaks enter the groundwater body and subsequently Lough Ramon, there is potential for negative effects on surface and groundwater quality. Refer to mitigation measures.
Air, Noise, Climate	Increased use of natural gas is likely to result in an overall negative effect on air quality and climate. However, as outlined in GNIs Vision 2050 document, converting Ireland's Heavy Goods Vehicles (HGVs) from diesel to CNG can yield near-term emissions reductions in the transport sector. This ultimately will aid GNI in achieving the emission reduction targets relevant to the gas sector, as set both by Ireland and the EU. An uncertain effect is therefore identified for the purpose of this assessment. Refer to mitigation measures.
Heritage	There are no know heritage features in proximity to the indicativee site location. A neutral effect on heritage is therefore identified.
Landscape &Visual	The site of the proposed new CNG station is that of a highly developed, urban area, with an already existing developed site. A neutral effect on landscape and visual is therefore identified.
Material Assets	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified
Capacity Upgrade to existing 3607 AGI The driver of this project is security of supply. A capacity upgrade is required at the existing 3607 AGI station in order to accommodate the projected future growth in demand in the local network. This project involves increasing the capacity of the existing Pressure Reduction Skid from 13.5kscmh to 16.1kscm	
Biodiversity	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on biodiversity are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on biodiversity.
Population and Human Health	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified. However, a potential negative on human health effect is also identified as a result of the health and safety risks associated with the installation of, or works to, gas infrastructure. An uncertain effect is therefore identified, for the purposes of this assessment. Refer to mitigation measures.
Land and Soil	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on land and soil are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on land and soil.
Water	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on water are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on water..
Air, Noise, Climate	Continued or increased use/supply of natural gas is likely to result in an overall negative effect on air quality and climate. Refer to mitigation measures.
Heritage	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on heritage are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on heritage.
Landscape &Visual	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on landscape and visual are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on landscape and visual.
Material Assets	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified
Capacity Upgrade to existing 5301 AGI The driver of this project is security of supply. A capacity upgrade is required at the existing 5301 AGI station in order to accommodate the projected future growth in demand in the local network. This project involves increasing the capacity of the existing Pressure Reduction Skid from 2kscmh to 2.2kscmh	
Biodiversity	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on biodiversity are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on biodiversity.

Population and Human Health	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified. However, a potential negative on human health effect is also identified as a result of the health and safety risks associated with the installation of, or works to, gas infrastructure. An uncertain effect is therefore identified, for the purposes of this assessment. Refer to mitigation measures.
Land and Soil	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on land and soil are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on land and soil.
Water	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on water are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on water.
Air, Noise, Climate	Continued or increased use/supply of natural gas is likely to result in an overall negative effect on air quality and climate. Refer to mitigation measures.
Heritage	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on heritage are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on heritage.
Landscape &Visual	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on landscape and visual are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on landscape and visual.
Material Assets	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified
<u>New CNG Station at NIP19LSCNG1</u> The driver of this project is to facilitate the installation of a new CNG station at Portlaoise, Co. Laois. The new CNG station is expected to connect to the existing low-pressure distribution gas network. The CNG station is expected to have a capacity of 0.56kscmh. The name of the CNG station NIP19LSCNG1 will change once GNI complete the design of this CNG station.	
Biodiversity	The development of new gas facilities has the potential to generate adverse impacts on biodiversity, with key potential impacts relating to disturbance, disruption, fragmentation and loss of habitats. However, as the precise location of the new CNG station is yet to be finalised, and the baseline environment of the development site unknown; an uncertain effect is identified for the purposes of this assessment. Portlaoise is generally of low environmental sensitivity. Much of Portlaoise town can be classified as Built Land and Artificial Surfaces. In turn, this makes the areas of open space and water courses potentially important as green corridors and stepping stones for biodiversity. The focus on brownfield lands or pre-developed sites during site-selection of the new CNG station will offset many potential effects on biodiversity. The site selection process for the new CNG station in Portlaoise should take into consideration the location of the River Trogue, which is a designated 'nutrient sensitive river', and which runs through Portlaoise town. These comprise nitrate vulnerable zones designated under the Nitrates Directive (91/676/EEC) and areas designated as sensitive under the Urban Waste Water Treatment Directive (91/271/EEC). Protection of the River Trogue should be ensured throughout development of the new CNG station. Further, there are a number of proposed Natural Heritage Areas in the vicinity of Portlaoise, including the Ridge of Portlaoise, which runs through the centre of the town. Designated sites should be afforded protection in the undertaking of this new development, in compliance with legislation. Refer to mitigation measures.
Population and Human Health	A positive effect on the population in identified, through increased access to fueling stations and the subsequent security of supply. However, a potential negative effect on human health is also identified, in that release of natural gas into the atmosphere, or indeed inhaled by persons can be harmful to health. Further, CNG stations can carry risk of fire or explosion, if unmitigated. An overall 'uncertain' effect is therefore identified.
Land and Soil	A potential negative effect is identified with regards land and soil, due to the excavations required to facilitate this development, and the risk of leaks from storage tanks and dispense pumps. The focus on brownfield lands or pre-developed sites during site-selection of the new CNG station will offset many potential effects on land and soil. Refer to mitigation measures There are a number of Geological Heritage Sites close to Portlaoise town; Darkin Well, Rathleaugue Spring, Ridge of Portlaoise. These should all be afforded protection during the development of the CNG station. Measures should be put in place to ensure no risk of soil contamination during construction or operation. Refer to mitigation measures.

Water	A potential negative effect is identified with regards water, due to the development of the proposed new facility. However, as the precise location is yet to be finalised, and the baseline environment of the development site unknown (i.e. proximity to watercourses); an uncertain effect is identified for the purposes of this assessment. The site selection process should have regard to the proximity of the site to existing water features the underlying groundwater bodies and their subsequent vulnerability. The River Triogue is the main surface water that runs through Portlaoise. The latest information from the catchments.ie website shows the overall WFD status of the River Triogue and a tributary the Kylegrove Stream to be of Poor-Quality s it runs through the town. Protection of the water quality of the River Triogue should be ensured. The Geological Survey of Ireland's Groundwater Vulnerability Mapping shows the groundwater vulnerability for the area of Portlaoise town within a catchment where groundwater vulnerability is considered moderate. Refer to mitigation measures.
Air, Noise, Climate	Increased use of natural gas is likely to result in an overall negative effect on air quality and climate. Increased use of natural gas is likely to result in an overall negative effect on air quality and climate. However, as outlined in GNIs Vision 2050 document, converting Ireland's Heavy Goods Vehicles (HGVs) from diesel to CNG can yield near-term emissions reductions in the transport sector. This ultimately will aid GNI in achieving the emission reduction targets relevant to the gas sector, as set both by Ireland and the EU. An uncertain effect is therefore identified for the purpose of this assessment. Refer to mitigation measures.
Heritage	A potential negative effect is identified with regards heritage, due to the development of the proposed new facility. However, as the precise location is yet to be finalised, and the baseline environment of the development site unknown (i.e. proximity to features or areas of archaeological, architectural or cultural heritage significance); an uncertain effect is identified for the purposes of this assessment. There are approximately 25 no. archaeological monuments listed in the Record of Monuments and Places and approximately 78 no. Protected Structures within the development boundary of Portlaoise. A zone of archaeological significance has also been identified within Portloaise town, and Portlaoise Centre has been designated as an Architectural Conservation Area. All areas of heritage significance should be afforded strict protection, in compliance with legislation, and should be avoided during site selection of the new CNG station. Refer to mitigation measures.
Landscape &Visual	A potential negative effect is identified with regards landscape and visual, due to the development of the proposed new facility. However, as the precise location is yet to be finalised, and the baseline environment of the development site unknown; an uncertain effect is identified for the purposes of this assessment. Much of Portlaoise town can be classified as Built Land and Artificial Surfaces. The focus on brownfield lands or pre-developed sites during site-selection of the new CNG station will offset many potential effects on landscape and visual. The site selection process should have regard to the proximity of the site to protected views/prospects. Refer to mitigation measures.
Material Assets	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified
New CNG Station at NIP19MHCNG1 The driver of this project is to facilitate the installation of a new CNG station at Gormanston, Co. Meath. The new CNG station is expected to connect to the existing low-pressure distribution gas network. The CNG station is expected to have a capacity of 0.56kscmh. The name of the CNG station NIP19MHCNG1 will change once GNI complete the design of this CNG station.	
Biodiversity	The development of new gas facilities has the potential to generate adverse impacts on biodiversity, with key potential impacts relating to disturbance, disruption, fragmentation and loss of habitats. However, as the precise location of the new CNG station is yet to be finalised, and the baseline environment of the development site unknown; an uncertain effect is identified for the purposes of this assessment. The focus on brownfield lands or pre-developed sites during site-selection of the new CNG station will offset many potential effects on biodiversity. There is a limited extent of existing development in Gormanston. There are no Candidate Special Conservation Areas (c.SAC), Special Protection Areas (SPA) or proposed Natural Heritage Areas (pNHA) within the development boundary of Gormanston. However, the River Nanny Estuary & Shore SPA is located to the north east of the development boundary. The site selection process of the new CNG station should have regard to potential hydrological or hydrogeological links to the SPA. Designated sites should be afforded protection in the undertaking of this new development, in compliance with legislation. Refer to mitigation measures.
Population and Human Health	A positive effect on the population in identified, through increased access to fueling stations and the subsequent security of supply. However, a potential negative effect on human health is also identified, in that release of natural gas into the atmosphere, or indeed inhaled by persons can be harmful to health. Further, CNG stations can carry risk of fire or explosion, if unmitigated. An overall 'uncertain' effect is therefore identified. Refer to mitigation measures.

Land and Soil	A potential negative effect is identified with regards land and soil, due to the undertaking of new development, and the risk of leaks from storage tanks and dispense pumps. The entire area of Gormanstown in a geological heritage site; MH008 Laytown to Gormanston. In accordance with the Meath County Development Plan, GNI should have regard to Laytown to Gormanstown Geological Heritage Site in site selection for the new CNG station, and avoid inappropriate development, through consultation with the Geological Survey of Ireland. Measures should be put in place to ensure no risk of soil contamination during construction or operation. Refer to mitigation measures.
Water	A potential negative effect is identified with regards water, due to the development of the proposed new facility. However, as the precise location is yet to be finalised, and the baseline environment of the development site unknown (i.e. proximity to watercourses); an uncertain effect is identified for the purposes of this assessment. The site selection process should have regard to the proximity of the site to existing water features the underlying groundwater bodies and their subsequent vulnerability. The river Delvin runs through Gormanstown. The river is currently noted as being of 'poor' status, and 'at risk' of not meeting the WFD objectives. Any development in the vicinity of the river should be carried out in cognisance of the same, and in a manner that will not deteriorate the water quality. The Geological Survey of Ireland's Groundwater Vulnerability Mapping shows the groundwater vulnerability for the area Gormanstown within a catchment where groundwater vulnerability is considered high. The site has a number of groundwater wells and springs which need to be taken into account at site-selection. Refer to mitigation measures.
Air, Noise, Climate	Increased use of natural gas is likely to result in an overall negative effect on air quality and climate. However, as outlined in GNIs Vision 2050 document, converting Ireland's Heavy Goods Vehicles (HGVs) from diesel to CNG can yield near-term emissions reductions in the transport sector. This ultimately will aid GNI in achieving the emission reduction targets relevant to the gas sector, as set both by Ireland and the EU. An uncertain effect is therefore identified for the purpose of this assessment. Refer to mitigation measures.
Heritage	A potential negative effect is identified with regards heritage, due to the development of the proposed new facility. However, as the precise location is yet to be finalised, and the baseline environment of the development site unknown (i.e. proximity to features or areas of archaeological, architectural or cultural heritage significance); an uncertain effect is identified for the purposes of this assessment. There are numerous items in Gormanston included on the Record of Protected Structures. There are also a number of archaeological monuments in the village environs which include a church within the Gormanston College campus (SMRS Ref: ME028 019) and a Habitation Site to the east of the village (SMRS Ref: ME028 051). All areas of heritage significance should be afforded strict protection, in compliance with legislation, and should be avoided during site selection of the new CNG station. Refer to mitigation measures.
Landscape &Visual	A potential negative effect is identified with regards landscape and visual, due to the development of the proposed new facility. However, as the precise location is yet to be finalised, and the baseline environment of the development site unknown; an uncertain effect is identified for the purposes of this assessment. There is a limited extent of existing development in Gormanston. The area lacks a distinct village form and has instead developed in a dispersed and disjointed manner. Thus, the development of the new CNG station should have regard to the existing size and context of the village. Nearly all of the features between Laytown and Gormanston can be viewed from public roads or from the beach. The northern part of this locality is owned by the Department of Defence and is used as a military aerodrome and rifle range as it is very flat. Much of the rest of the site is agricultural with the exception of an old sand and gravel pit to the south, which is used as an off road motor track. Due to the nature of the landuse (especially military use) general promotion is not suitable without appropriate arrangements being made with the Camp Commandant and various landowners. The focus on brownfield lands or pre-developed sites during site-selection of the new CNG station will offset many potential effects on landscape and visual. The site selection process should have regard to the proximity of the site to protected views/prospects. Refer to mitigation measures.
Material Assets	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified.
Capacity Upgrade to existing 7403 AGI The driver of this project is security of supply. A capacity upgrade is required at the existing 7403 AGI station in order to accommodate the projected future growth in demand in the local network. This project involves increasing the capacity of the existing Pressure Reduction Skid from 16.8kscmh to 18.7kscmh.	
Biodiversity	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on biodiversity are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on biodiversity.

Population and Human Health	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified. However, a potential negative on human health effect is also identified as a result of the health and safety risks associated with the installation of, or works to, gas infrastructure. An uncertain effect is therefore identified, for the purposes of this assessment. Refer to mitigation measures.
Land and Soil	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on land and soil are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on land and soil.
Water	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on water are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on water.
Air, Noise, Climate	Continued or increased use/supply of natural gas is likely to result in an overall negative effect on air quality and climate. Refer to mitigation measures.
Heritage	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on heritage are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on heritage.
Landscape &Visual	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on landscape and visual are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on landscape and visual.
Material Assets	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified
Capacity Upgrade to existing 6403 AGI The driver of this project is security of supply. A capacity upgrade is required at the existing 6403 AGI station in order to accommodate the projected future growth in demand in the local network. This project involves increasing the capacity of the existing Pressure Reduction Skid from 16.44kscmh to 17.8kscmh	
Biodiversity	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on biodiversity are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on biodiversity.
Population and Human Health	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified. However, a potential negative on human health effect is also identified as a result of the health and safety risks associated with the installation of, or works to, gas infrastructure. An uncertain effect is therefore identified, for the purposes of this assessment. Refer to mitigation measures.
Land and Soil	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on land and soil are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on land and soil.
Water	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on water are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on water.
Air, Noise, Climate	Continued or increased use/supply of natural gas is likely to result in an overall negative effect on air quality and climate. Refer to mitigation measures.
Heritage	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on heritage are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on heritage.

Landscape &Visual	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on landscape and visual are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on landscape and visual.
Material Assets	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified

Capacity Upgrade to existing 6103 AGI The driver of this project is security of supply. A capacity upgrade is required at the existing 6103 AGI station in order to accommodate the projected future growth in demand in the local network. This project involves increasing the capacity of the existing Pressure Reduction Skid from 19kscmh to 24kscmh.	
Biodiversity	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on biodiversity are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on biodiversity. Refer to mitigation measures.
Population and Human Health	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified. However, a potential negative on human health effect is also identified as a result of the health and safety risks associated with the installation of, or works to, gas infrastructure. An uncertain effect is therefore identified, for the purposes of this assessment. Refer to mitigation measures.
Land and Soil	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on land and soil are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on land and soil. Refer to mitigation measures.
Water	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on water are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on water. Refer to mitigation measures.
Air, Noise, Climate	Continued or increased use/supply of natural gas is likely to result in an overall negative effect on air quality and climate. Refer to mitigation measures. Refer to mitigation measures.
Heritage	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on heritage are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on heritage. Refer to mitigation measures.
Landscape &Visual	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on landscape and visual are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on landscape and visual. Refer to mitigation measures.
New CNG Station at NIP19KECNG1 The driver of this project is to facilitate the installation of a new CNG station at Monasterevin, Co. Kildare. The new CNG station is expected to connect to the existing low-pressure distribution gas network. The CNG station is expected to have a capacity of 0.307kscmh. The name of the CNG station NIP19KECNG1 will change once GNI complete the design of this CNG station.	
Biodiversity	The development of new gas facilities has the potential to generate adverse impacts on biodiversity, with key potential impacts relating to disturbance, disruption, fragmentation and loss of habitats. Monasterevin is a generally well-developed area. The focus on brownfield lands or pre-developed sites during site-selection of the new AGI station will offset many potential effects on biodiversity. However, it is in close proximity to the River Barrow And River Nore SAC, with one of its tributaries; the Baraderra running through the town. There is therefore potential for a hydrological, via the Baraderra or hydrogeological link to the SAC, by means of the underlying locally important aquafer. The aquafer which is underlying Monasterevin is a regionally important aquafer with high vulnerability. A potential negative effect on biodiversity is therefore identified. Refer to mitigation measures.
Population and Human Health	A positive effect on the population in identified, through increased access to fueling stations and the subsequent security of supply. However, a potential negative effect on human health is also identified, in that release of natural gas into the atmosphere, or indeed inhaled by persons can be harmful to health. Further, CNG stations can carry risk of fire or explosion, if unmitigated. Refer to mitigation measures. An overall 'uncertain' effect is therefore identified. Refer to mitigation measures.
Land and Soil	A potential negative effect is identified with regards land and soil, due to the excavations required to facilitate this development, and the risk of leaks from storage tanks and dispense pumps. Refer to mitigation measures.
Water	A potential negative effect is identified with regards water, due to the development of the proposed new facility. However, as the precise location is yet to be finalised, and the baseline environment of the development site unknown (i.e. proximity to watercourses); an uncertain effect is identified for the purposes of this assessment.

	As outlined previously, the location of the proposed new CNG station is in close proximity to the River Barrow and River Nore SAC, with one of its tributaries; the Baraderra running through the town. The aquafer which is underlying Monasterevin is a regionally important aquafer with high vulnerability. A potential negative effect on water quality is therefore identified, as a result of the development of the new infrastructure. Refer to mitigation measures.
Air, Noise, Climate	Increased use of natural gas is likely to result in an overall negative effect on air quality and climate. However, as outlined in GNIs Vision 2050 document, converting Ireland's Heavy Goods Vehicles (HGVs) from diesel to CNG can yield near-term emissions reductions in the transport sector. This ultimately will aid GNI in achieving the emission reduction targets relevant to the gas sector, as set both by Ireland and the EU. An uncertain effect is therefore identified for the purpose of this assessment. Refer to mitigation measures.
Heritage	A potential negative effect is identified with regards heritage, due to the development of the proposed new facility. However, as the precise location is yet to be finalised, and the baseline environment of the development site unknown (i.e. proximity to features or areas of archaeological, architectural or cultural heritage significance); an uncertain effect is identified for the purposes of this assessment. There are numerous items in Monasterevin included on the Record of Protected Structures. There are also a number of archaeological monuments in the village environs. All areas of heritage significance should be afforded strict protection, in compliance with legislation, and should be avoided during site selection of the new CNG station. Refer to mitigation measures.
Landscape &Visual	The site of the proposed new CNG station is that of a highly developed, urban area, with an already existing service station. A neutral effect on landscape and visual is therefore identified.
Material Assets	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified.
New CNG Station at NIP19MHCNG2 The driver of this project is to facilitate the installation of a new CNG station at Trim, Co. Meath. The new CNG station is expected to connect to the existing low-pressure distribution gas network. The CNG station is expected to have a capacity of 0.307kscmh. The name of the CNG station NIP19MHCNG2 will change once GNI complete the design of this CNG station.	
Biodiversity	The development of new gas facilities has the potential to generate adverse impacts on biodiversity, with key potential impacts relating to disturbance, disruption, fragmentation and loss of habitats. The focus on brownfield lands or pre-developed sites during site-selection of the new AGI station will offset many potential effects on biodiversity. The whitehall tributary, which flows to the River Boyne and River Blackwater SAC and SPA, are in vicinity of the proposed site location. Should any potentially contaminated surface water run-off enter the tributaries or indeed the River during construction, there is potential for contamination and subsequent negative effects on the conservation objectives of the SAC. A potential negative effect is therefore identified for the purpose of this assessment. Refer to mitigation measures.
Population and Human Health	A positive effect on the population in identified, through increased access to fueling stations and the subsequent security of supply. However, a potential negative effect on human health is also identified, in that release of natural gas into the atmosphere, or indeed inhaled by persons can be harmful to health. Further, CNG stations can carry risk of fire or explosion, if unmitigated. Refer to mitigation measures. An overall 'uncertain' effect is therefore identified. Refer to mitigation measures.
Land and Soil	A potential negative effect is identified with regards land and soil, due to the excavations required to facilitate this development, and the risk of leaks from storage tanks and dispense pumps. Refer to mitigation measures.
Water	A potential negative effect is identified with regards water, due to the development of the proposed new facility. However, as the precise location is yet to be finalised, and the baseline environment of the development site unknown (i.e. proximity to watercourses); an uncertain effect is identified for the purposes of this assessment. Refer to mitigation measures. The site selection process should have regard to the proximity of the site to existing water features, the underlying groundwater bodies and their subsequent vulnerability. The whitehall tributary, which flows to the River Boyne and River Blackwater SAC and SPA, are in vicinity of the proposed site location. Should any potentially contaminated surface water run-off enter the tributaries or indeed the River during construction, there is potential for contamination and subsequent negative effects on water quality. A potential negative effect is therefore identified for the purpose of this assessment. Refer to mitigation measures.
Air, Noise, Climate	Increased use of natural gas is likely to result in an overall negative effect on air quality and climate. However, as outlined in GNIs Vision 2050 document, converting Ireland's Heavy Goods Vehicles (HGVs) from diesel to CNG can yield near-term emissions reductions in the transport sector. This ultimately will aid GNI in achieving the emission reduction targets relevant to the gas sector, as set both by Ireland and the EU. An uncertain effect is therefore identified for the purpose of this assessment. Refer to mitigation measures.
Heritage	There are no know heritage features in proximity to the indicate site location. A neutral effect on heritage is therefore identified.
Landscape &Visual	The site of the proposed new CNG station is that of a highly developed, urban area, with an already existing developed site. A neutral effect on landscape and visual is therefore identified.
Material Assets	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified

Capacity Upgrade to existing 1303 AGI The driver of this project is security of supply. A capacity upgrade is required at the existing 1303 AGI station in order to accommodate the projected future growth in demand in the local network. This project involves increasing the capacity of the existing Pressure Reduction Skid from 270kscmh to 393kscmh	
Biodiversity	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on biodiversity are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on biodiversity. Refer to mitigation measures.
Population and Human Health	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified. However, a potential negative on human health effect is also identified as a result of the health and safety risks associated with the installation of, or works to, gas infrastructure. An uncertain effect is therefore identified, for the purposes of this assessment. Refer to mitigation measures.
Land and Soil	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on land and soil are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on land and soil. Refer to mitigation measures.
Water	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on water are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on water. Refer to mitigation measures.
Air, Noise, Climate	Continued or increased use/supply of natural gas is likely to result in an overall negative effect on air quality and climate. Refer to mitigation measures. Refer to mitigation measures.
Heritage	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on heritage are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on heritage. Refer to mitigation measures.
Landscape &Visual	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on landscape and visual are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on landscape and visual. Refer to mitigation measures.
Material Assets	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified.
Capacity Upgrade to existing A108 AGI The driver of this project is security of supply. A capacity upgrade is required at the existing A108 AGI station in order to accommodate the projected future growth in demand in the local network. This project involves increasing the capacity of the existing Pressure Reduction Skid from 6.5kscmh to 7.3kscmh	
Biodiversity	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on biodiversity are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on biodiversity. Refer to mitigation measures.
Population and Human Health	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified. However, a potential negative on human health effect is also identified as a result of the health and safety risks associated with the installation of, or works to, gas infrastructure. An uncertain effect is therefore identified, for the purposes of this assessment. Refer to mitigation measures.
Land and Soil	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on land and soil are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on land and soil. Refer to mitigation measures.
Water	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on water are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on water. Refer to mitigation measures.

Air, Noise, Climate	Continued or increased use/supply of natural gas is likely to result in an overall negative effect on air quality and climate. Refer to mitigation measures. Refer to mitigation measures.
Heritage	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on heritage are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on heritage. Refer to mitigation measures.
Landscape &Visual	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on landscape and visual are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on landscape and visual. Refer to mitigation measures.
Material Assets	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified
Station Bypass Project at 3603 AGI The driver of this project is security of supply. 3603 AGI has been identified as being a critical installation on the gas transportation system and is supplied by the offshore pipelines (IC1 and IC2) that supply gas from Scotland to the Republic of Ireland. Therefore, the consequence of 3603 AGI being unavailable has the potential to significantly impact gas flow in Ireland. A bypass pipeline around 3603 AGI is required to reduce the importance of this AGI to the network and improve the resilience of the network as a whole.	
Biodiversity	Planning permission has been sought for this project, and the appropriate environmental assessments carried out. Refer to the findings of the same.
Population and Human Health	
Land and Soil	
Water	
Air, Noise, Climate	
Heritage	
Landscape &Visual	
Material Assets	
New 85-70Bar AGI Station 8003 AGI The driver of this project is security of supply. Following the anticipated cessation of Celtic Sea operations and the supplies from the Inch Entry Point, GNI have initiated a project that will uprate a section of the ring main to 85 barg. A new AGI with a Pressure Reduction Skid is required in order to reinforce the network in the South of Ireland. This project involves installing a new AGI with a Pressure Reduction Skid with a capacity of 1300ksmch.	
Biodiversity	Planning permission has been sought for this project, and the appropriate environmental assessments carried out. Refer to the findings of the same.
Population and Human Health	
Land and Soil	
Water	
Air, Noise, Climate	
Heritage	
Landscape &Visual	
Material Assets	
New 70 -4 bar AGI Station NIP19DAGI1 AGI The driver of this project is security of supply. A new AGI is required in order to accommodate the projected future growth in demand in the local network. This project involves installing a new AGI with a capacity of 20 kscmh in the area. The name of this AGI NIP19DAGI1 will change once GNI complete the design of this AGI.	
Biodiversity	The development of new gas facilities/installations has the potential to generate adverse impacts on biodiversity, with key potential impacts relating to disturbance, disruption, fragmentation and loss of habitats. However, as the precise location of the new AGI station is yet to be finalised, and the baseline environment of the development site unknown; an uncertain effect is identified for the purposes of this assessment.

	The proposed new AGI is identified in the Porterstown area of Dublin. Much of Porterstown can be classified as Built Land and Artificial Surfaces. In turn, this makes the areas of open space and water courses potentially important as green corridors and stepping stones for biodiversity. The Royal Canal, which is a proposed Natural Heritage Area, flows through the Porterstown area. Designated sites should be afforded protection in the undertaking of this new development, in compliance with legislation. The focus on brownfield lands or pre-developed sites during site-selection of the new AGI station will offset many potential effects on biodiversity. Refer to mitigation measures.
Population and Human Health	A positive effect on the population in identified, through increased access to fueling stations and the subsequent security of supply. However, a potential negative effect on human health is also identified, in that the development of new gas infrastructure can carry risk of fire or explosion, if unmitigated. An overall 'uncertain' effect is therefore identified. Refer to mitigation measures.
Land and Soil	A potential negative effect is identified with regards land and soil, due to the excavations required to facilitate this development, and the risk of leaks from storage tanks and dispense pumps. The focus on brownfield lands or pre-developed sites during site-selection of the new AGI station will offset many potential effects on land and soil. Refer to mitigation measures There are no geological heritage sites in the Porterstown area. Measures should be put in place to ensure no risk of soil contamination during construction or operation. Refer to mitigation measures.
Water	A potential negative effect is identified with regards water, due to the development of the proposed new facility. However, as the precise location is yet to be finalised, and the baseline environment of the development site unknown (i.e. proximity to watercourses); an uncertain effect is identified for the purposes of this assessment. Refer to mitigation measures. The site selection process should have regard to the proximity of the site to existing water features the underlying groundwater bodies and their subsequent vulnerability. The Royal Canal flows through the Porterstown area. The Geological Survey of Ireland's Groundwater Vulnerability Mapping shows the groundwater vulnerability for the area Porterstown within a catchment where groundwater vulnerability is considered low, and the quality of the groundwater is considered high. The site has a number of groundwater wells and springs which need to be taken into account at site-selection. Refer to mitigation measures.
Air, Noise, Climate	Increased use of natural gas is likely to result in an overall negative effect on air quality and climate. Refer to mitigation measures.
Heritage	A potential negative effect is identified with regards heritage, due to the development of the proposed new facility. However, as the precise location is yet to be finalised, and the baseline environment of the development site unknown (i.e. proximity to features or areas of archaeological, architectural or cultural heritage significance); an uncertain effect is identified for the purposes of this assessment. Refer to mitigation measures. There is a protected structure located in close vicinity to the indicative location identified for this new AGI. All areas of heritage significance should be afforded strict protection, in compliance with legislation, and should be avoided during site selection of the new AGI station. Refer to mitigation measures.
Landscape &Visual	A potential negative effect is identified with regards landscape and visual, due to the development of the proposed new facility. However, as the precise location is yet to be finalised, and the baseline environment of the development site unknown; an uncertain effect is identified for the purposes of this assessment. The indicative location of the new AGI station is identified as 'sensitive landscape' under the Fingal County Development Plan. The focus on brownfield lands or pre-developed sites during site-selection of the new AGI station will offset many potential effects on landscape and visual. The site selection process should have regard to the proximity of the site to protected views/prospects. Refer to mitigation measures.
Material Assets	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified

Capacity Upgrade to existing 1302 AGI The driver of this project is security of supply. A capacity upgrade is required at the existing 1302 AGI station in order to accommodate the projected future growth in demand in the local network. This project involves increasing the capacity of the existing Pressure Reduction Skid from 18.1kscmh to 34.6kscmh	
Biodiversity	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on biodiversity are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on biodiversity. Refer to mitigation measures.
Population and Human Health	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified. However, a potential negative on human health effect is also identified as a result of the health and safety risks associated with the installation of, or works to, gas infrastructure. An uncertain effect is therefore identified, for the purposes of this assessment. Refer to mitigation measures.
Land and Soil	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on land and soil are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on land and soil. Refer to mitigation measures.
Water	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on water are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on water. Refer to mitigation measures.
Air, Noise, Climate	Continued or increased use/supply of natural gas is likely to result in an overall negative effect on air quality and climate. Refer to mitigation measures. Refer to mitigation measures.
Heritage	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on heritage are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on heritage. Refer to mitigation measures.
Landscape &Visual	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on landscape and visual are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on landscape and visual. Refer to mitigation measures.
Material Assets	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified
Capacity Upgrade to existing 7203 AGI The driver of this project is security of supply. A capacity upgrade is required at the existing 7203 AGI station in order to accommodate the projected future growth in demand in the local network. This project involves increasing the capacity of the existing Pressure Reduction Skid from 20kscmh to 22.7kscmh	
Biodiversity	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on biodiversity are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on biodiversity. Refer to mitigation measures.
Population and Human Health	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified. However, a potential negative on human health effect is also identified as a result of the health and safety risks associated with the installation of, or works to, gas infrastructure. An uncertain effect is therefore identified, for the purposes of this assessment. Refer to mitigation measures.
Land and Soil	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on land and soil are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on land and soil. Refer to mitigation measures.
Water	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on water are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on water. Refer to mitigation measures.

Air, Noise, Climate	Continued or increased use/supply of natural gas is likely to result in an overall negative effect on air quality and climate. Refer to mitigation measures. Refer to mitigation measures.
Heritage	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on heritage are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on heritage. Refer to mitigation measures.
Landscape &Visual	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on landscape and visual are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on landscape and visual. Refer to mitigation measures.
Material Assets	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified
<u>New CNG Station at NIP19DCNG1</u> The driver of this project is to facilitate the installation of a new CNG station at Clonshaugh Road, Co. Dublin. The new CNG station is expected to connect to the existing low-pressure distribution gas network. The CNG station is expected to have a capacity of 0.56kscmh. The name of the CNG station NIP19DCNG1 will change once GNI complete the design of this CNG station	
Biodiversity	Planning permission has been sought for this project, and the appropriate environmental assessments carried out. Refer to the findings of the same.
Population and Human Health	
Land and Soil	
Water	
Air, Noise, Climate	
Heritage	
Landscape &Visual	
Material Assets	
<u>New CNG Station at NIP19DCNG2</u> The driver of this project is to facilitate the installation of a new CNG station at Cappagh, Co. Dublin. The new CNG station is expected to connect to the existing low-pressure distribution gas network. The CNG station is expected to have a capacity of 0.56kscmh. The name of the CNG station NIP19DCNG2 will change once GNI complete the design of this CNG station	
Biodiversity	The development of new gas facilities has the potential to generate adverse impacts on biodiversity, with key potential impacts relating to disturbance, disruption, fragmentation and loss of habitats. Cappagh is a generally well-developed area in Dublin, with limited ecological sensitive areas. There are no Natura 2000 sites located in proximity to the site of the proposed new CNG station. However, as the precise location of the new CNG station is yet to be finalised, and the baseline environment of the development site unknown; an uncertain effect is identified for the purposes of this assessment. The focus on brownfield lands or pre-developed sites during site-selection of the new CNG station will offset many potential effects on biodiversity. Refer to mitigation measures.
Population and Human Health	A positive effect on the population in identified, through increased access to fueling stations and the subsequent security of supply. However, a potential negative effect on human health is also identified, in that release of natural gas into the atmosphere, or indeed inhaled by persons can be harmful to health. Further, CNG stations can carry risk of fire or explosion, if unmitigated. Refer to mitigation measures. An overall 'uncertain' effect is therefore identified. Refer to mitigation measures.
Land and Soil	A potential negative effect is identified with regards land and soil, due to the excavations required to facilitate this development, and the risk of leaks from storage tanks and dispense pumps. Refer to mitigation measures.
Water	The proposed development site is not located in close proximity to any main water features. The Geological Survey of Ireland's Groundwater Vulnerability Mapping shows the groundwater vulnerability for the area of Cappagh is of high to extremely high vulnerability. Measures should be put in place to ensure no risk of soil contamination during construction or operation Refer to mitigation measures.
Air, Noise, Climate	Increased use of natural gas is likely to result in an overall negative effect on air quality and climate. However, as outlined in GNIs Vision 2050 document, converting Ireland's Heavy Goods Vehicles (HGVs) from diesel to CNG can yield near-term emissions reductions in the transport sector. This ultimately will aid GNI in achieving the emission reduction targets relevant to the gas sector, as set both by Ireland and the EU. An uncertain effect is therefore identified for the purpose of this assessment. Refer to mitigation measures.

Heritage	A potential negative effect is identified with regards heritage, due to the development of the proposed new facility. However, as the precise location is yet to be finalised, and the baseline environment of the development site unknown (i.e. proximity to features or areas of archaeological, architectural or cultural heritage significance); an uncertain effect is identified for the purposes of this assessment. There are a number of archaeological monuments in the environs of Cappagh. All areas of heritage significance should be afforded strict protection, in compliance with legislation, and should be avoided during site selection of the new CNG station. Refer to mitigation measures.
Landscape &Visual	The site of the proposed new CNG station is that of a highly developed, urban area. A neutral effect on landscape and visual is therefore identified. Refer to mitigation measures.
Material Assets	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified.
New CNG Station at NIP19DCNG3 The driver of this project is to facilitate the installation of a new CNG station at Ballymount, Co. Dublin. The new CNG station is expected to connect to the existing low-pressure distribution gas network. The CNG station is expected to have a capacity of 0.56kscmh. The name of the CNG station NIP19DCNG3 will change once GNI complete the design of this CNG station	
Biodiversity	The development of new gas facilities has the potential to generate adverse impacts on biodiversity, with key potential impacts relating to disturbance, disruption, fragmentation and loss of habitats. Ballymount is a generally well-developed area in Dublin, with limited ecological sensitive areas. There are no Natura 2000 sites located in proximity to the site of the proposed new CNG station. However, as the precise location of the new CNG station is yet to be finalised, and the baseline environment of the development site unknown; an uncertain effect is identified for the purposes of this assessment. The focus on brownfield lands or pre-developed sites during site-selection of the new CNG station will offset many potential effects on biodiversity. Refer to mitigation measures.
Population and Human Health	A positive effect on the population in identified, through increased access to fueling stations and the subsequent security of supply. However, a potential negative effect on human health is also identified, in that release of natural gas into the atmosphere, or indeed inhaled by persons can be harmful to health. Further, CNG stations can carry risk of fire or explosion, if unmitigated. Refer to mitigation measures. An overall 'uncertain' effect is therefore identified.
Land and Soil	A potential negative effect is identified with regards land and soil, due to the excavations required to facilitate this development, and the risk of leaks from storage tanks and dispense pumps. Refer to mitigation measures.
Water	The proposed development site is not located in close proximity to any main water features. The Geological Survey of Ireland's Groundwater Vulnerability Mapping shows the groundwater vulnerability for the area of Ballymount is of high to extremely high vulnerability. Measures should be put in place to ensure no risk of soil contamination during construction or operation Refer to mitigation measures.
Air, Noise, Climate	Increased use of natural gas is likely to result in an overall negative effect on air quality and climate. However, as outlined in GNIs Vision 2050 document, converting Ireland's Heavy Goods Vehicles (HGVs) from diesel to CNG can yield near-term emissions reductions in the transport sector. This ultimately will aid GNI in achieving the emission reduction targets relevant to the gas sector, as set both by Ireland and the EU. An uncertain effect is therefore identified for the purpose of this assessment. Refer to mitigation measures.
Heritage	A potential negative effect is identified with regards heritage, due to the development of the proposed new facility. However, as the precise location is yet to be finalised, and the baseline environment of the development site unknown (i.e. proximity to features or areas of archaeological, architectural or cultural heritage significance); an uncertain effect is identified for the purposes of this assessment. There are a number of archaeological monuments and protected structures in the environs of Ballymount. All areas of heritage significance should be afforded strict protection, in compliance with legislation, and should be avoided during site selection of the new CNG station. Refer to mitigation measures.
Landscape &Visual	The site of the proposed new CNG station is that of a highly developed, urban area. A neutral effect on landscape and visual is therefore identified. Refer to mitigation measures.
Material Assets	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified.
New CNG Station at NIP19DCNG4 The driver of this project is to facilitate the installation of a new CNG station at St Margret's, Co. Dublin. The new CNG station is expected to connect to the existing low-pressure distribution gas network. The CNG station is expected to have a capacity of 0.307kscmh. The name of the CNG station NIP19DCNG4 will change once GNI complete the design of this CNG station.	

Biodiversity	The development of new gas facilities has the potential to generate adverse impacts on biodiversity, with key potential impacts relating to disturbance, disruption, fragmentation and loss of habitats. However, as the precise location of the new CNG station is yet to be finalised, and the baseline environment of the development site unknown; an uncertain effect is identified for the purposes of this assessment. The focus on brownfield lands or pre-developed sites during site-selection of the new CNG station will offset many potential effects on biodiversity. There is a limited extent of existing development in St. Margrets. There are no Candidate Special Conservation Areas (c.SAC), Special Protection Areas (SPA) or proposed Natural Heritage Areas (pNHA) within the development boundary of St Margrets. Refer to mitigation measures.
Population and Human Health	A positive effect on the population in identified, through increased access to fueling stations and the subsequent security of supply. However, a potential negative effect on human health is also identified, in that release of natural gas into the atmosphere, or indeed inhaled by persons can be harmful to health. Further, CNG stations can carry risk of fire or explosion, if unmitigated. Refer to mitigation measures. An overall 'uncertain' effect is therefore identified. Refer to mitigation measures.
Land and Soil	A potential negative effect is identified with regards land and soil, due to the excavations required to facilitate this development, and the risk of leaks from storage tanks and dispense pumps. Refer to mitigation measures.
Water	A potential negative effect is identified with regards water, due to the development of the proposed new facility. However, as the precise location is yet to be finalised, and the baseline environment of the development site unknown (i.e. proximity to watercourses); an uncertain effect is identified for the purposes of this assessment. Refer to mitigation measures. The site selection process should have regard to the proximity of the site to existing water features, the underlying groundwater bodies and their subsequent vulnerability. The Ward and Kilkeek rivers are located in vicinity to the site of the proposed new station. The indicative site of the proposed new facility is underlain by a poor aquafer, which is of moderate vulnerability. Refer to mitigation measures.
Air, Noise, Climate	Increased use of natural gas is likely to result in an overall negative effect on air quality and climate. However, as outlined in GNIs Vision 2050 document, converting Ireland's Heavy Goods Vehicles (HGVs) from diesel to CNG can yield near-term emissions reductions in the transport sector. This ultimately will aid GNI in achieving the emission reduction targets relevant to the gas sector, as set both by Ireland and the EU. An uncertain effect is therefore identified for the purpose of this assessment. Refer to mitigation measures.
Heritage	There are numerous items in St Margrets included on the Record of Protected Structures. There are also a number of archaeological monuments in the environs. All areas of heritage significance should be afforded strict protection, in compliance with legislation, and should be avoided during site selection of the new CNG station. Refer to mitigation measures.
Landscape &Visual	The site of the proposed new CNG station is that of a highly developed, urban area, with an already existing developed site. A neutral effect on landscape and visual is therefore identified.
Material Assets	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified
<u>New Renewable Gas Injection Facility at 0701 AGI</u> The driver of this project is to facilitate the installation of a new Centralised Gas Injection (CGI) Facility at 0701 AGI in order to facilitate the supply of Renewable Gas to the network. The new facility is expected to connect to the existing high-pressure 70Barg transmission gas network at the existing 0701 AGI. The Renewable Gas Injection Facility is expected to have a capacity of 20kscmh.	
Biodiversity	Planning permission has been sought for this project, and the appropriate environmental assessments carried out. Refer to the findings of the same.
Population and Human Health	
Land and Soil	
Water	
Air, Noise, Climate	
Heritage	
Landscape &Visual	
Material Assets	
<u>New Pressure Reduction Skid at existing 0705 AGI</u> The driver of this project is security of supply. Following the anticipated cessation of Celtic Sea operations and the supplies from the Inch Entry Point, GNI have initiated a project that will uprate a section of the ring main to 85 barg. A new Pressure Reduction Skid is required at the existing 0705 AGI in order to reinforce the network in the South of Ireland. This project involves installing a new Pressure Reduction Skid with a capacity of 350ksmch at the existing AGI.	

Biodiversity	The development of new gas facilities/installations has the potential to generate adverse impacts on biodiversity, with key potential impacts relating to disturbance, disruption, fragmentation and loss of habitats. The proposed new pressure reduction skid at the existing AGI 0705 will likely require additional land-take surrounding the existing site. This is likely to consist of grassland and other relatively insignificant habitats and species. However, any development of greenfield land has the potential to give rise on negative effects on biodiversity. Refer to mitigation measures.
Population and Human Health	A positive effect on the population in identified, through the assurance of security of gas supply. However, a potential negative effect on human health is also identified, in that the development of new gas infrastructure can carry risk of fire or explosion, if unmitigated. An overall 'uncertain' effect is therefore identified. Refer to mitigation measures.
Land and Soil	A potential negative effect is identified with regards land and soil, due to the excavations required to facilitate this development, and the risk of leaks from the infrastructure. The site is underlain by a locally important aquifer which is of high vulnerability and a potential effect on groundwater is therefore also possible to arise from required excavations. Refer to mitigation measures.
Water	There are no surface water features in proximity to the proposed works. No likely significant effects on the same are likely to occur.
Air, Noise, Climate	Increased use of natural gas is likely to result in an overall negative effect on air quality and climate. Refer to mitigation measures.
Heritage	The proposed project relates to an upgrade, or possible extension to, an existing AGI site. No known heritage features are expected to occur in proximity to the site. A neutral effect on heritage is therefore identified.
Landscape &Visual	A potential negative effect is identified with regards landscape and visual, due to the development of the proposed new infrastructure. Refer to mitigation measures.
Material Assets	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified
<u>New CNG Station at NIP19LKCNG1</u> The driver of this project is to facilitate the installation of a new CNG station at Ballysimon Road. The new CNG station is expected to connect to the existing low-pressure distribution gas network. The CNG station is expected to have a capacity of 0.56kscmh. The name of the CNG station NIP19LKCNG1 will change once GNI complete the design of this CNG station.	
Biodiversity	Planning permission has been sought for this project, and the appropriate environmental assessments carried out. Refer to the findings of the same.
Population and Human Health	
Land and Soil	
Water	
Air, Noise, Climate	
Heritage	
Landscape &Visual	
Material Assets	
<u>New CNG Station at NIP19TCNG1</u> The driver of this project is to facilitate the installation of a new CNG station at Birdhill. The new CNG station is expected to connect to the existing low-pressure distribution gas network. The CNG station is expected to have a capacity of 0.56kscmh. The name of the CNG station NIP19TCNG1 will change once GNI complete the design of this CNG station	

Biodiversity	The development of new gas facilities has the potential to generate adverse impacts on biodiversity, with key potential impacts relating to disturbance, disruption, fragmentation and loss of habitats. The Lower River Shannon SAC is located in proximity to the Birdhill area, and there could be a potential hydrogeological link by means of the underlying locally important aquafer. The aquafer is identified as being of high to extremely high vulnerability at the indicative site of the proposed development. Should any spills or leaks enter the groundwater body and subsequently Lough Ramon, there is potential for negative effects on biodiversity. Refer to mitigation measures.
Population and Human Health	A positive effect on the population in identified, through increased access to fueling stations and the subsequent security of supply. However, a potential negative effect on human health is also identified, in that release of natural gas into the atmosphere, or indeed inhaled by persons can be harmful to health. Further, CNG stations can carry risk of fire or explosion, if unmitigated. Refer to mitigation measures. An overall 'uncertain' effect is therefore identified. Refer to mitigation measures.
Land and Soil	A potential negative effect is identified with regards land and soil, due to the excavations required to facilitate this development, and the risk of leaks from storage tanks and dispense pumps. Refer to mitigation measures.
Water	A potential negative effect is identified with regards water, due to the development of the proposed new facility. However, as the precise location is yet to be finalised, and the baseline environment of the development site unknown (i.e. proximity to watercourses); an uncertain effect is identified for the purposes of this assessment. As previously outlined, the Birdhill area is located in proximity to the River Shannon and Kilmastulla River. The site selection process should have regard to the proximity of the site to existing water features, the underlying groundwater bodies and their subsequent vulnerability. Refer to mitigation measures.
Air, Noise, Climate	Increased use of natural gas is likely to result in an overall negative effect on air quality and climate. However, as outlined in GNIs Vision 2050 document, converting Ireland's Heavy Goods Vehicles (HGVs) from diesel to CNG can yield near-term emissions reductions in the transport sector. This ultimately will aid GNI in achieving the emission reduction targets relevant to the gas sector, as set both by Ireland and the EU. An uncertain effect is therefore identified for the purpose of this assessment. Refer to mitigation measures.
Heritage	The site of the proposed new CNG station is that of a highly developed, urban area, with an already existing developed site. A neutral effect on landscape and visual is therefore identified. Refer to mitigation measures.
Landscape &Visual	A potential negative effect is identified with regards landscape and visual, due to the development of the proposed new facility. However, as the precise location is yet to be finalised, and the baseline environment of the development site unknown; an uncertain effect is identified for the purposes of this assessment. The focus on brownfield lands or pre-developed sites during site-selection of the new CNG station will offset many potential effects on landscape and visual. The site selection process should have regard to the proximity of the site to protected views/prospects. Refer to mitigation measures.
Material Assets	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified.
<u>Capacity Upgrade to existing 0605 AGI</u> The driver of this project is security of supply. A capacity upgrade is required at the existing 0605 AGI station in order to accommodate the projected future growth in demand in the local network. This project involves increasing the capacity of the existing Pressure Reduction Skid from 2kscmh to 2.7kscmh	
Biodiversity	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on biodiversity are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on biodiversity. Refer to mitigation measures.
Population and Human Health	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified. However, a potential negative on human health effect is also identified as a result of the health and safety risks associated with the installation of, or works to, gas infrastructure. An uncertain effect is therefore identified, for the purposes of this assessment. Refer to mitigation measures.
Land and Soil	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on land and soil are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on land and soil. Refer to mitigation measures.
Water	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on water are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on water. Refer to mitigation measures.
Air, Noise, Climate	Continued or increased use/supply of natural gas is likely to result in an overall negative effect on air quality and climate. Refer to mitigation measures.

Heritage	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on heritage are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on heritage. Refer to mitigation measures.
Landscape &Visual	For the purposes of this assessment, it is assumed that the upgrade works will all take place within the development footprint of the existing AGI. Thus, this proposed capital investment project involves limited development at an already established AGI site. As such, no significant negative effects on landscape and visual are expected. Should development be required outside the boundary of the existing AGI, there is potential for negative effects on landscape and visual. Refer to mitigation measures.
Material Assets	By ensuring security of energy supply in Ireland, an overall positive effect on the population, is identified.

	Aims/Commitments	SEA Environmental Objectives								Commentary
		Biodiversity	Population & Human Health	Land & Soils	Water	Air, Noise & Climate	Heritage	Landscape & Visual	Material Assets	
General										
4.1.1	GNI aim to uphold best environmental practice in the design and appraisal of transmission development projects.									All of these general environmental aims/commitments will likely result in neutral or positive environmental effects.
4.1.2	GNI aims to ensure that transmission development projects follow the standard approach to environmental assessment of transmission projects.									
4.1.3	GNI aim to ensure that the special interest of protected structures, including their curtilages and settings, are protected to the greatest extent possible when considering site or route options for transmission infrastructure development.									
4.1.4	GNI aim to continue to protect and enhance landscapes through the sustainable planning and design of transmission infrastructure development.									
4.1.5	It is the aim of GNI to seek to preserve and maintain air and noise quality in accordance with good practice and relevant legislation in the construction of its transmission projects.									
4.1.6	GNI aims not increase in flood risk as a result of transmission development, and to ensure any flood risk to the development is appropriately managed.									
4.1.7	It is the aim of GNI to deliver our services in a sustainable manner which contributes to the protection of the environment. whilst focusing on the areas where we can make the biggest difference.									
4.1.8	GNI is committed to ensuring the United Nations Sustainable Development Goals are at the core of our business decisions and key to our strategy.									
4.1.9	GNI is committed to uphold transparency in our sustainability and environmental performance, and to disclose widely on our sustainability performance									
4.1.10	GNI is committed to embedding sustainability and decarbonisation principles to the core of our business decisions and strategy.									
4.1.11	GNI will maintain certification to the Environmental Management System ISO 14001 and the Energy Management System ISO 50001. We will continue to actively participate in the National Energy Efficiency Action Plan, aimed at delivering 33% energy efficiency savings in the Public Sector by 2020. We are committed to improving our energy performance of 33% by 2020 from a 2006 baseline and to date, have already achieved over 44% energy efficiency improvements.									

4.1.12	GNI will carry out planning, design, construction and operation in a manner that is both environmentally acceptable and aligned to our sustainability framework as it is an essential part of this process and will continue to play a key role in driving sustainable change in our business.								
4.1.13	Ireland's gas network provides a major opportunity to achieve significant and enduring emissions savings, sooner rather than later, across every sector of the economy, in a least cost and least disruptive manner; while retaining energy sector security and flexibility. Gas Networks Ireland are committed to developing the gas network so that this opportunity can be realised.								
4.1.14	GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.								
Biodiversity									
4.2.1	GNI will continue our multifaceted Biodiversity Enhancement Programme which aims to increase awareness about biodiversity among our staff and stakeholders.								All of these biodiversity aims/commitments will likely result in an overall positive effect on biodiversity
4.2.2	GNI will continue to drive and enhance biodiversity as part of a long-term Biodiversity strategy to delivery our 2025 commitments as part of "Our seeds for Nature" commitments.								
4.2.3	GNI will implement our public pledge to manage all infrastructure, asset base and offices in Ireland and Scotland in line with biodiversity best practice;								
4.2.4	GNI will Strive to have a net positive impact on biodiversity in all our operations								
4.2.5	GNI will Promote red clover, which is good for bees and soil, by encouraging farmers to grow this as a feedstock crop to produce biogas.								
4.2.6	GNI will continue to protect biodiversity across our business and in our community and remain a key supporter of the All Ireland Pollinator Plan:								
4.2.7	GNI will Implement a number of measures at our sites including reduced grass cuttings and pesticide use; installation of bird boxes, biodiversity awareness signage and planting of wildflowers.								
4.2.8	GNI will continue to deliver internal biodiversity awareness talks								
4.2.9	GNI will continue to hold Nature walks to educate staff about biodiversity and presenting Biodiversity talks to other Business as part of our Business in the Community initiative, and increase engagement with the community by hosting biodiversity awareness sessions in local primary schools in the local community.								
Climate Change									
4.3.1	GNI is committed to delivering a safe, affordable and clean energy future for the people of Ireland through the decarbonisation of our network and the reduction of emissions across all sectors of Irish society.								All of these climate change aims/commitments will likely result in an overall positive effect on air and climate, as well as population and human health.

4.3.2	GNI is committed to becoming a leader in compliant, sustainable infrastructure development and service provision in Ireland.								
4.3.3	GNI is committed to halving our greenhouse gas emissions by 2030 as part of low carbon pledge; an initiative developed by the 34 Business Working Responsibly Mark companies to tackle climate change. This pledge aims to practically demonstrate Irish business commitment to reducing carbon emissions and to act as a catalyst for wider, complementary initiatives and actions.								
4.3.4	GNI plans to Define what Carbon Neutrality means for GNI by 2024.								
4.3.5	GNI will Continue to drive better sustainability practices through the entire supply chain by enhancing our procurement processes, and								
4.3.6	GNI will Assess initiatives identified through the Climate Action Working Group on the basis of the potential achievable emissions reduction and the associated mitigation/abatement cost.								
4.3.7	GNI will Reduce the carbon footprint of the GNI fleet prioritising CNG vehicles where technically feasible. Where CNG vehicles are not feasible, examine opportunities to use alternative zero/ low carbon fuels – e.g. biodiesel:								
4.3.8	GNI will Review journeys undertaken by GNI (fleet and grey-fleet) and examine ways in which journeys can be reduced, e.g. through the use of technology etc;								
4.3.9	GNI will Incentivise selection, procurement and use of zero/ low carbon/ fuel efficient vehicles by delivery partners (e.g. the next NSWC contract).								
4.3.10	GNI are committed to working with government and policy makers across all sectors, to ensure we maximise the contribution this asset owned by the people of Ireland can make to help reduce emissions at least cost.								
4.3.11	GNI is committed to a clean energy future for Ireland. A whole energy system approach will deliver Ireland's climate ambitions in the most practical and least cost manner. To achieve this, we will partner with key energy stakeholders, industry bodies, research institutes and communities to ensure a least cost and fair transformation to a clean energy society								
4.3.12	GNI has an ambition to deliver a net zero carbon gas network which will help to ensure that Ireland plays its part in the global effort to tackle climate change, supporting a clean energy society now and for generations to come.								
Waste									
4.4.1	GNI is committed to reducing our waste to landfill, our target is zero waste to landfill by 2025.								An overall positive effect on material assets, population and human health and air quality and climate is identified.

8.1 Summary of Potential Environmental Effects

8.1.1 Capacity Upgrades to Existing AGIs

The capital investment projects outlined in the Draft NIP include 12 No. capacity upgrade projects, to existing AGIs. Capacity upgrades of this nature generally involve limited development at already established AGI sites. All of the existing AGIs listed above have already been subject to environmental assessment at project level; by means of EIA, AA or indeed GNI's EnviroPlan and EnviroKit. As such, potential negative effects on the environment are assumed to have already been mitigated in these locations.

Should development be required outside the boundary of the existing AGI however, there is potential for negative effects on biodiversity, land and soil, water, and landscape, heritage and visual. Refer to mitigation measures.

Continued or increased supply/ use of natural gas will have an overall negative effect on air quality and climate. Further, any development of, or works to, gas infrastructure has health and safety implications.

The security of energy supply in Ireland is likely to have an overall positive effect on the population, as well as material assets.

8.1.2 New AGI Stations

The capital investment projects outlined in the Draft NIP include the development of 2 No. new AGIs; all in Dublin.

The development of new AGIs has the potential to generate adverse impacts on biodiversity, with key potential impacts relating to disturbance, disruption, fragmentation and loss of habitats.

A potential negative effect is identified with regards landscape and visual, due to the development of the proposed new facilities, in particular should the sites of the proposed new AGIs be a greenfield sites.

Further, any new development has the potential to give rise to negative effects on land, soil and groundwater, due to the excavations required to facilitate this development, and the risk of leaks from pipes and infrastructure. Measures should be put in place to ensure no risk of soil contamination during construction or operation.

The site selection process should therefore have regard to the proximity of the site to existing water features and protected views/prospects, the underlying groundwater bodies and their subsequent vulnerability, soil conditions, existing land-use etc.

Designated sites should be afforded protection in the undertaking of this new development, in compliance with legislation.

All areas of heritage significance/designated sites should be afforded strict protection, in compliance with legislation, and should be avoided during site selection of the new AGI stations.

The focus on brownfield lands or pre-developed sites during site-selection of the new CNG station will offset many potential effects on biodiversity, land and soil, water, heritage and landscape and visual.

A positive effect on the population and material assets is identified, through increased access to fuelling stations and the subsequent security of supply. However, a potential negative effect on human health is also identified, in that the development of new gas infrastructure can carry risk of fire or explosion, if unmitigated. Increased use of natural gas is also likely to result in an overall negative effect on air quality and climate.

8.1.3 New CNG Stations

The capital investment projects outlined in the Draft NIP include the development of 11 No. new CNG stations.

The development of new CNG stations has the potential to generate adverse impacts on biodiversity, with key potential impacts relating to disturbance, disruption, fragmentation and loss of habitats.

A potential negative effect is identified with regards landscape and visual, due to the development of the proposed new facilities, in particular should the sites of the proposed new CNG stations be a greenfield sites.

Further, any new development has the potential to give rise to negative effects on land, soil and groundwater, due to the excavations required to facilitate this development, and the risk of leaks from storage tanks and dispense pumps. Measures should be put in place to ensure no risk of soil contamination during construction or operation.

The site selection process should therefore have regard to the proximity of the site to existing water features and protected views/prospects, the underlying groundwater bodies and their subsequent vulnerability, soil conditions, existing land-use etc.

Designated sites should be afforded protection in the undertaking of this new development, in compliance with legislation. All areas of heritage significance/designated sites should be afforded strict protection, in compliance with legislation, and should be avoided during site selection of the new CNG stations.

The focus on brownfield lands or pre-developed sites during site-selection of the new CNG stations will offset many potential effects on biodiversity, land and soil, water, heritage and landscape and visual.

A positive effect on the population and material assets is identified, through increased access to fuelling stations and the subsequent security of supply. However, a potential negative effect on human health is also identified, in that the development of new gas infrastructure can carry risk of fire or explosion, if

unmitigated. Increased use of natural gas is also likely to result in an overall negative effect on air quality and climate. However, as outlined in GNIs Vision 2050 document, converting Ireland's Heavy Goods Vehicles (HGVs) from diesel to CNG can yield near-term emissions reductions in the transport sector. This ultimately will aid GNI in achieving the emission reduction targets relevant to the gas sector, as set both by Ireland and the EU.

Five of the proposed new CNG stations offer particular vulnerability to significant negative effects:

- **New CNG Station at NIP19LSCNG1-** The River Trogue, which is a nutrient sensitive river runs through Portlaoise town, as does the Ridge of Portlaoise NHA and a number of geological heritage sites.
- **New CNG Station at NIP19MHCNG1-** The entire area of Gormanstown is a Geological Heritage Site**.** Further, the area is generally limited in its extent of existing development, meaning greenfield development is likely.
- **New CNG Station at NIP19TCNG1-** The indicative site of the proposed new CNG station in Birdhill is in immediate vicinity of the Ratheen and Mountshannon tributaries which flow directly to the River Shannon SAC.
- **New CNG Station at NIP19MHCNG2-** The indicative site of the proposed new CNG station in Trim is located in immediate vicinity of the Whitehall tributary, which flows directly into the River Boyne and River Blackwater SAC and SPA.
- **New CNG Station at NIP19CNCNG1-** The indicative site of the proposed new CNG station at Maghera is located approximately 500m from Lough Ramon which is hydrologically linked to the River Boyne And River Blackwater SAC and SPA.

8.1.4 Renewable Gas Injection Facility

The capital investment projects outlined in the Draft NIP include the development of 1 No. new renewable gas injection facility. Planning permission has been sought, and the project has been subject to project level environmental assessment.

8.1.5 AGI Bypass

The capital investment projects outlined in the Draft NIP include the development of 1 No. AGI bypass project. Planning permission has been sought, and the project has been subject to project level environmental assessment.

8.2 Interactive and Cumulative Effects

8.2.1 Interactive Effects

The SEA Directive requires the ER to include information on the likely significant effects on the environment, including on issues such as biodiversity, fauna, flora, population, human health, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors.

The presence of significant interactive effects between environmental factors is identified on **Table 8.4** below.

Table 8.4: Interactive Effects

	Biodiversity	Population and Human	Land and Soil	Water	Air, Noise, Climate	Heritage	Landscape &Visual	Material Assets
Biodiversity								
Population and Human Health	No							
Land and Soil	Yes	Yes						
Water	Yes	Yes	Yes					
Air, Noise, Climate	Yes	Yes	No	No				
Heritage	No	No	Yes	No	No			
Landscape &Visual	Yes	Yes	No	No	No	Yes		
Material Assets	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

8.2.2 Cumulative Effects

Cumulative effects are those that arise when the effects of the implementation of a plan or project occur in combination with those of other plans or projects.

Within the draft NIP, multiple proposed new infrastructure developments or upgrades to existing infrastructure are proposed. Each of these projects should be subject to cumulative assessment at project level, as necessary, to determine whether the subject project is likely to give rise to cumulative effects with other proposed or existing gas projects. However, it is thought that the mitigation measures outlined in Section 9 of this report will assist in the reduction or avoidance of cumulative environmental effects.

In Section 8.1 Summary of Potential Environmental Effects, there is also merit in referring to the importance in/of considering the potential for cumulative effects arising from the potential development of multiple proposed new infrastructure and upgrades to gas related infrastructure in implementing the Plan. Where uncertain effects are identified, the proposed mitigation measures are deemed sufficient to cater for this uncertainty in a consistent manner.

Section 3 of this Environmental Report sets out the other plans and programmes of relevance to the draft NIP. **Table 8.5** assesses the effects of the implementation of the draft NIP in combination with each of the key plans and programmes.

Table 8.5: Assessment of Cumulative Effects

Plan(s)	Potential for Cumulative Effects
DCCAE 2019, Ireland's Climate Action Plan 2019 DCCAE 2019, Electricity & Gas Networks Sector Climate Change Adaptation Plan DCCAE 2019, National Energy and Climate Plan 2021 – 2030 National Energy Efficiency Action Plan for Ireland #4 2017–2020 National Policy Framework on Alternative Fuels Infrastructure for Transport in Ireland - 2017 to 2030 White Paper on Energy: Ireland's Transition to a Low Carbon Energy Future 2015 – 2030 DCCAE 2010, National Renewable Energy Action Plan Draft National Marine Planning Framework	The NIP sets out a range of aims and commitments which will allow GNI to begin to realise their vision for Ireland's gas network to be net zero carbon by 2050. The NIP sees the introduction of new technologies to facilitate renewable gas injection into the gas network, and to supply Compressed Natural Gas (CNG) from the gas network as a fuel source for commercial vehicles. These new technologies align with the provisions of the plans outlined. The NIP also outlines a range of climate change, environmental and sustainability aims/commitments which align with those in these plans. A positive cumulative effect is identified, in that the NIP, in combination with these plans will together enable Ireland, and the EU, to strive towards meeting their GHG emission reduction targets. However, where the NIP identifies capital investment projects of a non-renewable nature, a potential negative cumulative effect is identified.
CRU 2019, Strategic Plan 2019 - 2020	The NIP aligns with the values and strategic priorities outlined in the CRUs Strategic Plan. No negative cumulative effect is anticipated as a result of the implementation of the two plans.
GNI 2018, Network Development Plan 2018	As outlined in Section 2 of this ER, the purpose of the NIP, which is the subject of this SEA, is to set out in more detail, the manner in which the short-term capital investment proposals identified in the NDP will be developed in the Plan area over the three-year plan period 2020-2023. The two plans are generally aligned and, as such, no negative cumulative effects are anticipated as a result of the implementation of both plans.

Plan(s)	Potential for Cumulative Effects
DHPLG 2018, National Planning Framework	The focus of the NPF is on sustainable land use planning for the next 20 years. The NIP aligns with National Policy Objective 47: *in co-operation with relevant Departments in Northern Ireland, strengthen all-island energy infrastructure and interconnection capacity, including distribution and transmission networks to enhance security of electricity supply.* A positive cumulative effect this therefore identified. However, there is also potential for negative impacts in the wider environment as a result of implementation of the NPF policies, particularly where gas infrastructure cannot keep pace with the growth projected in the cities and towns of Ireland. The potential negative effects include the deterioration of air quality and increases in emissions if sufficient public transport options are not in place, etc.
County and City Development Plans Regional Spatial and Economic Strategies Local Area Plans National River Basin Management Plan	The development of new gas infrastructure will potentially – both indirectly and cumulatively – conflict with the protection of various environmental components including ecology, the landscape, cultural heritage, water resources and land resources which is provided for in City and County Development Plan, as well as Local Area Plans. These potential conflicts will be mitigated by measures which have been integrated into the NIP through the SEA and they will be addressed by lower tier environmental assessment, as appropriate

8.3 Transboundary Effects

By ensuring security of supply of natural gas in Ireland, the draft NIP will reduce both the need for new transboundary energy generation projects in the UK and Europe, and the associated potential environmental effects.

The continued use and supply of natural gas gives rise to continued greenhouse gas emissions and will negatively effects Ireland and the EUs greenhouse gas emission reduction targets. However, with the introduction of projects such as the proposed renewable gas injection facility, the NIP demonstrates GNI's commitment to reducing emissions and meeting Ireland and the EU's targets.

9 Mitigation Measures and Monitoring

9.1 Mitigation

Mitigation measures are measures envisaged and designed to prevent, reduce and as fully as possible offset any significant adverse impacts on the environment of implementing the Draft NIP. All mitigation measures have been developed and agreed with GNI as part of the SEA iterative process.

The primary mitigation measure is to ensure the sustainable and appropriate development of the plan area without compromising the integrity of the natural and built environment.

It is recommended that all legislation, policies and guidelines outlined in this Environmental Report and are adhered to.

In implementing the NIP, projects arising out of the NIP will comply with the relevant legislation, guidelines and align with the relevant national environmental policies and, in so far as possible, align with the commitments and obligations of higher-level plans and programmes.

In general terms, all proposals for development will be required to have due regard to environmental considerations outlined in this Environmental Report and associated AA Screening.

In this section the mitigation measures are discussed under each environmental parameter heading. Refer to **Table 9.1** for proposed mitigation measures, and recommendations of the SEA.

Table 9.1: Mitigation measures for the Draft NIP

Aspect	Mitigation measures	Relevant Aim/Commitments of the Draft NIP	Recommendations of SEA ER	Incorporated into final NIP?
Biodiversity	To afford the highest level of protection to all designated European sites and species in accordance with the relevant legislation	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To require all planning applications for development that may have (or cannot rule out) likely significant effects on European Sites in view of the site's Conservation Objectives, either in isolation or in combination with other plans or projects, to submit a Natura Impact Statement in accordance with the requirements of the EU Habitats Directive and the Planning and Development Act, 2000 (as amended)	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To recognise and afford appropriate protection to any existing new or modified SPAs or SACs that are identified during the lifetime of the NIP	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To implement Article 6(3) and where necessary 6(4) of the Habitats Directive and to ensure that Appropriate Assessment is carried out in relation to works, plans and projects likely to impact on European sites (SACs and SPAs), whether directly or indirectly or in combination with any other plan(s) or project(s)	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To have regard to Appropriate Assessment of Plans and Projects in Ireland – Guidelines for Planning Authorities 2009 or any updated version.	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To actively promote the conservation and protection of areas designated as an NHA (including proposed sites) and to only consider proposals for development within or affecting an NHA where it can be clearly demonstrated that the proposed development will not have a significant adverse effect on the NHA or pNHA;	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14

Aspect	Mitigation measures	Relevant Aim/Commitments of the Draft NIP	Recommendations of SEA ER	Incorporated into final NIP?
	To identify and afford appropriate protection to any new, proposed or modified NHAs identified during the lifetime of this plan.	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To ensure the protection and conservation of areas, sites, species and ecological networks/corridors of biodiversity value outside of designated sites throughout the country and to require an ecological assessment to accompany development proposals likely to impact on such areas or species;	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To implement the EIA Directive, ensuring that all elements/stages or components of the project are included in one overall assessment and all reasonable alternatives are taken into consideration in choosing the option with the least environmental impact.	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To have regard to "Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessments (2013)' when considering proposals for which an EIA is required;	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To protect and promote the sustainable management of the natural heritage, flora and fauna of the county through the promotion of biodiversity, the conservation of natural habitats and the enhancement of new and existing habitats	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To promote the conservation of biodiversity through the protection of sites of biodiversity importance and wildlife corridors, both within and between the designated sites and the wider Plan area;	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To ensure there is no net loss of potential Lesser Horseshoe Bat feeding habitats, treelines and hedgerows within 3km of known roosts.	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14

Aspect	Mitigation measures	Relevant Aim/Commitments of the Draft NIP	Recommendations of SEA ER	Incorporated into final NIP?
	To ensure that development proposals support and enhance the connectivity and integrity of habitats in the plan area by incorporating natural features into the design of development proposals.	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To raise awareness of the threat of alien invasive species and take all necessary steps to prevent the spread of non-native invasive species and noxious weeds in the plan area, including requiring landowners, developers and boat operators to adhere to best practice guidance in relation to their control;	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To require all development proposals to address the presence or absence of invasive alien species on the proposed development site and to require an Invasive Species Management Plan where such species are present;	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To implement the requirements of EU Regulations 1143/2014 on the Prevention and Management of the Introduction and Spread of Invasive Alien Species.	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	The development of new pipelines should be subject to route option assessment and environmental assessment, where required.	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	The development of new infrastructure should be subject to site options assessment and environmental assessment, where required.	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
Population and Human Health	To seek to ensure that site security and health and safety is given high priority through the imposition and enforcement of conditions with regard to site security and warning signs.	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	

Aspect	Mitigation measures	Relevant Aim/Commitments of the Draft NIP	Recommendations of SEA ER	Incorporated into final NIP?
	To ensure that all GNI staff and their sub-contractors have regard to *the Safety Advice for Working In The Vicinity Of Natural Gas Pipelines, the HSA: Code of Practice for Avoiding Danger from Underground Services*, and all other relevant guidance document in advance of any works	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To consult with and have regard to the technical advice of the Health and Safety Authority and assessing planning applications where the Major Accidents Directive and any associated regulations are relevant	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
Soils and Geology	To ensure that, prior to the redevelopment of a site previously known to include an operation with the potential for high environmental impact such as petrol stations, gasworks or coal yards, due diligence is carried out on the site	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To ensure that contaminated soil is disposed of in accordance with the Waste Management Regulations (S.I.821 of 2007)	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To protect and enhance the valuable peatland resource in the country whilst protecting the heritage and environmental value of these peatland areas.	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	a) To recognise the importance of Geological Heritage Sites and to protect the character and integrity of these sites	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To work with the GSI and relevant stakeholders to undertake a review of Geological Heritage Sites in the county during the lifetime of this Plan.	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
Water Resources	To work with all relevant stakeholders to protect and manage inland waters, river corridors and their floodplains, turloughs, lakes, fens and other water bodies from degradation and damage, and to recognise and promote them as natural assets and key elements in the green infrastructure network in the county;	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14

Aspect	Mitigation measures	Relevant Aim/Commitments of the Draft NIP	Recommendations of SEA ER	Incorporated into final NIP?
	To facilitate the implementation of the relevant River Basin Management Plan and the for ground, surface, estuarine, coastal and transitional waters in the plan area as part of the implementation of the EU Water Framework Directive;	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To protect groundwater resources in accordance with the statutory requirements and specific measures as set out in the relevant River Basin Management Plan	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To consider proposals for development where it can be clearly demonstrated that the development will meet the requirements of the relevant River Basin Management Plan.	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To ensure that developments that would have an unacceptable impact on water resources, including surface water and groundwater quality and quantity, designated sources protection areas, estuarine, coastal transitional waters, river corridors and associated wetlands will not be permitted;	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	In areas of potable groundwater resources or over vulnerable aquifer areas, development proposals will only be considered if the applicant can clearly demonstrate that the proposed development will not pose a risk to the quality of the underlying groundwater;	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To protect groundwater resources, in accordance with statutory requirements and specific measures as set out in the River Basin Management Plan;	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	Prevent the alteration of natural drainage systems and in the case of development works require the provision of acceptable mitigation measures in order to minimise the risk of flooding and negative impacts on water quality.	4.1.6. GNI aims not increase in flood risk as a result of transmission development, and to ensure any flood risk to the development is appropriately managed 4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary	Include mitigation measure as additional aim/commitment	As aim 4.1.14

Aspect	Mitigation measures	Relevant Aim/Commitments of the Draft NIP	Recommendations of SEA ER	Incorporated into final NIP?
	Comply with the objectives and policies of the Eastern Catchment Flood Risk Assessment Management Study.	4.1.6. GNI aims not increase in flood risk as a result of transmission development, and to ensure any flood risk to the development is appropriately managed 4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include mitigation measure as additional aim/commitment	As aim 4.1.14
	Promote SUDS principles for all drainage including the integration of storm water attenuation facilities for new developments and existing catchment areas.	4.1.6. GNI aims not increase in flood risk as a result of transmission development, and to ensure any flood risk to the development is appropriately managed 4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include mitigation measure as additional aim/commitment	As aim 4.1.14
	Ensure that any new development does not present an inappropriate risk of flooding or does not cause or exacerbate such a risk at other locations.	4.1.6. GNI aims not increase in flood risk as a result of transmission development, and to ensure any flood risk to the development is appropriately managed 4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include mitigation measure as additional aim/commitment	As aim 4.1.14
	Comply with the DoECLG/OPW guidance on development and flood risk through the control of development in any flood plain so that new and existing developments are not exposed to increased risk of flooding and that any loss of flood storage is compensated for elsewhere in the river catchment.	4.1.6. GNI aims not increase in flood risk as a result of transmission development, and to ensure any flood risk to the development is appropriately managed 4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include mitigation measure as additional aim/commitment	As aim 4.1.14
Air, Noise and Climate	Promoting energy conservation, energy efficiency and use of renewable energy sources in the production of all goods and services in accordance with national, regional and county regulations and policy requirements;	4.1.13 Ireland's gas network provides a major opportunity to achieve significant and enduring emissions savings, sooner rather than later, across every sector of the economy, in a least cost and least	Include as aim/commitment	As aim 4.1.14

Aspect	Mitigation measures	Relevant Aim/Commitments of the Draft NIP	Recommendations of SEA ER	Incorporated into final NIP?
		disruptive manner; while retaining energy sector security and flexibility. Gas Networks Ireland are committed to developing the gas network so that this opportunity can be realised. 4.3.1 GNI is committed to delivering a safe, affordable and clean energy future for the people of Ireland through the decarbonisation of our network and the reduction of emissions across all sectors of Irish society. 4.3.3 GNI is committed to halving our greenhouse gas emissions by 2030 as part of low carbon pledge; an initiative developed by the 34 Business Working Responsibly Mark companies to tackle climate change. This pledge aims to practically demonstrate Irish business commitment to reducing carbon emissions and to act as a catalyst for wider, complementary initiatives and actions. 4.3.7 GNI will reduce the carbon footprint of the GNI fleet prioritising CNG vehicles where technically feasible. Where CNG vehicles are not feasible, examine opportunities to use alternative zero/ low carbon fuels – e.g. biodiesel: 4.3.8 GNI will Review journeys undertaken by GNI (fleet and grey-fleet) and examine ways in which journeys can be reduced, e.g. through the use of technology etc; 4.3.9 GNI will incentivise selection, procurement and use of zero/ low carbon/ fuel efficient vehicles by delivery partners (e.g. the next NSWC contract).		

Aspect	Mitigation measures	Relevant Aim/Commitments of the Draft NIP	Recommendations of SEA ER	Incorporated into final NIP?
		4.3.10 GNI are committed to working with government and policy makers across all sectors, to ensure we maximise the contribution this asset owned by the people of Ireland can make to help reduce emissions at least cost. 4.3.11 Gas Networks Ireland is committed to a clean energy future for Ireland. A whole energy system approach will deliver Ireland's climate ambitions in the most practical and least cost manner. To achieve this, we will partner with key energy stakeholders, industry bodies, research institutes and communities to ensure a least cost and fair transformation to a clean energy society 4.3.12 Gas Networks Ireland has an ambition to deliver a net zero carbon gas network which will help to ensure that Ireland plays its part in the global effort to tackle climate change, supporting a clean energy society now and for generations to come. 4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.		
	Consideration of likely noise impacts/effects associated with new developments	4.1.5. It is the aim of GNI to seek to preserve and maintain air and noise quality in accordance with good practice and relevant legislation in the construction of its transmission projects.	-	As aim 4.1.14
	To support the implementation of the Climate Change policy documents and legislation outlined in the ER.	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To facilitate measures which seek to reduce emissions of greenhouse gases;	4.1.13. Ireland's gas network provides a major opportunity to achieve significant and enduring emissions savings, sooner rather than later, across every sector of the	-	As aim 4.1.14

Aspect	Mitigation measures	Relevant Aim/Commitments of the Draft NIP	Recommendations of SEA ER	Incorporated into final NIP?
		economy, in a least cost and least disruptive manner; while retaining energy sector security and flexibility. GNI are committed to developing the gas network so that this opportunity can be realised. 4.3.1. GNI is committed to delivering a safe, affordable and clean energy future for the people of Ireland through the decarbonisation of our network and the reduction of emissions across all sectors of Irish society. 4.3.3. GNI is committed to halving our greenhouse gas emissions by 2030 as part of low carbon pledge; an initiative developed by the 34 Business Working Responsibly Mark companies to tackle climate change. This pledge aims to practically demonstrate Irish business commitment to reducing carbon emissions and to act as a catalyst for wider, complementary initiatives and actions. 4.3.7. GNI will reduce the carbon footprint of the GNI fleet prioritising CNG vehicles where technically feasible. Where CNG vehicles are not feasible, examine opportunities to use alternative zero/ low carbon fuels – e.g. biodiesel: 4.3.8. GNI will Review journeys undertaken by GNI (fleet and grey-fleet) and examine ways in which journeys can be reduced, e.g. through the use of technology etc; 4.3.9. GNI will incentivise selection, procurement and use of zero/ low carbon/ fuel efficient vehicles by delivery partners (e.g. the next NSWC contract). 4.3.10. GNI are committed to working with government and policy makers across all sectors, to ensure we maximise the contribution this asset owned by the people of Ireland can make to help reduce emissions at least cost. 4.3.11. GNI is committed to a clean energy future for Ireland. A whole energy system approach will deliver Ireland's climate ambitions in the most practical and least cost manner.		

Aspect	Mitigation measures	Relevant Aim/Commitments of the Draft NIP	Recommendations of SEA ER	Incorporated into final NIP?
		To achieve this, we will partner with key energy stakeholders, industry bodies, research institutes and communities to ensure a least cost and fair transformation to a clean energy society 4.3.12. GNI has an ambition to deliver a net zero carbon gas network which will help to ensure that Ireland plays its part in the global effort to tackle climate change, supporting a clean energy society now and for generations to come. 4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.		
	Ensure that the objectives and polices of EU Air Quality legislation are incorporated into plans and programmes	4.1.5. It is the aim of GNI to seek to preserve and maintain air and noise quality in accordance with good practice and relevant legislation in the construction of its transmission projects. 4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	-	As aim 4.1.14
	To ensure that developments do not give rise to negative effects on air quality, during both construction and operation	4.1.5. It is the aim of GNI to seek to preserve and maintain air and noise quality in accordance with good practice and relevant legislation in the construction of its transmission projects. 4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	-	As aim 4.1.14
Heritage	To ensure the protection of the architectural heritage through the identification of Protected Structures, the designation of Architectural Conservation Areas, the safeguarding historic gardens, and the recognition of structures and elements that contribute positively to vernacular and industrial heritage	4.1.3. GNI aim to ensure that the special interest of protected structures, including their curtilages and settings, are protected to the greatest extent possible when considering site or route options for transmission infrastructure development.	Replace Aim/commitment 4.1.3 with this mitigation measure, and those identified in this section	As aim 4.1.14

Aspect	Mitigation measures	Relevant Aim/Commitments of the Draft NIP	Recommendations of SEA ER	Incorporated into final NIP?
		4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.		
	To ensure that the architectural heritage is not damaged either through direct destruction or by unsympathetic developments	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To protect, as set out in the Record of Protected Structures, all structures, which are of special architectural, historical, archaeological, artistic, cultural, scientific, social, or technical interest	4.1.3. GNI aim to ensure that the special interest of protected structures, including their curtilages and settings, are protected to the greatest extent possible when considering site or route options for transmission infrastructure development. 4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Replace Aim/commitment 4.1.3 with this mitigation measure, and those identified in this section	As aim 4.1.14
	To review the Record of Protected Structures periodically and add structures of special interest as appropriate, including significant elements of industrial, maritime or vernacular heritage and any twentieth century structures of merit.	4.1.3. GNI aim to ensure that the special interest of protected structures, including their curtilages and settings, are protected to the greatest extent possible when considering site or route options for transmission infrastructure development. 4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Replace Aim/commitment 4.1.3 with this mitigation measure, and those identified in this section	As aim 4.1.14
	To ensure that new developments within or adjacent to an ACA respect the established character context of the area and contribute positively to the ACA in terms of design, scale, setting and material finishes;	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To protect existing buildings, structures, groups of structures, sites, landscapes and features such as street furniture and paving, which are considered to be intrinsic elements of the special character of the ACA, from demolition or removal and non-sympathetic	4.1.3. GNI aim to ensure that the special interest of protected structures, including their curtilages and settings, are protected to the greatest extent possible when considering site or route options for transmission infrastructure development.	Replace Aim/commitment 4.1.3 with this mitigation measure, and those identified in this section	As aim 4.1.14

Aspect	Mitigation measures	Relevant Aim/Commitments of the Draft NIP	Recommendations of SEA ER	Incorporated into final NIP?
	alterations;			
	To ensure that all new signage, lighting, advertising and utilities to buildings within an ACA are designed, constructed and located in a manner that does not detract from is complementary to the character of the ACA;	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To safeguard sites, features and objects of archaeological interest generally;	4.1.3. GNI aim to ensure that the special interest of protected structures, including their curtilages and settings, are protected to the greatest extent possible when considering site or route options for transmission infrastructure development. 4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Replace Aim/commitment 4.1.3 with this mitigation measure, and those identified in this section	As aim 4.1.14
	To secure the preservation (i.e. preservation in situ or in exceptional cases preservation by record) of all archaeological monuments included in the Record of Monuments and Places as established under Section 12 of the National Monuments (Amendment) Act, 1994, and of sites, features and objects of archaeological and historical interest generally;	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To have regard to the government publication Framework and Principles for the Protection of the Archaeological Heritage 1999 in relation to protecting sites, features and objects of archaeological interest	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To protect and preserve archaeological sites discovered since the publication of the Record of Monuments and Places.	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14

Aspect	Mitigation measures	Relevant Aim/Commitments of the Draft NIP	Recommendations of SEA ER	Incorporated into final NIP?
	To protect the Zones of Archaeological Potential located within both urban and rural areas as identified in the Record of Monuments and Places.	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
	To have regard to archaeological concerns when considering proposed service schemes located in close proximity to Recorded Monuments and Places and the Zones of Archaeological Potential.	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Include as aim/commitment	As aim 4.1.14
Landscape and Visual	Ensure that all new plans and programmes incorporate the findings of the County Landscape Character Assessments.	4.1.4. GNI aim to continue to protect and enhance landscapes through the sustainable planning and design of transmission infrastructure development. 4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Replace Aim/commitment 4.1.4 with this mitigation measure, and those identified in this section	As aim 4.1.14
	To require that all proposed developments in Heritage Landscapes demonstrate that every effort has been made to reduce visual impact. This must be demonstrated for all aspects of the proposal- from site selection through to details of siting and design. All other relevant provisions of the development plan must be complied with.	4.1.4. GNI aim to continue to protect and enhance landscapes through the sustainable planning and design of transmission infrastructure development. 4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Replace Aim/commitment 4.1.3 with this mitigation measure, and those identified in this section	As aim 4.1.14
	To protect sensitive areas from inappropriate development while providing for development and change that will benefit the rural community	4.1.4 GNI aim to continue to protect and enhance landscapes through the sustainable planning and design of transmission infrastructure development. 4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Replace Aim/commitment 4.1.3 with this mitigation measure, and those identified in this section	As aim 4.1.14
	To ensure that proposed developments take into consideration their effects on views from the public road towards scenic features or areas and are designed and located to minimise their impact	4.1.4. GNI aim to continue to protect and enhance landscapes through the sustainable planning and design of transmission infrastructure development.	Replace Aim/commitment 4.1.3 with this mitigation measure, and those identified in this section	As aim 4.1.14

Aspect	Mitigation measures	Relevant Aim/Commitments of the Draft NIP	Recommendations of SEA ER	Incorporated into final NIP?
		4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.		
	To ensure that appropriate standards of location, siting, design, finishing and landscaping are achieved.	4.1.4. GNI aim to continue to protect and enhance landscapes through the sustainable planning and design of transmission infrastructure development. 4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Replace Aim/commitment 4.1.3 with this mitigation measure, and those identified in this section	As aim 4.1.14
Material Assets	Promote the implementation of the Waste Management Plan together with any future National or Regional Waste Management Plans. Additionally, ensure national policies and regulations regarding waste are adhered to.	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Replace Aim/commitment 4.4.1 with this mitigation measure, and those identified in this section	As aim 4.1.14
	Encourage waste prevention, minimisation, reuse, recycling and recovery as methods of managing waste.	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Replace Aim/commitment 4.4.1 with this mitigation measure, and those identified in this section	As aim 4.1.14
	Promote the development of sufficient energy resources to meet the needs of the plan area and promote the use of renewable energies to meet those needs.	4.1.14 GNI will endeavour to adhere to the mitigation measures outlined in SEA Environmental Report and Natura Impact Report that relates to the NIP where necessary.	Replace Aim/commitment 4.4.1 with this mitigation measure, and those identified in this section	As aim 4.1.14

9.2 Monitoring

Article 10 of the SEA Directive requires that monitoring should be carried out in order to identify at an early stage any unforeseen adverse impacts associated with the implementation of the plan or programme.

A monitoring programme is developed based on the indicators selected to track progress towards achieving strategic environmental objectives and reaching targets, enabling positive and negative impacts on the environment to be measured.

As outlined in the EPA guidance document '*Guidance on SEA Statements and Monitoring'* (EPA, 2020), SEA monitoring should reflect the nature and level of detail of the plan/programme. Many national-level plans/programmes lack geographic specificity, contain only high-level strategic objectives and do not lend themselves to cause–effect models in terms of direct measuring of environmental effects. As such, SEA monitoring for these plans should focus on national indicators to examine environmental trends.

The monitoring programme outlined in **Table 9.2** therefore is based on national indicators and informed by the content of the NIP.

The SEA carried out has ensured that any potential significant environmental impacts have been identified and given due consideration.

GNI is responsible for collating existing relevant monitored data, the preparation of preliminary and final monitoring evaluation reports, the publication of these reports and, if necessary, the carrying out of corrective action.

Table 9.2: Monitoring programme for the Draft NIP

Objectives	Targets	Indicators	Monitoring Source	Monitoring Frequency and Responsibility
SEO 1 Biodiversity				
SEO 1.1 Protect, conserve, enhance where possible and avoid loss of diversity and integrity of the broad range of habitats, species and wildlife corridors. **SEO 1.2** To support achievement of the conservation objectives of European Sites (SACs and SPAs) and other sites of nature conservation. **SEO 1.3** Conserve and protect other sites of nature conservation including NHAs, pNHAs,National Parks, Nature Reserves, Wildfowl Sanctuaries as well as protected species outside these areas as covered by the Wildlife Act. **SEO 1.4** To minimise and, where possible, eliminate threats to biodiversity including invasive species.	**SET 1.1** Siting of development of infrastructure installation on non-sensitive sites. **SET 1.2** Maintenance of favourable conservation status for all habitats and species protected under the Habitat Directive. **SET 1.3** No loss of protected habitats and species during the lifetime of the Plan. **SET 1.4** No significant ecological networks or parts thereof which provide functional connectivity for SAC/SPAs to be lost without remediation resulting from development provided for by the NIP**.**	**SEI 1.1** Number and extent of Designated Sites; **SEI 1.2** Achievement of favourable conservation status of designated sites; **SEI 1.3** Population and range of Designated Species; and **SEI 1.4** Achievement of the Objectives of Biodiversity Plans and County Development Plans.	1. Monitoring of the effects of capital investment project development required under separate processes (EIA, AA) 2. Department of Arts, Heritage and the Gaeltacht report of the implementation of the measures contained in the Habitats Directive - as required by Article 17 of the Directive 3. The Status of EU Protected Habitats and Species in Ireland Report (Department of Culture, Heritage and the Gaeltacht) **4.** Monitoring related to relevant Local Area Plans and County/City Development Plans 5. EPA State of the Environment Report	1. In accordance with the monitoring provisions of EIA/ AA 2. Department of Arts, Heritage and the Gaeltacht- every 6 years 3. Department of Culture, Heritage and the Gaeltacht. Every 6 years. 4. In accordance with the monitoring provisions of the lower level plans 5. EPA. Every 4 years.
SEO 2 Population and Human Health				

Objectives	Targets	Indicators	Monitoring Source	Monitoring Frequency and Responsibility
SEO 2.1 Protect, enhance and improve people's quality of life through energy provision. **SEO 2.2** Protect human health from hazards or nuisances arising from incompatible development. **SEO 2.3** Provide all of the energy services required to sustainably meet future housing demands. **SEO 2.4** To minimise the proximity of development to concentrations of population and to mitigate potential effect of development in order to reduce actual and perceived environmental effects.	**SET 2.1** Minimise population exposure to high levels of noise, vibration and air pollution. **SET 2.2** No significant deterioration in human health as a result of environmental factors. **SET 2.3** No spatial concentrations of health problems arising from environmental factors. **SET 2.4** Maintenance of gas supply to meet the energy needs of the population, while commencing a shift towards renewable energy use.	**SEI 2.1** Census population data; **SEI 2.2** % increase in housing (number and type); and **SEI 2.3** Changes in trends in perceived health status.	1. Monitoring of the effects of capital investment project development required under separate processes (EIA, AA) **2.** CSO Population and Gas Consumption Data **3.** Monitoring related to relevant Local Area Plans and County/City Development Plans or RSES's	1. In accordance with the monitoring provisions of EIA/ AA 2. CSO, results published every new Census year (6 years) 3. In accordance with the monitoring provisions of the lower level plans
SEO 3 Land & Soil				
SEO 3.1 Conserve, protect and avoid loss of diversity and integrity of designated habitats, geological features, species or their sustaining resources in designated ecological sites.	**SET 3.1** Prevent pollution of soil through adoption of appropriate environmental protection procedures during construction, installation and maintenance works on site.	**SEI 3.1** Incidences of soil contamination; **SEI 3.2** Rates of re-use/recycling of construction waste; **SEI 3.3** Rates of brownfield site and contaminated land reuse and development; and	1. Monitoring of the effects of capital investment project development required under separate processes (EIA, AA) **2.** CORINE mapping resurvey **3.** EPA State of the Environment Report.	1. In accordance with the monitoring provisions of EIA/ AA 2. European Community (EC). Varies. 3. EPA, every 4 years. 4. EPA, varies

Objectives	Targets	Indicators	Monitoring Source	Monitoring Frequency and Responsibility
	SET 3.2 No incidences of soil contamination. **SET 3.3** Ensure appropriate management of existing contaminated soil in accordance with the requirements of current waste legislation.	**SEI 3.4** Rates of greenfield development.	4. EPA National Waste Statistics **5.** Monitoring related to relevant Local Area Plans and County/City Development Plans or RSES's	5. In accordance with the monitoring provisions of the lower level plans
SEO 4 Water				
SEO 4.1 Maintain or improve the quality of surface water and groundwater (including estuarine) to status objectives as set out in the WaterFramework Directive (WFD). **SEO 4.2** Support achievement of the requirements of the Water Framework Directive and implementation of the National River Basin Management Plan'	**SET 4.1** Support the achievement of "good" ecological and chemical status/potential of waterbodies by 2015 in accordance with the Water Framework Directive. . **SET 4.5** Not to cause deterioration in the status of any surface or ground water or affect the ability of any surface or ground water to maintain or achieve 'good' status.	**SEI 4.1** Compliance of surface and ground waters with national and international standards; **SEI 4.2** Achievement of the Objectives of the River Basin Management Plan;	**1.** Monitoring of the effects of capital investment project development required under separate processes (EIA, AA) 2. EPA Water Quality Status for surface and ground water 3. EPA Risk Status for surface and ground water **4.** EPA water quality monitoring	1. In accordance with the monitoring provisions of EIA/ AA 2. EPA, varies 3. EPA, varies 4. EPA, continuous
SEO 5 Air & Noise				
SEO 5.1 To support the protection of ambient environment through the implementation of European,	**SET 5.1** Maintain ambient air quality.	**SEI 5.1** Air quality indicators-National and region-specific emission data; and	1. Monitoring of the effects of capital investment project development required under	1. In accordance with the monitoring provisions of EIA/ AA 2. EPA, continuous

Objectives	Targets	Indicators	Monitoring Source	Monitoring Frequency and Responsibility
national and regional policy and legislation relating to air quality, greenhouse gases, climate change, light pollution noise pollution and waste management.	**SET 5.2** Minimise air and noise emissions during construction and operation of new developments.	**SEI 5.2** Compliance with national standards.	separate processes (EIA, AA) 2. EPA Air Quality Monitoring 3. EPA State of the Environment Report 4. EPA Air Quality in Ireland Report **5.** Monitoring related to relevant Local Area Plans and County/City Development Plans or RSES's – such as noise action plans	3. EPA, every 4 years 4. EPA, annually 5. In accordance with the monitoring provisions of the lower level plans
SEO 6 Climate and Resilience				
SEO 6.1 Comply with relevant national climate change targets e.g. Ireland's Climate Action and Low Carbon Development Act 2015, the and EU 2030 and 2050 Emissions and Renewable Energy Targets and the Paris Agreement Targets. **SEO 6.2** To support implementation of the National Climate Action Plan 2019	**SET 6.1** Achieve a reduction in greenhouse gas emissions. **SET 6.2** Increase the amount of gas from renewable sources that is introduced to the network. **SET 6.3** Growth in the level of fuel switching from high-carbon fuels to gas, in both heating and transport. **SET 6.4** Promote minimisation of greenhouse gas emissions to the atmosphere.	**SEI 6.1** Levels of greenhouse gas emissions; **SEI 6.2** Number of energy/renewable energy production facilities; and **SEI 6.3** Rates of energy/renewable energy consumption. **SEI 6.4** Groundwater levels	1. Monitoring of the effects of capital investment project development required under separate processes (EIA, AA) 2. EPA State of the Environment Report **3.** Monitoring related to relevant Local Area Plans and County/City Development Plans or RSES's 4. EPA climate change projections 5. EPA Greenhouse Gas emissions data	1. In accordance with the monitoring provisions of EIA/ AA 2. EPA, every 4 years 3. In accordance with the monitoring provisions of the lower level plans 4. EPA, varies 5. EPA, varies 6. In accordance with the monitoring provisions of these plans 7. GSI, continuous

Objectives	Targets	Indicators	Monitoring Source	Monitoring Frequency and Responsibility
	SET 6.5 To achieve a 30% reduction on GHG emission levels (compared with 2005 levels) by 2050.		6. Monitoring related to Climate Adaptation or Mitigation plans 7. Monitoring of groundwater levels by GSI under the GWCimate project	
SEO 7 Archaeological, Architectural and Cultural Heritage				
SEO 7.1 Promote the protection and conservation of archaeological, architectural and cultural heritage, specifically those buildings identified on the Record of Protected Structures, and Recorded Monuments in Ireland.	**SET 7.1** Maintenance and enhancement of archaeological heritage- including entries to the Record of Monuments and Places and unknown archaeology- and the context of the above within the surrounding landscape where relevant. **SET 7.2** Maintenance and enhancement of entries to the Record of Protected Structures and/or their context within the surrounding landscape where relevant.	**SEI 7.1** Achieving the objectives of development plans regarding heritage protection; and **SEI 7.2** full or partial loss to entries to the RPSs/NIAHs	1. Monitoring of the effects of capital investment project development required under separate processes (EIA, AA) 2. Monitoring related to relevant Local Area Plans and County/City Development Plans or RSES's	1. In accordance with the monitoring provisions of EIA/ AA 2. In accordance with the monitoring provisions of the lower level plans
SEO 8 Landscape and Visual				
SEO 8.1 Ensure no significant disruption of historic/cultural landscapes and features. **SEO 8.2** Ensure no significant visual impact from developments/installations.	**SET 8.1** No avoidable significant impacts on the landscape resulting from development provided for by the NIP.	**SEI 8.1** Range and extent of Amenity Landscapes; **SEI 8.2** Rates of development within designated landscapes; **SEI 8.3** Rates of urban expansion; and	1. Monitoring of the effects of capital investment project development required under separate processes (EIA, AA) 2. Monitoring related to relevant Local Area Plans and County/City	3. In accordance with the monitoring provisions of EIA/ AA 4. In accordance with the monitoring provisions of the lower level plans 5. European Communities (EC), varies

Objectives	Targets	Indicators	Monitoring Source	Monitoring Frequency and Responsibility
SEO 8.3 Ensure no significant disruption of high landscape values. **SEO 8.4** To support achievement of the objectives of the National Landscape Strategy	**SET 8.2** Ensure development and infrastructure installations are sensitive to its surroundings. **SET 8.3** Ensure no significant disruption of historic/cultural landscapes and features.	**SEI 8.4** % change of land use from rural to urban.	Development Plans or RSES's 3. CORINE mapping resurvey	
SEO 9 Material Assets				
SEO 9.1 Make best use of existing infrastructure and phase the significant future growth of Ireland in line with the capacity and delivery of the sustainable development of new physical infrastructure. **SEO 9.2** Promote use of renewable energy sources and support energy conservation initiatives including the development of low carbon business practices and buildings. **SEO 9.3** Minimise effects upon the existing and planned infrastructure.	**SET 9.1** High levels of energy demand growth are accommodated. **SET 9.2** Secure and competitive supplied of gas and are maintained. **SET 9.3** Increase in renewable energy developments. **SET 9.4** To achieve a 30% reduction on GHG emission levels (compared with 2005 levels) by 2050. **SET 9.5** Improve efficiencies of energy infrastructure.	**SEI 9.1** Location/level of infrastructure; **SEI 9.2** Achievement of development plan objectives; and **SEI 9.3** No. of renewable energy developments granted planning permission.	1. Monitoring of the effects of capital investment project development required under separate processes (EIA, AA) 2. Monitoring related to relevant Local Area Plans and County/City Development Plans or RSES's **3.** CSO Population and Gas Consumption Data	1. In accordance with the monitoring provisions of EIA/ AA 2. In accordance with the monitoring provisions of the lower level plans 3. CSO, every 6 years

References

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SEAI, 2018, Energy in Ireland 2018,

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House of the Oireachtas, 2019, Renewable Energy Generation Targets,

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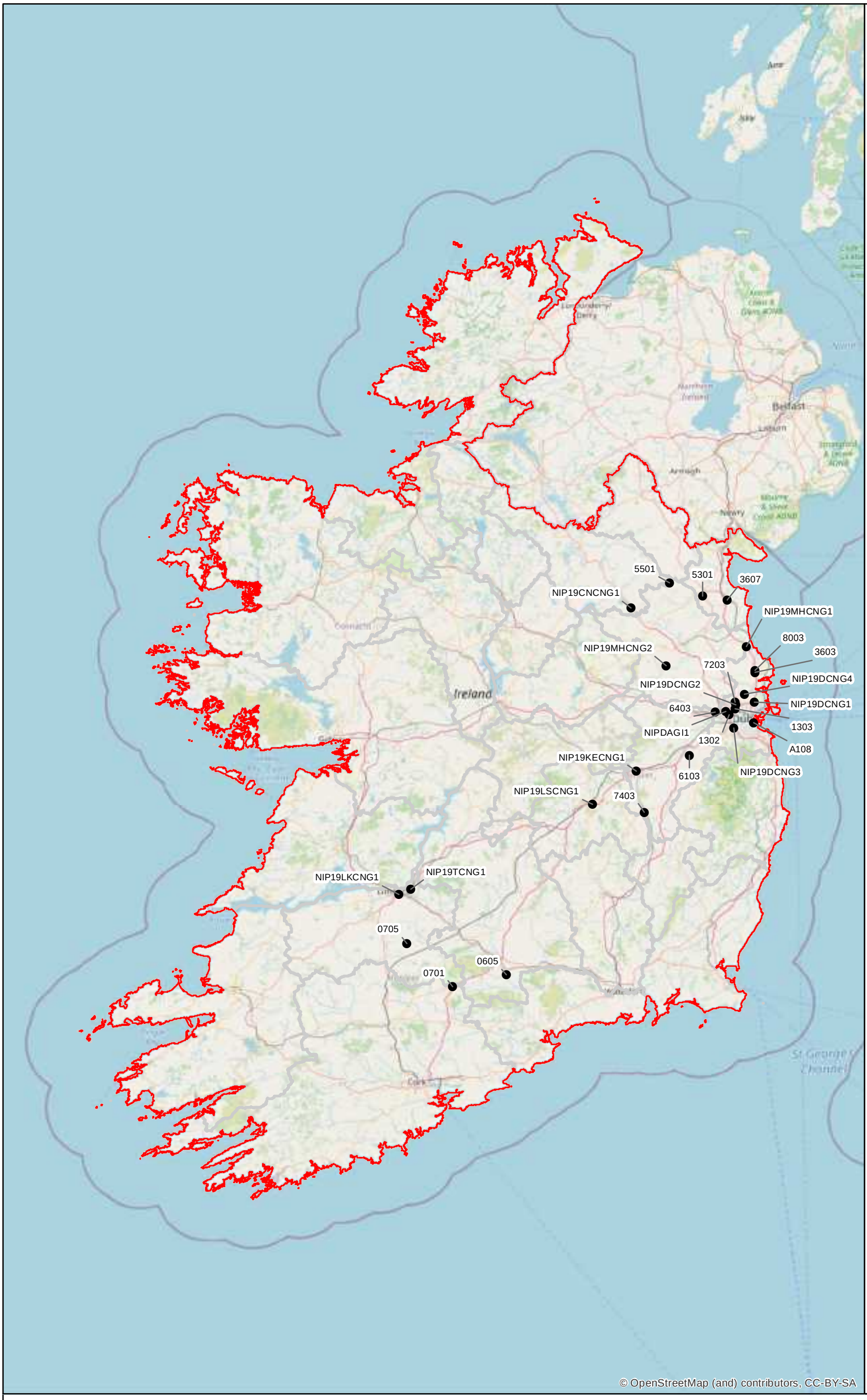
EPA, 2018, Ireland's Final GHG Emissions 1990 – 2016,

Appendix A

Figures

A1



Consultant

ARUP

50 Ringsend Road T +353 1 233 4455
Dublin 4 F +353 1 668 3169
D04 T6X0 W www.arup.com
Ireland E dublin@arup.com

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title: Gas Networks Ireland - Network Implementation Plan

Scale: 1:1,750,000

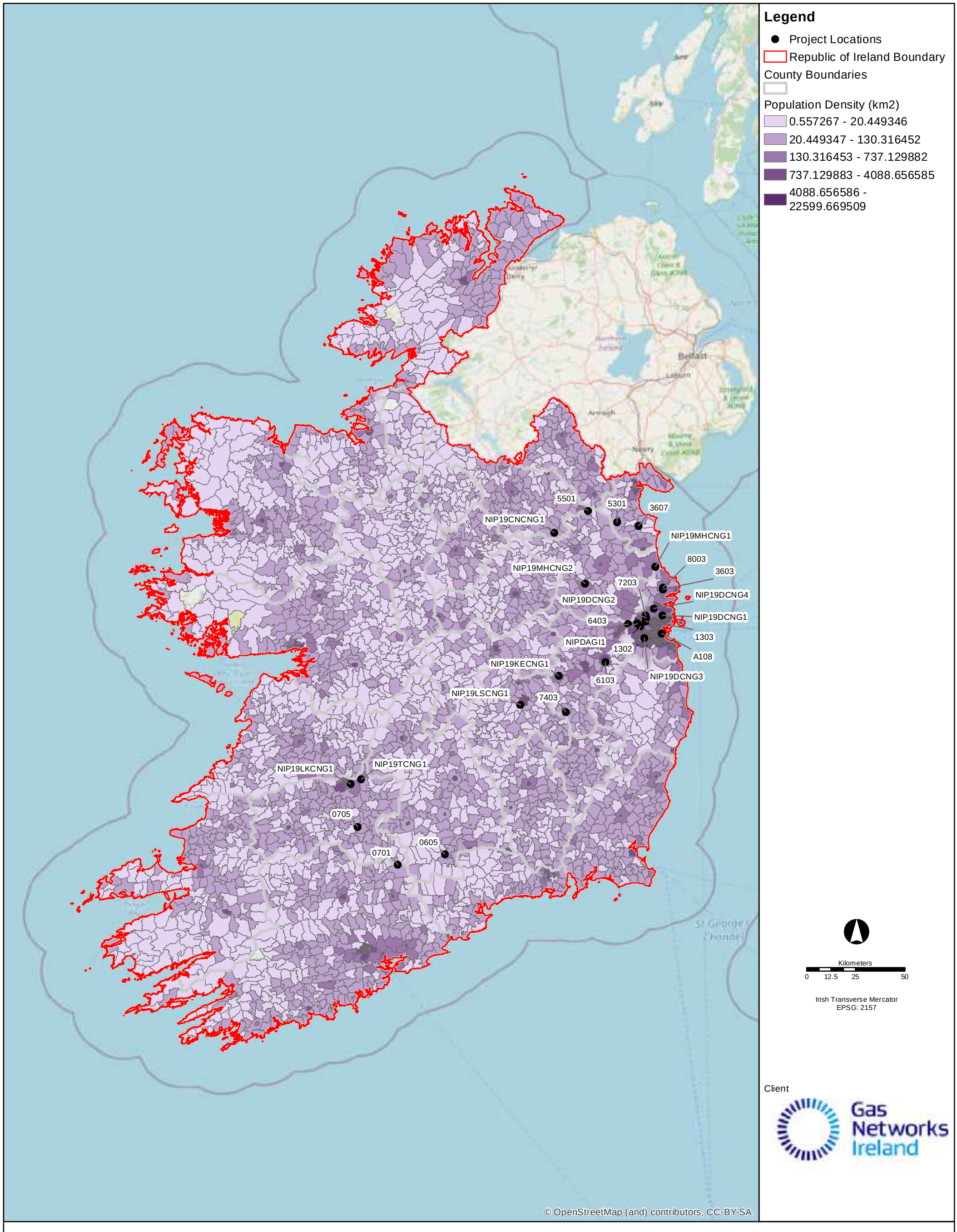
Date:

Drawing Title: Study Area

Drawing Status:

Figure No.: Fig A1

Issue:



Client

Gas Networks Ireland

Consultant

ARUP

50 Ringsend Road T +353 1 233 4455
Dublin 4 F +353 1 668 3169
D04 T6X0 W www.arup.com
Ireland E dublin@arup.com

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title: Gas Networks Ireland - Network Implementation Plan

Scale: 1:1,750,000

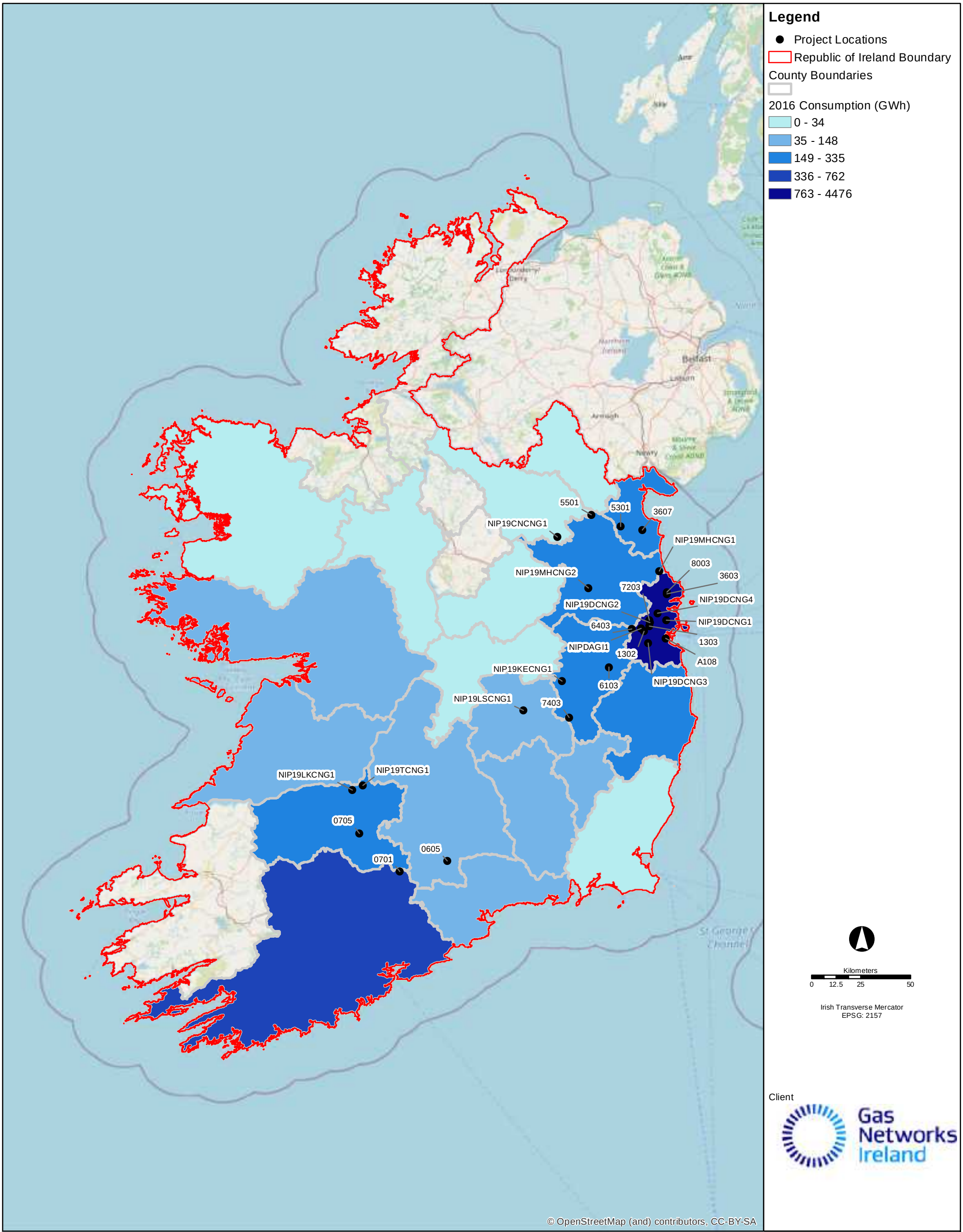
Date:

Drawing Title: Population Density

Drawing Status:

Figure No.: Fig A2

Issue:



Consultant
ARUP
50 Ringsend Road
Dublin 4
D04 T6X0
Ireland
T +353 1 233 4455
F +353 1 668 3169
W www.arup.com
E dublin@arup.com

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title
Gas Networks Ireland - Network Implementation Plan

Drawing Title
Gas Consumption - Residential

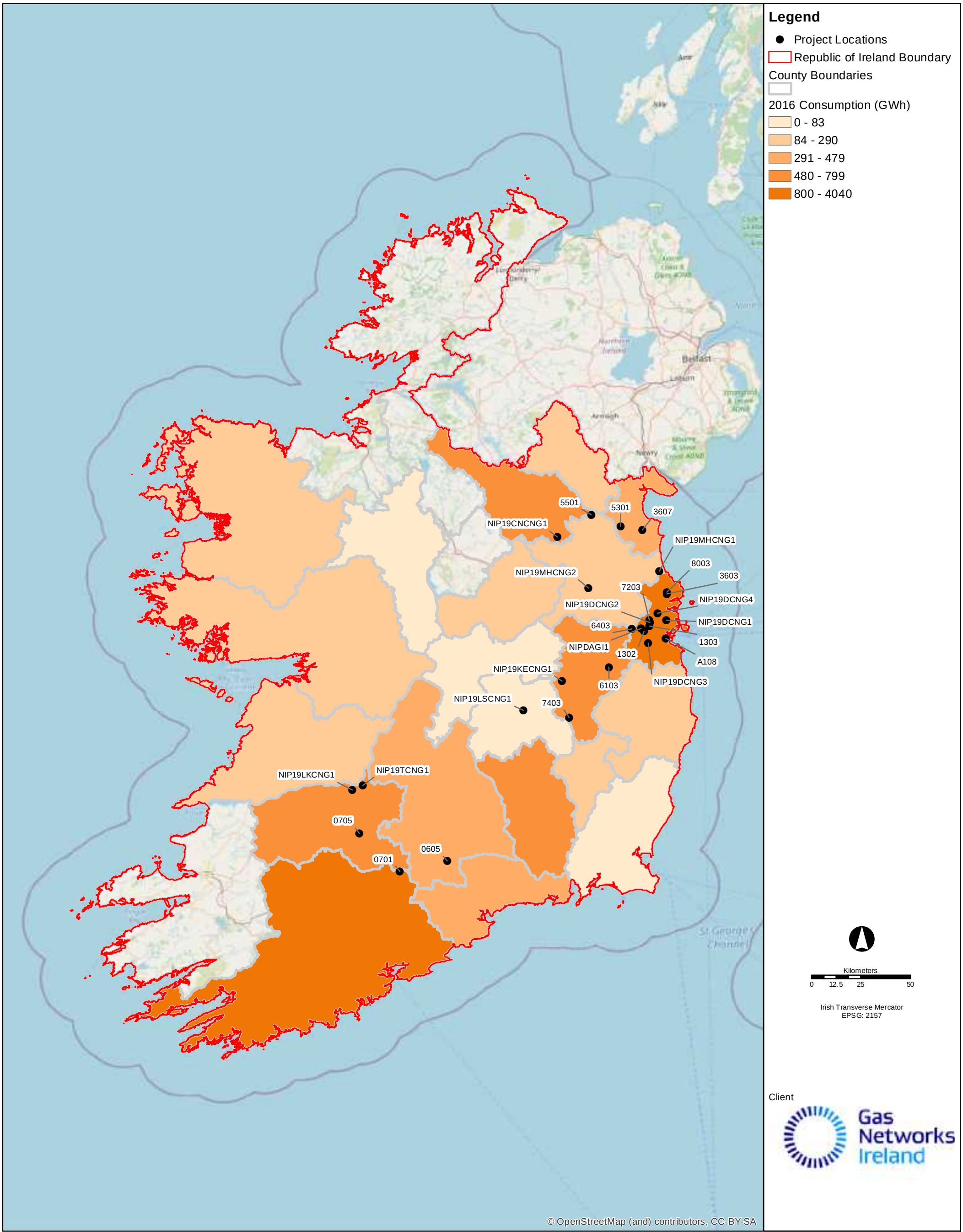
Scale
1:1,750,000

Drawing Status

Date

Figure No.
Fig A3

Issue



Consultant
ARUP
50 Ringsend Road
Dublin 4
D04 T6X0
Ireland
T +353 1 233 4455
F +353 1 668 3169
W www.arup.com
E dublin@arup.com

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title: Gas Networks Ireland - Network Implementation Plan

Drawing Title: Gas Consumption - Non-Residential

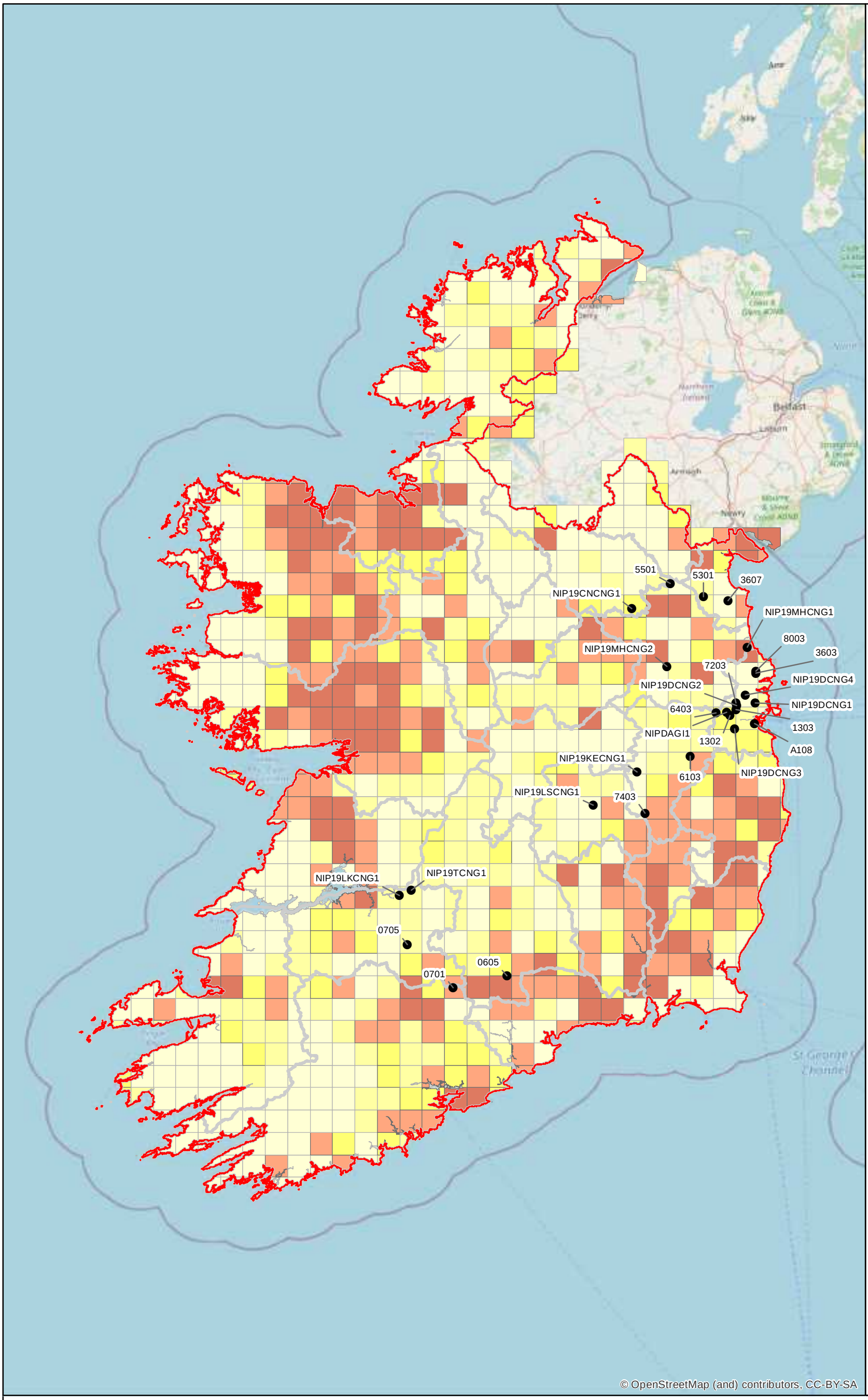
Scale: 1:1,750,000

Drawing Status:

Date:

Figure No.: Fig A4

Issue:



Legend

- Project Locations
- Republic of Ireland Boundary
- County Boundaries
- Radon Levels
  - < 1%
  - 1% - 5%
  - 5% - 10%
  - 10% - 20%
  - > 20%

Kilometers
0 12.5 25 50

Irish Transverse Mercator
EPSG: 2157

Client

Gas Networks Ireland

Consultant

ARUP

50 Ringsend Road
Dublin 4
D04 T6X0
Ireland

T +353 1 233 4455
F +353 1 668 3169
W www.arup.com
E dublin@arup.com

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title: Gas Networks Ireland - Network Implementation Plan

Drawing Title: Radon Levels

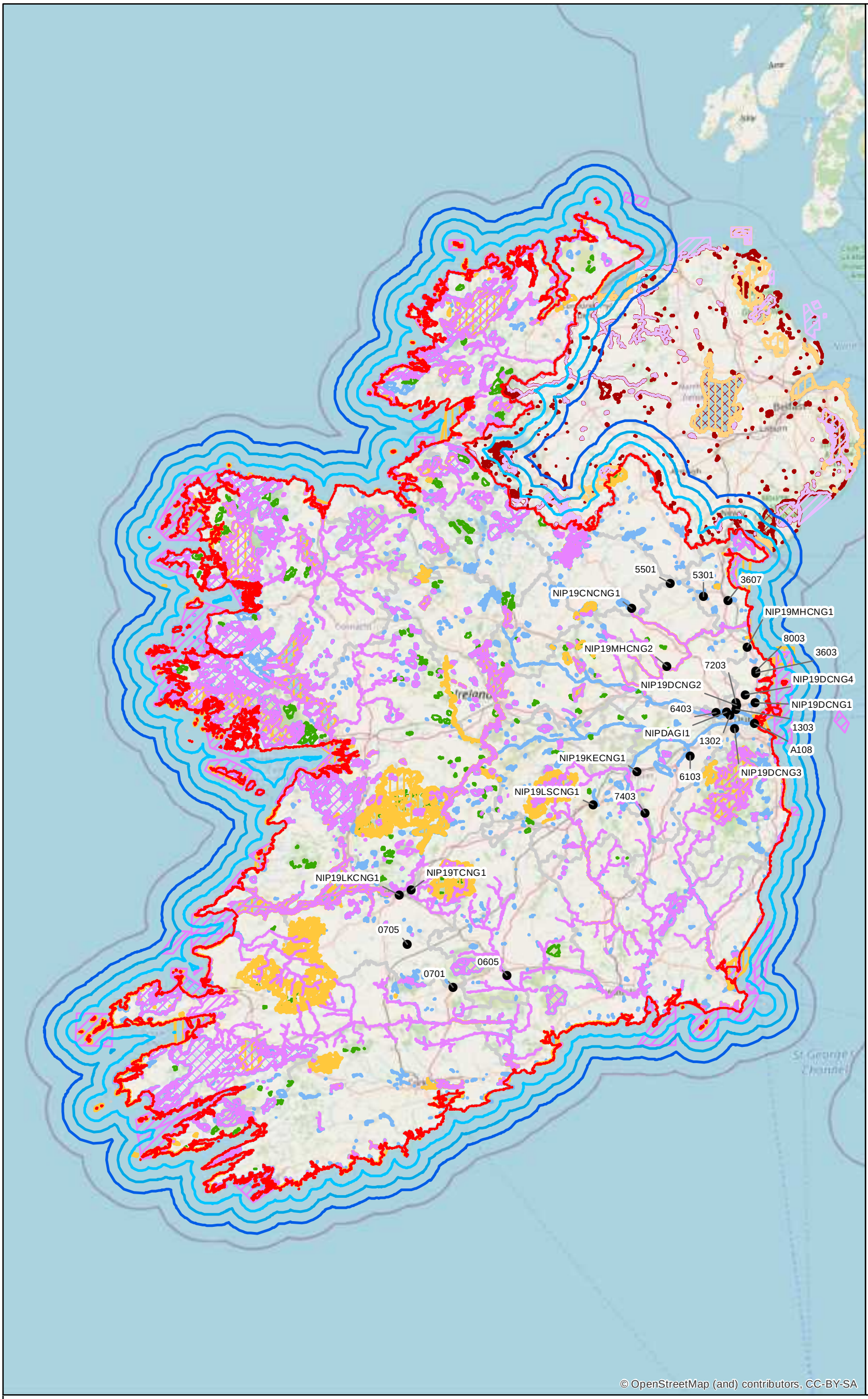
Scale: 1:1,750,000

Drawing Status:

Date:

Figure No.: Fig A5

Issue:



Legend

- Project Locations
- Republic of Ireland
- 15km Buffer
- 10km Buffer
- 5km Buffer
- Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)
- Natural Heritage Area (NHA)
- Proposed National Heritage Areas (pNHA)
- Special Area of Conservation (NI)
- Special Protection Area (NI)
- Area of Special Scientific Interest
- County Boundaries

Kilometers
0 12.5 25 50

Irish Transverse Mercator
EPSG: 2157

Client

Gas Networks Ireland

Consultant

ARUP

50 Ringsend Road
Dublin 4
D04 T6X0
Ireland

T +353 1 233 4455
F +353 1 668 3169
W www.arup.com
E dublin@arup.com

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title: Gas Networks Ireland - Network Implementation Plan

Drawing Title: Ecological Designated Sites (including Natura 2000 sites)

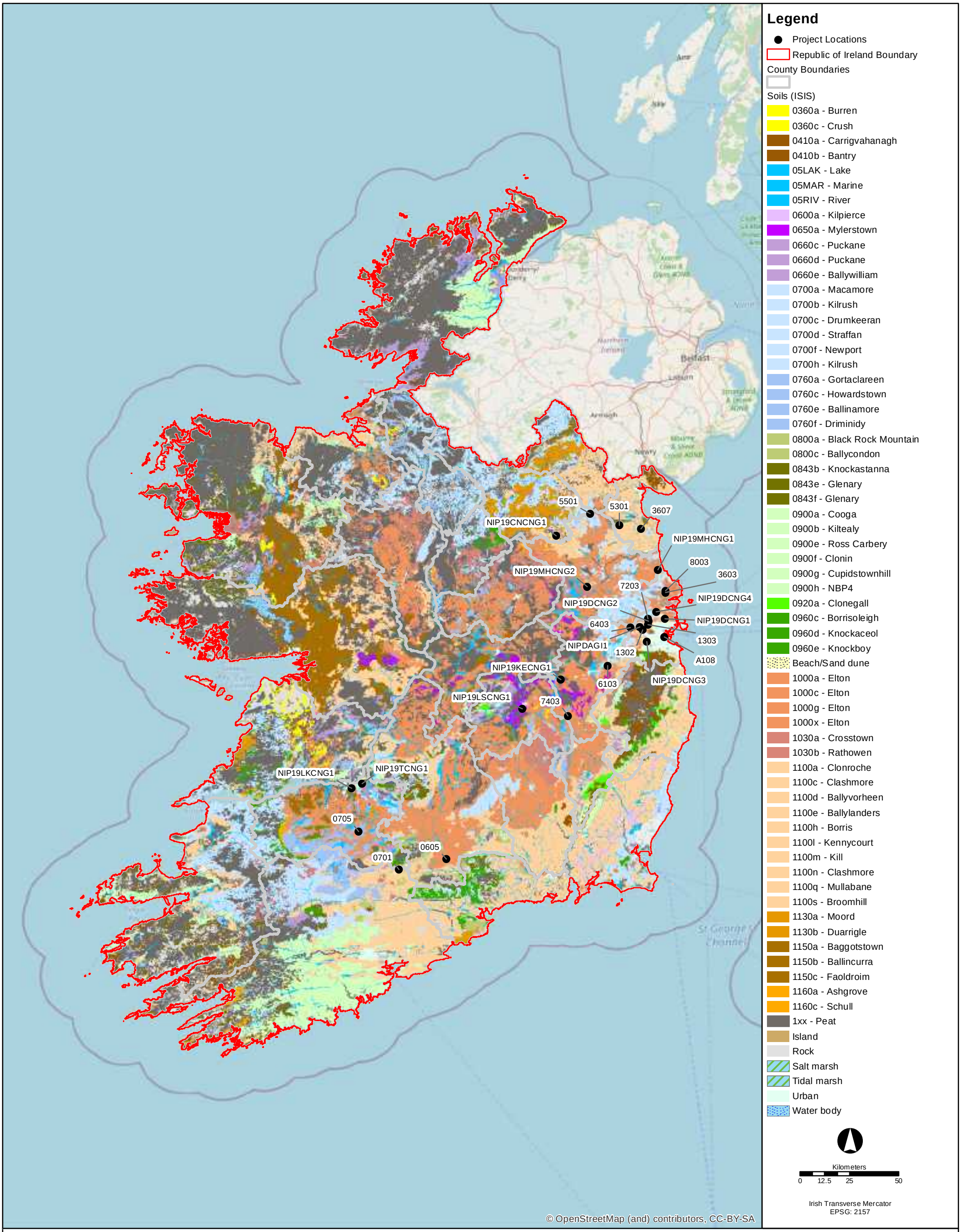
Scale: 1:1,750,000

Drawing Status:

Date:

Figure No.: Fig A6

Issue:



Consultant
ARUP
50 Ringsend Road T +353 1 233 4455
Dublin 4 F +353 1 668 3169
D04 T6X0 W www.arup.com
Ireland E dublin@arup.com

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Gas Networks Ireland

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title
Gas Networks Ireland - Network Implementation Plan

Scale
1:1,750,000

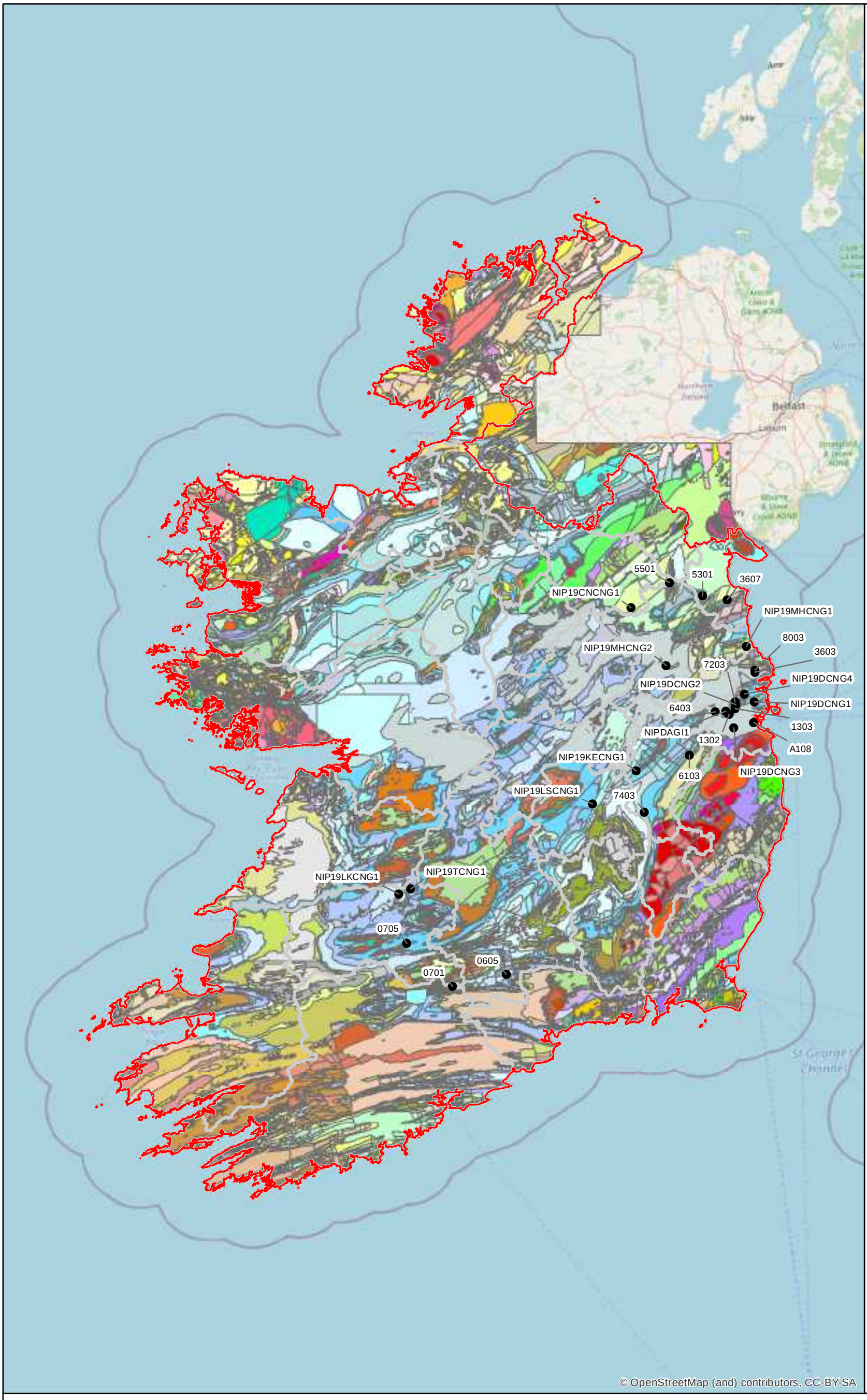
Date

Drawing Title
Soils

Drawing Status

Figure No.
Fig A7

Issue



Legend

- Project Locations
- Republic of Ireland Boundary
- County Boundaries

Complete legend for bedrock geology can be seen overleaf

Client

Gas Networks Ireland

Consultant

ARUP

50 Ringsend Road
Dublin 4
D04 T6X0
Ireland

T +353 1 233 4455
F +353 1 668 3169
W www.arup.com
E dublin@arup.com

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title: Gas Networks Ireland - Network Implementation Plan

Scale: 1:1,750,000

Date:

Drawing Title: Bedrock Geology

Drawing Status:

Figure No.: Fig A8

Issue:

Legend

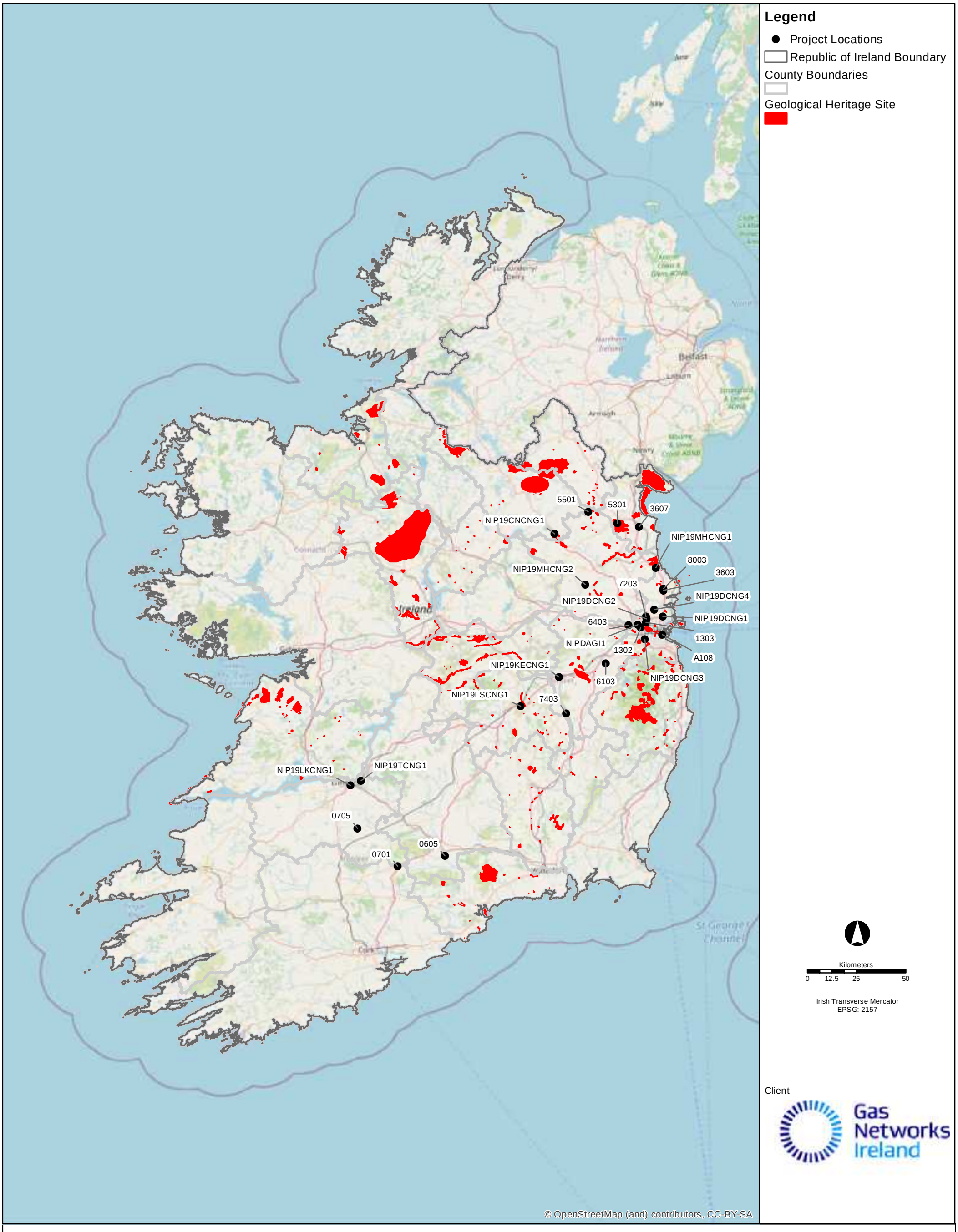
Project Locations
Republic of Ireland Boundary

County Boundaries

Bedrock Geology

<all other values>
Kilmore Formation
Achill Head Formation
Addergoole River Formation
Aghyaran & Killygordon Limestone Fo
Lifford Volcanic Member
Marble unit
Aghaward Formation
Aghamore Formation
Altan Limestone Formation
Old Road Member
Annagh Division (undifferentiated)
Ards Pelite Formation
Ards Quartzite Formation
Ardvarney Formation
Arva Granodiorite
Balbriggan Formation
Bangor/Corslieve Formation
Carrafull Member
Owenmore Member
Ballycong Limestone Formation
Belcamp Formation
Belderg Formation
Bellagarvaun Formation
Benmore Formation\ Broad Haven Form
Benmore Formation
Ballybeg Park Limestone Formation
Boultypatrick (Grit) Formation
Briska Boulder Bed Formation
Bangor Church Banded Member
Bangor Reservoir Dolomitic Schist M
Broad Haven Formation
Broomfield Formation
Brittstown Formation
Ballyhean Formation
Bryanstown Formation
Derravaragh Cherts
Liscarton Formation
Meath Formation
Stackallan Member
Moathill Formation
Ardenagh Formation
BALLYCOGLY GROUP
Blackhall Formation
Booley Bay Formation
Bray Head Formation
in Bray Head Formation
Bray Group
Cahore House Formation
Cahore Point Formation
Cullentra Formation
Cross Lake Formation
Cullenstown Formation
Devils Glen Formation
in Devils Glen Formation
Drumleck Formation
Elsinore Formation
Glascarrig Formation
Gaskins Leap Formation
Hippy Hole Formation
Kiln Bay Formation
Newtown Formation
Polldarrig Formation
Ballynacarrig Member
Pipers Gut Formation
Carnes Formation
Roney Formation
Carrysalia Formation
Shelmaliere Formation
Ardnasillagh Formation
Aghmacart Formation
Aughnanure Oolite Formation
Aille Limestone Formation
Aille and Barney Fms (undifferentia
Westport Oolite
Allenwood Formation
Armagh Group
Athassel Limestone Formation
Basal clastics
Ballyadams Formation
in Ballyadams Formation
Ballysteen Formation
Bullockpark Bay Member
in Bullockpark Bay Member
Lisduff Oolite Member
Ballynash Member
in Ballysteen Formation
in Ballysteen Formation
Ballina Limestone Formation (Lower)
Ballina Limestone Formation (Upper)
Banagher Sandstone Formation
Basal Beds
Ballycar Formation
Doobally Sandstone
Bellavally Shale Formation
Benbulben Shale Formation
Ballyglasheen Oolite Formation
Ballymore Limestone Formation
Ballymartin Formation
Borrisokane Formation
Boston Hill Formation
Boyne Formation
Ardmulchan Member
Beauparc Member
Kiln Hill Member
Bricklieve Limestone Formation
Bricklieve Limestone Formation (lower)
in Bricklieve Limestone Formation
Bricklieve Limestone Formation (upper)
Barney Limestone Formation
Bohoge Member
Kinturk Member
Ballyshannon Limestone Formation
Argillaceous limestones & calc. sha
Basal sandstones
Abbeytown Limestone
Newtownbutler Limestone Member
Red Hill Member
Bundoran Shale Formation
Mullynagowan Sandstone Member
Burren Formation
Aillwee Member
Aillwee member (lower)
Aillwee Member (upper)
Aillwee & Maumcaha Members
Ballard Member
Black Head Member
Fanore Member
Hawkhill Member
Maumcaha Member
Butlersgrove Formation
in Butlersgrove Formation
Ballynahone Micrite Formation
Boyle Sandstone Formation
Ballyness Formation
Ballyreagh Conglomerate Formation
Caherduggan Limestone Formation
Camillan Sandstone Formation
Capnagower Formation
Carraun Shale Formation
Doagh Limestone Member
Castlebar River Fm. / Lough Akeel F
Cong Canal Formation
Cong Limestone Formation
Carrickaness Sandstone Formation
Claragh Sandstone Formation
Cooldaragh Formation
Cloghan Sandstone Formation
Clonlusk Formation
Cloonagh Limestone Formation
Cracoean Reef Member
Clogrenan Formation
Kilmore Slump Member
Clashavodig Formation
Clogher Valley Formation
Copstown Limestone Formation
Courtmacsherry Formation
Cork Red Marble Formation
Cregg Limestone Formation
Coranellistrum Formation
Croane Formation
Croghan Limestone Formation
Crosspatrick Formation
Crows Point Formation
Crufty Formation
Cruicetown Group (undifferentiated)
Culmore Formation
Dartry Limestone Formation
Ballagh Limestone Member
Knockmore Reef, bedded facies
Knockmore Limestone Member
Legacurry Member
Carn Limestone Member
Carrickmacsparrow Limestone Member
in Dartry Limestone Formation
in Dartry Limestone Formation
Drumchorick Siltstone Formation
Dinantian Limestones (undifferentia
Drumgesh Shale Formation
Drumman More Sandstone Formation
Donabate Formation
Downpatrick Formation
Dargan Limestone
Dromkeen Limestone Formation
Dirtoge Limestone Formation
Duncormick Formation
Durnish Formation
Durrow Formation
Edenderry Oolite Member
Feighcullen Formation
Fennor Formation
Ferbane Mudstone Formation
Fingal Group (undifferentiated)
Fearnaght Formation
Fortwilliam Oolite Member
Glenade Sandstone Formation
Glencar Limestone Formation
Greyfield Formation
Hazelwood Limestone Formation
Herbertstown Formation
Herbertstown Limestone Formation
Holmpatrick Formation
Hore Abbey Limestone Formation
Illaunagappul Formation
Johnstown Red Marble Formation
Keenaghan Shale Formation
Killin Formation
Killuney Conglomerate Formation
Kinsale Formation
Cuskinny Member
Narrow Cove Member
Pigs Cove Member
Reenagough Member
Kilbryan Limestone Formation
Knockordan Limestone Formation
Knockmaa Formation
Knockroe Basalt Lava Flow Member
Knockroe Lithic Tuff Member
Knockroe Trachyte Lava Flow Member
Knockroe Vitric-Lithic Tuff Member
Knockseefin Volcanic Formation
Knockseefin Lava Flow Member
Knockseefin Lithic Tuff Member
Knockseefin Vitric Tuff Member
Kilsheelan Formation
Lane Formation
Laggan Formation
Lough Gur Formation
Loughshinny Formation
Mattock Member
Lismaline Micrite Formation
Little Island Formation
Lower Limestone Shale
Loughbeg Formation
Lispatrick Formation
Lisgorman Shale Formation
Leitrim Group
Lucan Formation
Boulder Conglomerate
Maam Formation
Malahide Formation
Meenymore Formation
Cammore Sandstone Member
Glen Member
Quarry Sandstone Member
Mellon House Formation
Mornington Formation
Milford Formation
in Milford Formation
Milverton Group (undifferentiated)
Moy Sandstone Formation
Mooretown Formation
Muckros Sandstone Formation
Mullaghfin Formation
Killala Oolite Member
Mullaghmore Sandstone Formation
Maydown Limestone Formation
Naul Formation
Navan Beds
Rockfield Sandstone Member
Oakport Limestone Formation
Burrishoole Member
Creagh Member
Lough Carra Member
Oldchapel Limestone Formation
Oldcourt Cherty Limestone Formation
OMahonys Rock Formation
Owenriff Member
Waterfall Member
Parsonage & Corgrig Lodge Formation
Platin Formation
Porters Gate Formation
Quinagh Formation
Rathkeale Formation
Rathronan Formation
Reenydonagan Formation
Retreat Siltstone Formation
Rickardstown Formation
Ringmoylan Formation
Rinn Point Limestone Formation
Rockfield Limestone Formation
Rockfleet Bay Limestone Formation
Rush Conglomerate Formation
Shanagolden Formation
Silverspring Formation
Slane Castle Formation
Slevoir Formation
Smugglers Cave Formation
Slievenaglasha Formation
Aylecotty Member
Cullaun Member
Ballyelly Member
Fahee North Member
Lissylisheen Member
Balliny Member
Turret Volcanic Member
Subulter Volcanic Formation
Suir Limestone Formation
Terryglass Formation
Tober Colleen Formation
Topped Mountain Formation
Barr Church Andesite
Transition Beds
Tullyallen Formation
Tubber Formation
Cregmahon Member
Castlequarter Member
Fiddaun Member
Finavarra Member
Newtown Member
Twigspark Formation
Tonweeroe Formation
Argillaceous Limestones (Visean)
Ulster Canal Formation
Visean Limestones (undifferentiated
in Visean Limestones (undiff)
Waulsortian Limestones
in Waulsortian Limestones
Wexford Formation
in Wexford Formation
Caledonain Cloonfad Felsite
Croaghgarrow Formation
Glenflesk Chloritic Sandstone Forma
Cloonygowan Formation
Deer Park Complex
Deer Park Schist Formation
Farnacht Formation
South Achillbeg Formation
Achillbeg Conglomerate Member
Achillbeg Lighthouse Psammite Membe
Achillbeg School Black Slate Member
Serpentinite
Claudy Formation
Clashford House Formation
Clogherhead Formation
Clontail Formation
Carricktriss Formation
Ardagh Shale Formation
Annabella Formation
Ballinamallard Mudstone Formation
Bencroy Shale Formation
Bencroy Sandstone Member
Ballynahown Sandstone Formation
Balrickard Formation
Bregaun Flagstone Formation
Briscloonagh Sandstone Formation
Cabra Formation
Corratober Bridge Formation
Central Clare Group
Carrickleck Formation
Carrickleck Sandstone Member
Cloone Flagstone Formation
Clare Shale Formation
Clontrain Formation
Dergvone Shale Formation
Lacoon Flagstone Member
Donore Formation
Cruicerath Member
East Point Formation
Farranacliff Formation
Feale Sandstone Formation
Giants Grave Formation
Glenoween Shale Formation
Gowlaun Shale Formation
Gull Island Formation
Corn Hill Formation
Killeshin Siltstone Formation
Lackagh Sandstone Formation
Lackantedane Formation
Caherconreafy Member
Longstone Flagstone Member
Longstone Shale Member
Luggacurren Shale Formation
Middle Battery Formation
Namurian (undifferentiated)
Ross Sandstone Formation
Shannon Group
Shrough Formation
Tullig Sandstone
White Strand Formation
Walshestown Formation
Collon Formation
Craggagh Shale Formation
Lower Sandstone Member
Upper Sandstone Member
Creeslough Formation
Cranford Limestone Formation
Croaghaun Formation
Gubroe Quartzite Member
Croaghubbrid Pelite Formation
Croveenananta Formation
Trachyte
Clatterstown Formation
Culdaff Limestone Formation
Liscarroll Limestone Formation
Clay Gall Sandstone Formation
Coolbaun Formation
Swan Sandstone Member
Drumlish Conglomerate Formation
Lickfinn Coal Formation
Moanour Formation
Moyadd Coal Formation
Westphalian (undifferentiated)
Carrickdexter Formation
Conglomerate & pebbly sandstone
Bealtra volcaniclastic rocks
Beginish Island Intrusion
Ballymastocker Formation
Edergole Formation
Gortfinbar Conglomerate Formation
Raveagh Sandstone Formation
Basalt
Kilmore Formation
Old Red Sandstone (undifferentiated
Doogort Boulder Bed Formation
Doogort Beach Schist Formation
Doogort Dolomite Formation
Doogort Quartzite Formation
Doogort Road Formation
Doogort schist Formation
Derryharriff Formation
Denhamstown Formation
Lacka Sandstone Formation
Ballyferriter Formation
Bulls Head Formation
Ballymore Sandstone Formation
in Ballymore Sandstone Formation
Coumeenoole Sandstone Formation
Eask Sandstone Formation
Glashabeg Conglomerate Formation
Coosgorrib Conglomerate Member
Coosmore Conglomerate Member
Coosglass Conglomerate Member
Graffa More Formation
Keadew Formation
Sheegorey Member
Moygara Formation
Slea Head Formation
Trabeg Conglomerate Formation
Bird Hill Formation
Birreen Formation
Ballydavid Formation
Croaghmoyle Formation
Farran Sandstone Formation
Gortanimill Formation
Inch Conglomerate Formation
Kilmurry Sandstone Formation
Pigeon Rock Formation
Sauce Creek Formation
Slaheny Sandstone Formation
Doon-na-Dell Schist Formation
Doolough (per-alkaline) Granite Gne
Dooagh Schist Formation
Doonamo Formation
Aughernagalliagh Quartzite Member
Moyny Point Limestone Member
Ardane Formation
Ayle River Formation
Ballinskelligs Sandstone Formation
Ardnagluggen Sandstone Member
Doulus Head Conglomerate Member
in Ballinskelligs Sandstone Fm.
Ballytrasna Formation
Doon Lava Member
Mine Head Member
Carrigcleenamore Volcanics
Capard Formation
Cappagh Sandstone Formation
Cappagh White Sandstone Formation
Carrigmaclea Formation
Castlehaven Formation
in Castlehaven Formation
Cadamstown Formation
Clonaslee Member
Caha Mountain Formation
Coumaraglin Formation
Comeragh Conglomerate Sandstone Gro
Coumshingaun Conglomerate Formation
Carrigduff Volcanic Member
Coolnahorna Volcanic Member
Croughaun Formation
Devilsbit Formation
Glandahalin Formation
Galtymore Formation
Glenflesk Chloritic Sandstone Forma
Doo Lough Pebbly Sandstone Member
Lough Guitane rhyolites
Lough Guitane volcaniclastics
in GlenfleskChloritic Sandst Fm.
Glendossaun Member
Gun Point Formation
Gyleen Formation
Ballyknock Member
Ballyquinn Member
Ardmore Member
Harrylock Formation
Helvick Formation
Inshaboy Formation
Kilnafrehan Conglomerate Formation
Kiltorcan Formation
Knockmealdown Sandstone Formation
Keeper Hill Formation
Lack Sandstone Formation
Lough Acoose Sandstone Formation
Lough Acoose Sandst Form&Conglom&pe
Lough Muskry Formation
Lough Slat Conglomerate Formation
Old Head Sandstone Formation
Bere Island Member
Oldtown Bay Formation
Poulgrania Sandstone Formation
Pointagare Group
Scalpnagown Formation
Maghera Cornstone Member
Sherkin Formation
Sheskin Formation
Shanmullagh Formation
Slieve Mish Group
Slievereagh Conglomerate Formation
Slievenamuck Conglomerate Formation
St. Finans Sandstone Formation
in St. Finans Sandstone Formation
in St. Finans Sandstone Formation
Smerwick Group
Templetown Formation
Knockavellish Member
Brownstown Head Member
Beenlea Head Member
Toe Head Formation
Treanearla Formation
Duvillaun Formation
Valentia Slate Formation
in Valentia Slate Fm.
Extrusive Rhyolite Formation
Lough Eske Psammite Formation
Fahan Grit Formation
Cloghan Green Beds Member
Falcarragh Limestone Formation
Fahan Slate Formation
Finlough Formation
Fieldstown Formation
Fournocks Formation
Altered Fault Rock (igneous?)
Porphyritic-Megacrystic Granite
Magma Mixing-Mingling Zone
Gaugin Quartzite Formation
Glencolumbkille Limestone Formation
Glencolumbkille Pelite Formation
Glenisland Formation
Raheen Barr Volcanic Member
Cashel Member
Lough Darrdun Schist Member
Glencullin River Formation
Glen Lodge Formation
Greencastle Green Beds Formation
Glaspistol Formation
Gubastuckaun Formation
in Broadford Formation
Hilltown Formation
Hill Of Slane Formation
Ballygawley Tonalitic Gneiss
Porphyritic rhyolite
Ardara Granite, G1 variety
Ardara Granite, G2 variety
Ardara Granite, G3 variety
Barnesmore Granite, G1 variety - Cronamuck Granodiorite
Barnesmore Granite, G2 variety
Barnesmore Granite, G3 varieties of sheet complex
Syenite
Trachyte Breccias
Trachyte
Blackstairs Graiguenamanagh Granite Gneiss
Blackstairs Type 1 Granite
Blackstairs Type 2 Equigranular Granite
Blackstairs Type 2 Microcline Porphyritic Grani
Cloghmore Granodiorite
Corvock Granite
Costello Murvey Granite
Errisbeg Townland Granite
Callowfinish Granite
Murvey Granite
Carna-type
Roundstone Granite
Cuilleen-type
Minor Granitic Bodies
Crossdoney Granite
Newry Granite
Inish Granite
Knock Granite
Lettermore Granodiorites
Letterfrack granitic plutons
Lough Fadda Granodiorite
Lough Lurgan Granite
Barravore Aplogranite
Carrawaystick Aplite
Glendalough Adamellite
Glen of Imail Quartz-diorite
Percys Table Granodiorite
Type 1 granodiorite
Type 3 muscovite porphyritic
Type 4 muscovite/microcline porphyr
Type 2e equigranular
Type 2p microcline porphyritic
Omey Granite
Drogheda Granite
Shannapheasteen Granite
Type 1 Granite
Tullow Type 2 Equigranular Granite
Tullow Type 2 Sparsely Porphyritic Granite
Tullow Type 2 Microcline Porphyritic Grani
Ballynamuddagh Granite
Easky Adamellite
Lough Talt
Fanad Granite
Fanad Granite
Feldspar porphyry
Lough Nacorrussaun Metabasites
Rhyolite
Thorr Granite
Thorr Granite migmatitic facies
Rafts in Thorr Granite
Toories Granite
Tullagh Point Granite
Main Donegal Granite
Microgranite and related rocks
Inishderry Formation
Inishowen Head Grits and Phyllites
Inishkea Division (undifferentiated
Inver Schist Formation
Croghan Kinshelagh Granite
Quartz Diorite Gneiss & Granitic Gn
Metagabbro and Related Lithologies
Oughterard Granite
Feldspar Porphyry
Quartz porphyry and Felsite
Quartz Diorite Gneiss
Saltees Granite
Ballyconneely Amphibolite
Amphibolite (northeast Ox Mountains
Metabasite
Metadolerite or amphibolite
Serpentinite
Rathlin OBirne Granite
Rosses Granite G1 variety
Rosses Granite G2 variety
Rosses Granite G3 variety
Rosses Granite G4 variety
Carnsore Granite
Slieve Gamph Igneous Complex, equigranular
Slieve Gamph Igneous Complex, megacrystic
Slieve Gamph Igneous Complex, Muscovite Granite
Layered Gabbro
Layered Gabbro
Layered Gabbro
Layered Gabbro
Layered Gabbro
Hawaiite Lava
Vent Agglomerate
Early Gabbro
Granophyre
Trawenagh Bay Biotite Granite
Trawenagh Bay Biotite-muscov. Grani
Trawenagh Bay Biotite-muscov. Grani
Trawenagh Bay Aplogranite
Trawenagh Bay Transitional G1/G2 Gr
Basalt & Trachyte Lava
Cam Lough Breccia
Porphyritic Felsite
Porphyritic granophyre
Shanes Hill Rhyodacite
Vent agglomerate
Ballydeenlea Formation
Kanfinalta Formation
Knockerk Formation
Bockagh Member
Kennetstown Formation
Killadangan Formation
Kilnaleck Shale Formation
King's Hill Formation
Ardaturrish Member
Ardnamanagh Member
Keem Conglomerate Formation
Keem Limestone Formation
Keem Schist Formation
Killeter Quartzite Formation
Ulster White Limestone Formation
Lackan Formation
Lambay Volcanic Formation
Lough Brohly Quartzite Formation
Lough Brohly Schist Formation
Lower Crana Quartzite Formation
Lough Doo Formation
Slieve League Formation
Letter Formation
Lower Falcarragh Pelite Formation
Lough Foyle Succession
Pelitic unit in Lough Foyle Success
Lough Mourne Formation
Lower Palaeozoic rocks
Loughros Formation
Agglomerate
Andesite
Aplite
Hornblende diorite
Appinite suite
Appinite suite intrusive breccia
Basalt
Chert
diamictite
Dolerite
Dolerite and Gabbro
Diorite
Felsite
Marginal Porphyritic Granite
Gabbro
Granodiorite and diorite
Fine-grained foliated granite
in Cornagnoe Formation
Microgranite
Granite (undifferentiated)
Little Harbour Formation
Marble
Metadolerite
Metadolerite & Lithologically diver
Metadolerite
Metagabbro & orthogneiss suite
Monzogranite
Mudbank limestone
Oolitic limestone
Pegmatite
Rafts in Thorr Granite; pelite
Feldspar or Quartz Porphyry
Caledonian Pyroxene Diorite
in Lough Eske Psammite Formation
in Finnalaghta Formation
in Caha Mountain Formation
Rafts in Thorr Granite
Serpentinite
in Rathkenny Formation, in Central and Northern Belt, in Salterstwon Formation
Tectonic schist
Rafts in Thorr Granite; lithologically diverse
Volcanics
Volcaniclastic Rocks
in Lough Eske Psammite Formation, in Termon Formation
Undifferentiated pyroclastic rocks
Malin Schist Formation
Anaffrin Formation
Glennamong Member
Sraheens Lough Formation
Minnaun Sandstone Formation
Moyteoge Head Formation
Ashleam Bridge Dolomitic Formation
Ashleam Bridge Quartzite Formation
Ashleam Bridge Graphitic Member
Ashleam Bay Formation
Atlantic Drive Schist Formation
Barnanoraun Schist Formation
Connemara Marble Formation
Cullydoo Formation
Srahmore Quartzite Member
Srahmore Quartzite and Schist Membe
Derreen Marble Formation
Dooega Head Formation
Knockcorraun Formation
Knockcorraun Lough Marble Member
Portnahally Formation
Ashleam Head Formation
Attymass Group (undifferentiated)
Attymass Volcanic Formation
Attymass Formation (undifferentiated)
Lower Attymass Formation
Upper Attymass Formation
Bennabeola Quartzite Formation
Birreencorragh Schist Formation
Birreencorragh Quartzite Member
Ballynakill Schist Formation
Buckoogh Formation
Bunnafahy Conglomerate Formation
Bunaveela Lough Formation
Carrick OHara Formation
Corradrishy Quartzite Member
Cashel Schist Formation
Corradrishy Formation
Cleggan Boulder Bed Formation
Corraun Formation
Corraun Schist (Lower) Member
Corraun Quartzite Member
Corraun Schist (Upper) Member
Kildownet Quartzite Member
Cove Schist Formation
Derreen Schist Member
Mount Eagle Formation
Mount Eagle Schist Member
Glenlara Volcanic Formation
Curraghnagark Member
Doonweelin Member
Grit Unit (Curraghnagark Member)
Lakes Marble Formation
Leckee Quartzitic Formation
Kilmore Limestone Member
Liscarragh Formation
North Carrowgarve Formation
Ooghnadarve Formation
South Carrowgarve Formation
Skerdagh River Volcanic Formation
Glenlara Marble Member
Srahmore Lodge Dolomite Formation
Streamstown Schist Formation
Tawnyshane Tillite Formation
Slievenagark Member
Newantrim Member
Meelick Member
Callow Formation
Cornamona Marble Formation
Lough Kilbride Schist Formation
Lower Lismoran Formation
Upper Lismoran Formation
Westport Grit Formation
Mullyfa and Deele Formations
Undifferentiated Dalradian schists
Nakil Formation
Middle Nephin Group (Undifferentia
Nephin Formation
Argyle Group
Appin Group
Bencorragh Formation
Bunmahon Formation
Bohaun Volcanic Formation
Derry Bay Formation
Delaney Dome Meta-rhyolite Formatio
Derryveeny Formation
Derrylea Formation
Carricklea Grey Marble Member
Carricklea Pink Marble Member
Derrymore Formation
Dunabrattin Formation
Finny Formation
Glenummera Formation
Golam Formation
Gorumna Formation
Sedimentary lenses
Knock Kilbride Formation
Letterbrock Formation
Loch Faoilean Formation
Lettermullen Formation
Mount Partry Formation
Maumtrasna Formation
Mweelrea Formation
Slate Members
Rosroe Formation
Ryans Farm Formation
South Connemara Group
Sheeffry Formation
Skerd Formation
Tourmakeady Formation
Ballygreany Formation
Castleshane Formation
Carrickateane Formation
Shanmullagh Mill Formation
Aghfarrell Formation
Dowery Hill Member
Ballybro Formation
Butter Mountain Formation
Donard Andesite Member
in Butter Mountain Formation
Ballylane Formation
Moneyteige Member
Ballylane Formation & Intermediate
Carracastle Formation
Gortnagleav Formation
Grahormack Formation
Horan Formation
Kilmacthomas Formation
in Kilmacthomas Formation
Muggorts Bay Formation
Milltown Formation
Oaklands Formation
Palace Member
Riverchapel Formation
Seamount Formation
TUSKAR GROUP
Tawnyinagh Formation
Arklow Head Formation
in Arklow Head Formation
Avoca Formation
in Avoca Formation
in Avoca Formation
Ballymoyle Formation
in Ballymoyle Formation
in Ballymoyle Formation
Ballynaclogh Formation
Caher Hill Formation
Campile Formation
Garraun Member
Newtown Head Member
in Newtown Head Member
in Newtown Head Member
Arthurstown Member
Ballyhack Member
in Ballyhack Member
Ross Member
in Ross Member
shale units in Campile Formation
in Campile Formation
in Campile Formation
Clashabeema Formation
Finnalaghta Formation
Kilmacrea Formation
in Kilmacrea Formation
Laragh Formation
Toberelatan Formation
Ballinatray Formation
Carrighalia Formation
Courtown Formation
in Courtown Formation
Grange Cottage Formation
Ooghnadirka Schist Formation
Tramore Limestone Formation
Tramore Shale Formation
Kildare Limestone Formation
Allen Andesite Formation
Coronea Formation
Grange Hill Formation
Red Island Formation
Northern Belt (undifferentiated)
Paragneiss, Migmatite and Hornfels
Oriel Brook Formation
Central Belt (undifferentiated)
Corderrybane Shale Formation
Drumagelvin Greywacke Formation
Kehernaghkilly Formation
Tullyraghan Shale Formation
Askingarran Formation
Ballyhoge Formation
Glencullen River Formation
Maulin Formation
Oldcourt Member
Brownsford Member
Ballybeg Member
in Ballybeg Member
Kilcarry Member
Monaughrim Member
in Monaughrim Member
Ballyneale Member
in Ballyneale Member
Knockree Member
Roundwood Member
in Maulin Formation
in Maulin Formation
Wicklow Head Formation
Ballymalone Formation
Conlanstown Formation
Slieve Gamph Igneous Complex, Acidic Lithologies
Slieve Gamph Igneous Complex, Basic Lithologies
Unassigned metasediment rafts
Ox Mountains Granodiorite
Adamellite
Slieve Gamph Igneous Complex, Tonalite
Port Askaig Formation
Dobbin Sandstone Formation
Mall Member
Drumarg Conglomerate Formation
Kinrovar Schist
Kingscourt Gypsum Formation
Pollacappul Formation
Glencalry Schist Member
Glenagh River Limestone Member
Lugnalettin Black Schist Member
Portrane Limestone Formation
Portrane Volcanic Formation
GREENORE POINT GROUP
KILMORE QUAY GROUP
Slishwood Division, Semi-pelitic biotite schists
Slishwood Division, Metalimestones
Slishwood Division, Cregg House Formation
Slishwood Division, Pelitic & semi-pelitic paragneiss
Slishwood Division, Psammitic Paragneiss
Killag Formation
Prioryland Formation
Castlerahan Formation
Raheen Barr Albite Schist Formation
Raheen Barr Quartzite Formation
Red Mans Cove Formation
Reelan Formation
Rhinns Complex of Inishtrahull etc.
Rathkenny Formation
Ridge Point Psammitic Formation
Rinmore Formation
Ballytoohy Formation
Bunnamohaun Siltstone Formation
Bouris Formation
Clogher Head Formation
Creggan baun Formation
Croaghmarhin Formation
Coosglass Slate Formation
Derryheagh Formation
Drom Point Formation
Derrymore Glen Formation
Fairy Hill Conglomerate Formation
Foilnamahagh Formation
Ferriters Cove Formation
Glen Pebbly Arkose Formation
Glencraff Formation
Inishnabro Formation
Inishvickillane Formation
Kilbride Formation
Tonalee Member
Kill Sandstone Formation
Knockmore Sandstone Formation
Knockshigowna Formation
Landing Place Formation
Ben Levy Grit Formation
Lettergesh Formation
Gowlaun Member
Lough Mask Formation
Ardaun Lava Member
Mill Cove Formation
Lough Muck Formation
Lough Nacorra Formation
Salrock Formation
Strake Banded Formation
Inniskeen Formation
Salia Formation
Annagh Member
Salterstown Formation
Scotch Port Schist
Caherconree Formation
Sessiagh-Clonmass Formation
Clonmass Limestone Member
Port Limestone Member
in Sessiagh-Clonmass Formation
Pollareagh Member
Shanaghy Green Bed Formation
Foilcoagh Bay Member
Silurian (undifferentiated)
Ahenny Formation
Brownstown Member
Cornagnoe Formation
Cloonnamna Formation
Carrighill Formation
Dunmurry Formation
Glen Ding Formation
Glen School Formation
Guidenstown Formation
Inchacoomb Formation
Assaroola Member
Lough Avaghon Formation
Aghnamullen Member
Mullanalt Member
Cootehill Member
Lisbellaw Formation
Oghill Formation
Pollaphuca Formation
Rathclarish Formation
Rahilla Formation
Slieve Glah Formation
Slate Quarries Formation
South Lodge Formation
Shercock Formation
Taghart Mountain Formation
Tipperkevin Formation
Slieve Tooey Quartzite Formation
Ballindysert Formation
Ballyhest Member
Kilclooney Member
Ballygeana Formation
Broadford Formation
Broadford Formation & conglom & coa
in Broadford Formation
Garryduff Formation
Hollyford Formation
Slievemore Psammitic Formation
Slieve Bernagh Formation
Slieve Bernagh Formation & conglom
in Slieve Bernagh Formation
Slievemore Schist Formation
South Slope Quartzite Member
St. Marys Basalt
Snowtown Formation
Srah Formation
Srahlaghy Limestone Formation
Srahlaghy Quartzite Formation
Skerries Formation
Stags of Broad Haven Schist
St. Itas Formation
Cratloes Formation
Ballycar South Member
Glennagross Member
Annascaul Formation
Ballynane Formation
Cloonierin Formation
Derryfadda Formation
Kilanena Formation
Tawnaghmore Formation
Termon Granite
Granitic dykes assoc w Termon Grani
Termon Formation
Knockletteragh Member
Dolerite and Gabbro
Lower Basalt Formation
Ballymacadam Formation
Deerycreevy Sandstone Formation
Kingscourt Sandstone Formation
Mercia Mudstone Formation
Milltown Conglomerate Formation
Tooromin Shale Formation
Lough Neagh Group
Upper Crana Quartzite Formation
Upper Falcarragh Pelite Formation
White Island Bridge Formation

This is the legend for Fig A8 Bedrock Geology



Consultant

ARUP

50 Ringsend Road
Dublin 4
D04 T6X0
Ireland

T +353 1 233 4455
F +353 1 668 3169
W www.arup.com
E dublin@arup.com

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title
Gas Networks Ireland - Network Implementation Plan

Scale
1:1,750,000

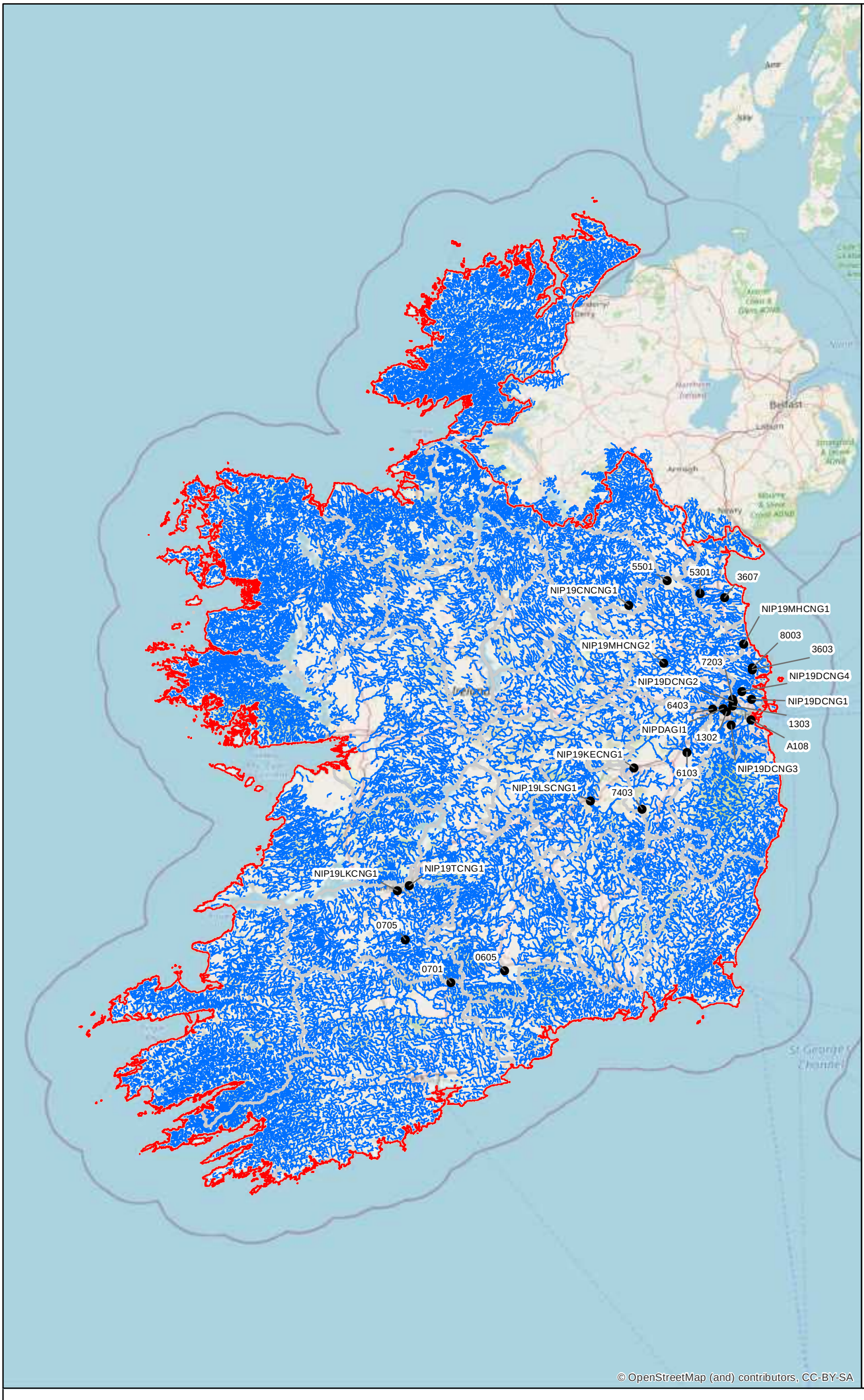
Date

Drawing Title
Geological Heritage Sites

Drawing Status

Figure No.
Fig A9

Issue



Legend

- Project Locations
- Republic of Ireland Boundary
- County Boundaries
- River Network

Kilometers

0 12.5 25 50

Irish Transverse Mercator
EPSG: 2157

Client

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ARUP

50 Ringsend Road T +353 1 233 4455
Dublin 4 F +353 1 668 3169
D04 T6X0 W www.arup.com
Ireland E dublin@arup.com

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title: Gas Networks Ireland - Network Implementation Plan

Scale: 1:1,750,000

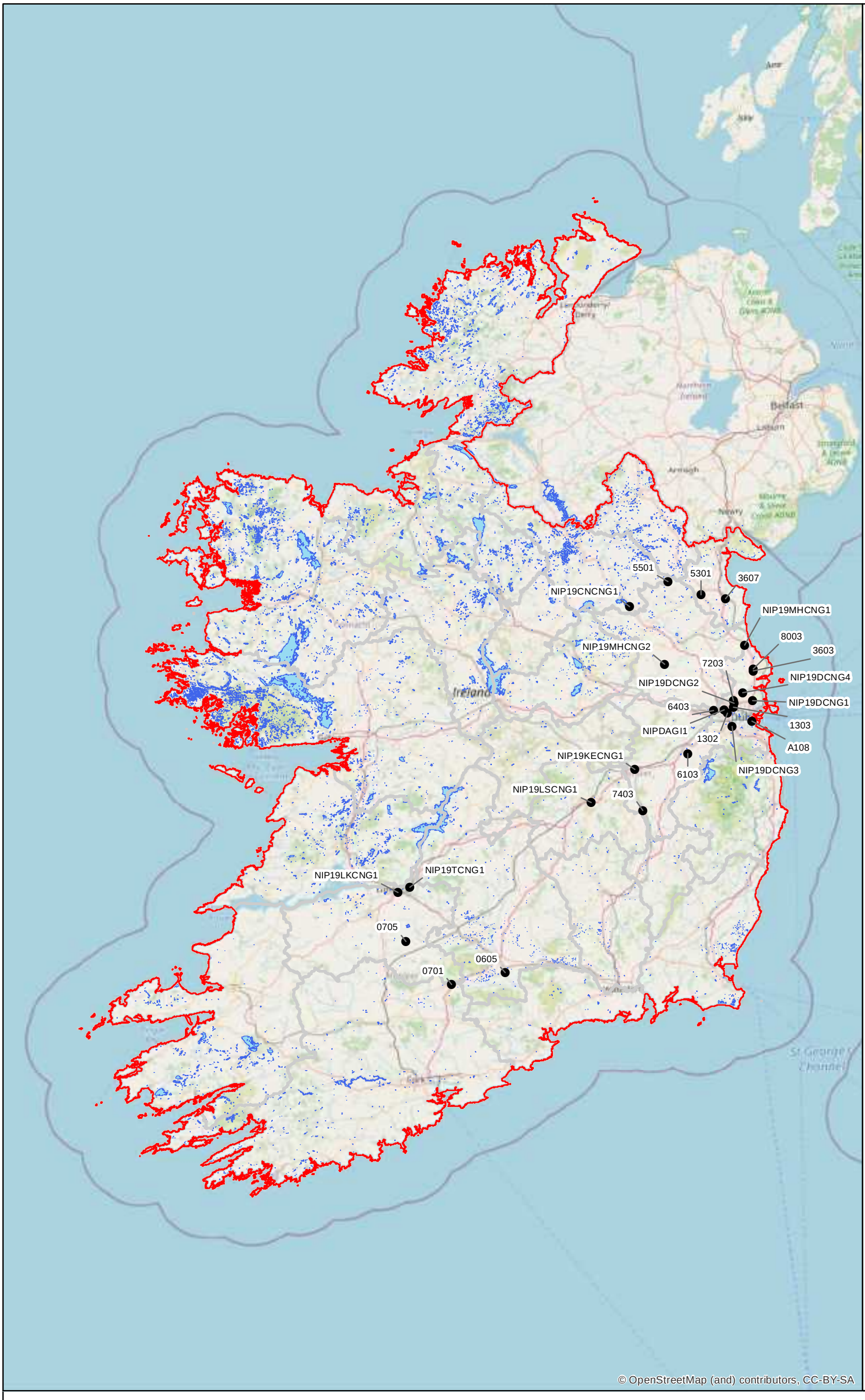
Date:

Drawing Title: Surface Water Features - Rivers

Drawing Status:

Figure No.: Fig A10

Issue:



Legend

- Project Locations
- Republic of Ireland Boundary
- County Boundaries
- Lakes

Kilometers

0 12.5 25 50

Irish Transverse Mercator
EPSG: 2157

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Consultant

ARUP

50 Ringsend Road
Dublin 4
D04 T6X0
Ireland

T +353 1 233 4455
F +353 1 668 3169
W www.arup.com
E dublin@arup.com

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	8/27/2020	LM		

Project Title: Gas Networks Ireland - Network Implementation Plan

Scale: 1:1,750,000

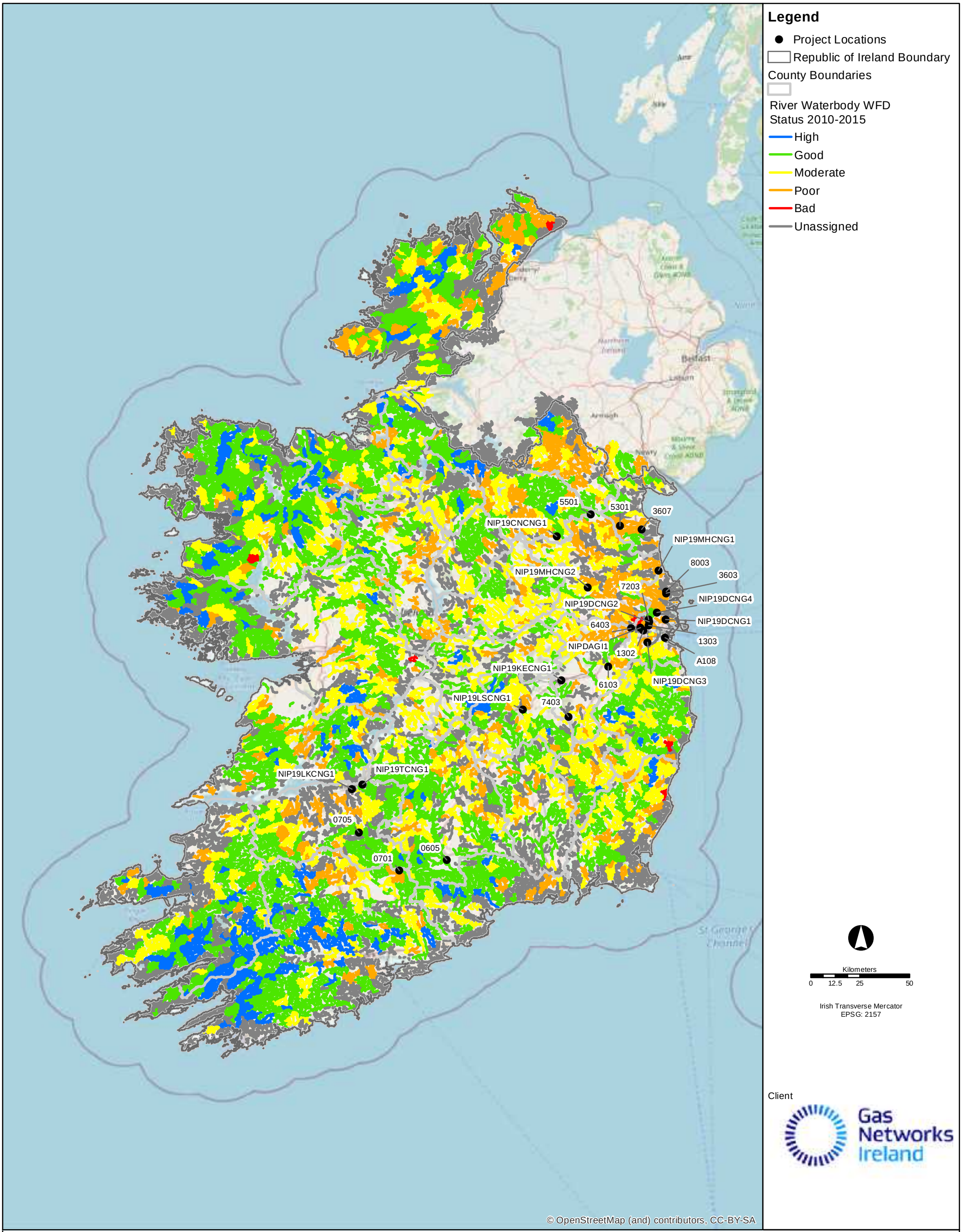
Date:

Drawing Title: Surface Water Features - Lakes

Drawing Status:

Figure No.: Fig A11

Issue:



Consultant

ARUP

50 Ringsend Road
Dublin 4
D04 T6X0
Ireland

T +353 1 233 4455
F +353 1 668 3169
W www.arup.com
E dublin@arup.com

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title
Gas Networks Ireland - Network Implementation Plan

Scale
1:1,750,000

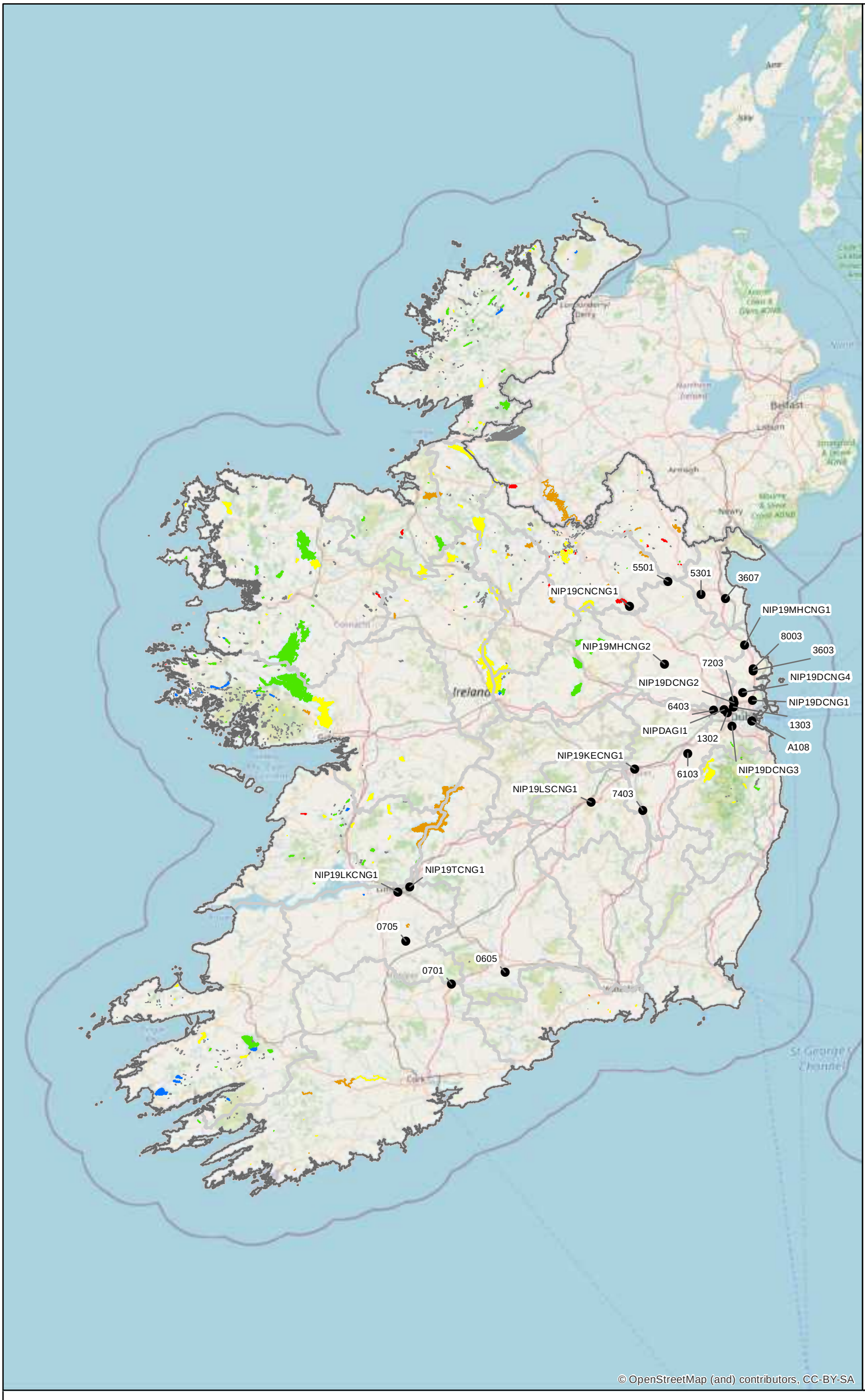
Date

Drawing Title
River Waterbody WFD Quality Status 2010-2015

Drawing Status

Figure No.
Fig A12

Issue



Legend

- Project Locations
- Republic of Ireland Boundary
- County Boundaries
- Lake Waterbody WFD Status 2010-2015
  - High
  - Good
  - Moderate
  - Poor
  - Bad
  - Unassigned

Kilometers

0 12.5 25 50

Irish Transverse Mercator
EPSG: 2157

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Consultant

ARUP

50 Ringsend Road T +353 1 233 4455
Dublin 4 F +353 1 668 3169
D04 T6X0 W www.arup.com
Ireland E dublin@arup.com

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title: Gas Networks Ireland - Network Implementation Plan

Scale: 1:1,750,000

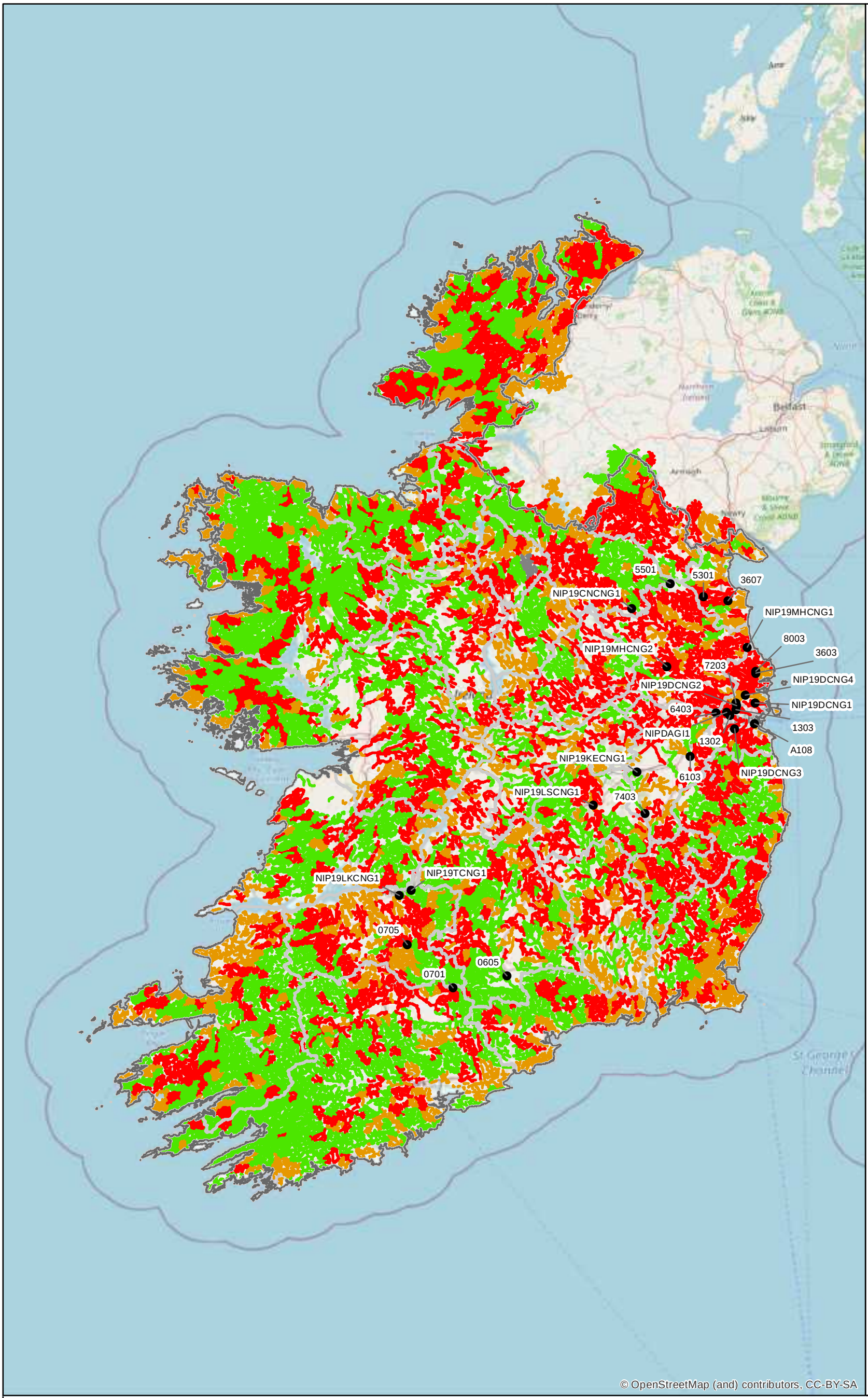
Date:

Drawing Title: Lake Waterbody WFD Quality Status 2010-2015

Drawing Status:

Figure No.: Fig A13

Issue:



Legend

- Project Locations
- Republic of Ireland Boundary
- County Boundaries
- River Waterbodies (Risk)
  - <Null>
  - At risk
  - Not at risk
  - Review

Kilometers
0 12.5 25 50

Irish Transverse Mercator
EPSG: 2157

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Gas Networks Ireland

Consultant

ARUP

50 Ringsend Road
Dublin 4
D04 T6X0
Ireland

T +353 1 233 4455
F +353 1 668 3169
W www.arup.com
E dublin@arup.com

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title: Gas Networks Ireland - Network Implementation Plan

Drawing Title: WFD Risk Status for Rivers

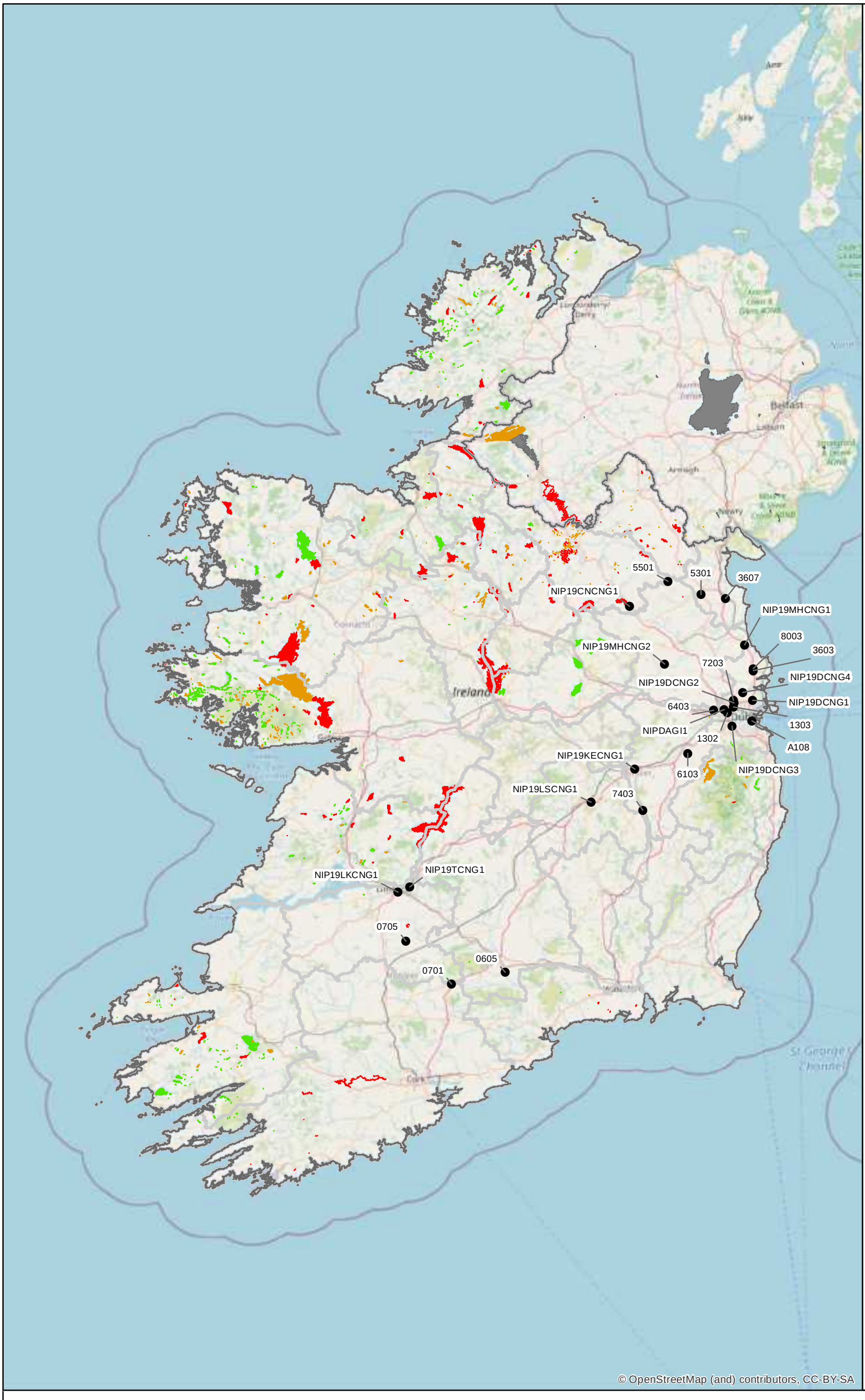
Scale: 1:1,750,000

Drawing Status:

Date:

Figure No.: Fig A14

Issue:



Legend

- Project Locations
- Republic of Ireland Boundary
- County Boundaries
- Lake Waterbodies (Risk)
  - <Null>
  - At risk
  - Not at risk
  - Review

Kilometers

0 12.5 25 50

Irish Transverse Mercator
EPSG: 2157

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Gas Networks Ireland

Consultant

ARUP

50 Ringsend Road T +353 1 233 4455
Dublin 4 F +353 1 668 3169
D04 T6X0 W www.arup.com
Ireland E dublin@arup.com

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title: Gas Networks Ireland - Network Implementation Plan

Drawing Title: WFD Risk Status for Lakes

Scale: 1:1,750,000

Drawing Status:

Date:

Figure No.: Fig A15

Issue:

Legend

- Project Locations
- Republic of Ireland Boundary
- County Boundaries
- Groundwater Source Protection Areas
  - SI-Inner Protection Area
  - SO-Outer Protection Area
- Karst Landforms
- Groundwater Wells and Springs

5501
5301
3607
NIP19CNCNG1
NIP19MHCNG1
8003
NIP19MHCNG2
3603
7203
NIP19DCNG4
NIP19DCNG2
NIP19DCNG1
6403
1303
NIPDAGI1
1302
A108
NIP19KECNG1
NIP19DCNG3
6103
NIP19LSCNG1
7403
NIP19LKCNG1
NIP19TCNG1
0705
0605
0701

Kilometers
0 12.5 25 50

Irish Transverse Mercator
EPSG: 2157

Client

Gas Networks Ireland

Consultant

ARUP

50 Ringsend Road
Dublin 4
D04 T6X0
Ireland

T +353 1 233 4455
F +353 1 668 3169
W www.arup.com
E dublin@arup.com

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title
Gas Networks Ireland - Network Implementation Plan

Drawing Title
Groundwater Features and Public Supply Source Protection Zones

Scale
1:1,750,000

Drawing Status

Date

Figure No.
Fig A16

Issue

Legend

- Project Locations
- Republic of Ireland Boundary
- County Boundaries
- Groundwater Vulnerability
  - Rock at or near Surface or Karst
  - Extreme
  - High
  - Moderate
  - Low
  - Water

5501
5301
3607
NIP19CNCNG1
NIP19MHCNG1
8003
NIP19MHCNG2
3603
7203
NIP19DCNG4
NIP19DCNG2
NIP19DCNG1
6403
1303
NIPDAGI1
1302
A108
NIP19KECNG1
6103
NIP19DCNG3
NIP19LSCNG1
7403
NIP19LKCNG1
NIP19TCNG1
0705
0605
0701

Belfast

Kilometers
0 12.5 25 50

Irish Transverse Mercator
EPSG: 2157

Client

Gas Networks Ireland

Consultant

ARUP

50 Ringsend Road T +353 1 233 4455
Dublin 4 F +353 1 668 3169
D04 T6X0 W www.arup.com
Ireland E dublin@arup.com

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title: Gas Networks Ireland - Network Implementation Plan

Scale: 1:1,750,000

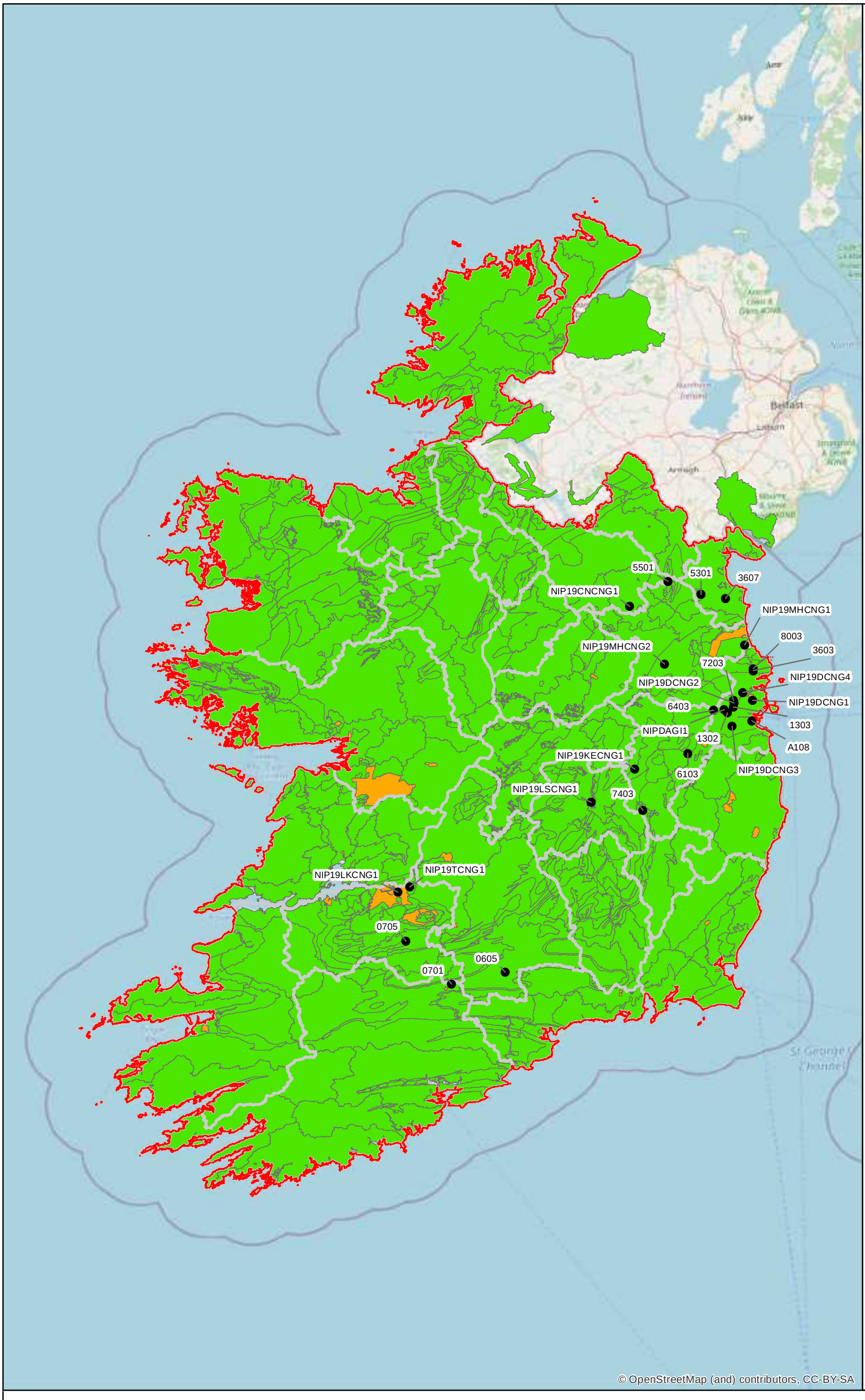
Date

Drawing Title: Groundwater Vulnerability

Drawing Status

Figure No.: Fig A17

Issue



Legend

- Project Locations
- Republic of Ireland Boundary
- County Boundaries
- Ground Waterbody WFD Status 2010-2015
  - Good
  - Poor (GW)

Kilometers
0 12.5 25 50

Irish Transverse Mercator
EPSG: 2157

Client

Gas Networks Ireland

Consultant

ARUP

50 Ringsend Road
Dublin 4
D04 T6X0
Ireland

T +353 1 233 4455
F +353 1 668 3169
W www.arup.com
E dublin@arup.com

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title: Gas Networks Ireland - Network Implementation Plan

Scale: 1:1,750,000

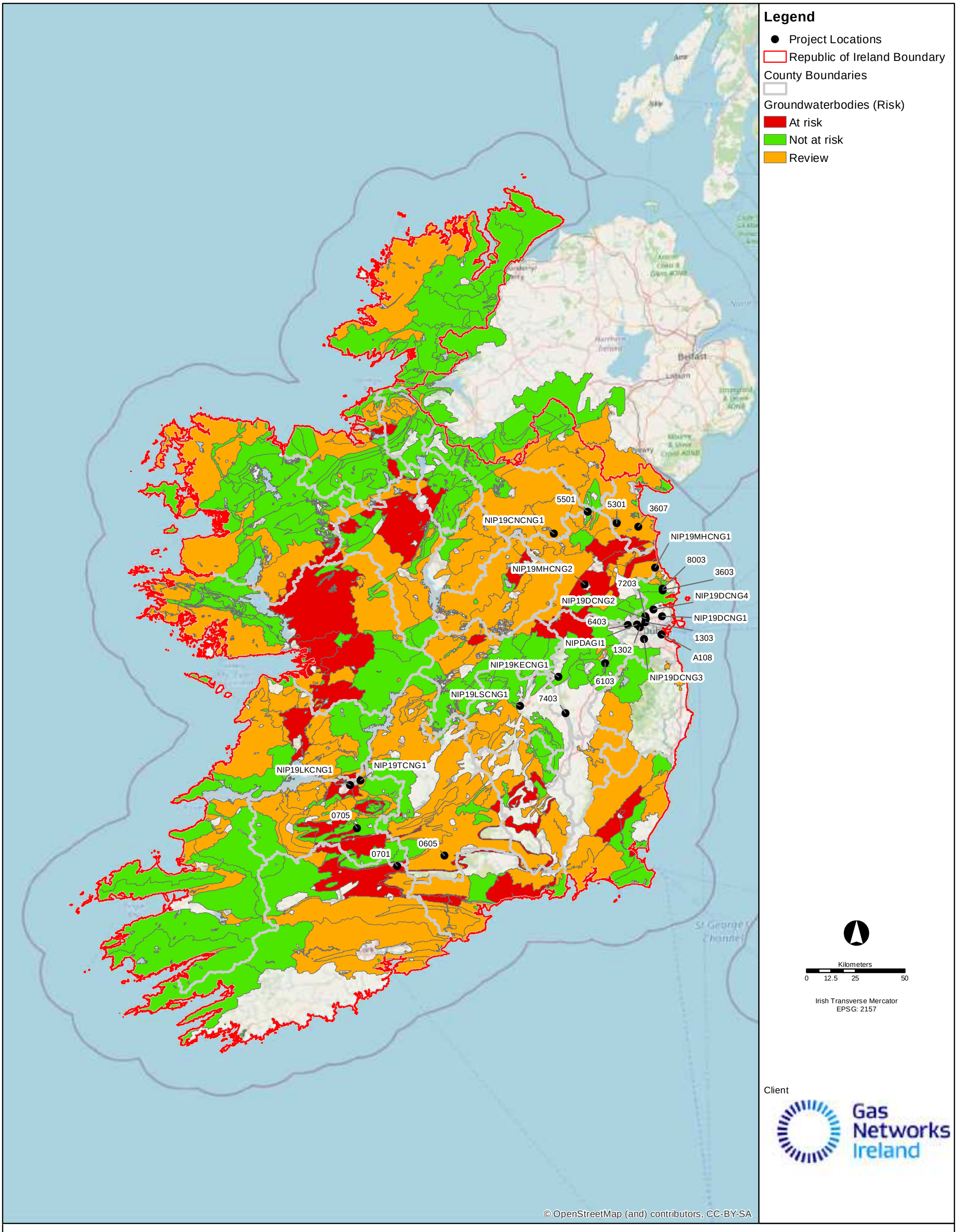
Date:

Drawing Title: Groundwater WFD Quality Status 2010-2015

Drawing Status:

Figure No.: Fig A18

Issue:



Consultant
ARUP
50 Ringsend Road T +353 1 233 4455
Dublin 4 F +353 1 668 3169
D04 T6X0 W www.arup.com
Ireland E dublin@arup.com

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title
Gas Networks Ireland - Network Implementation Plan

Drawing Title
WFD Risk Status for Groundwater

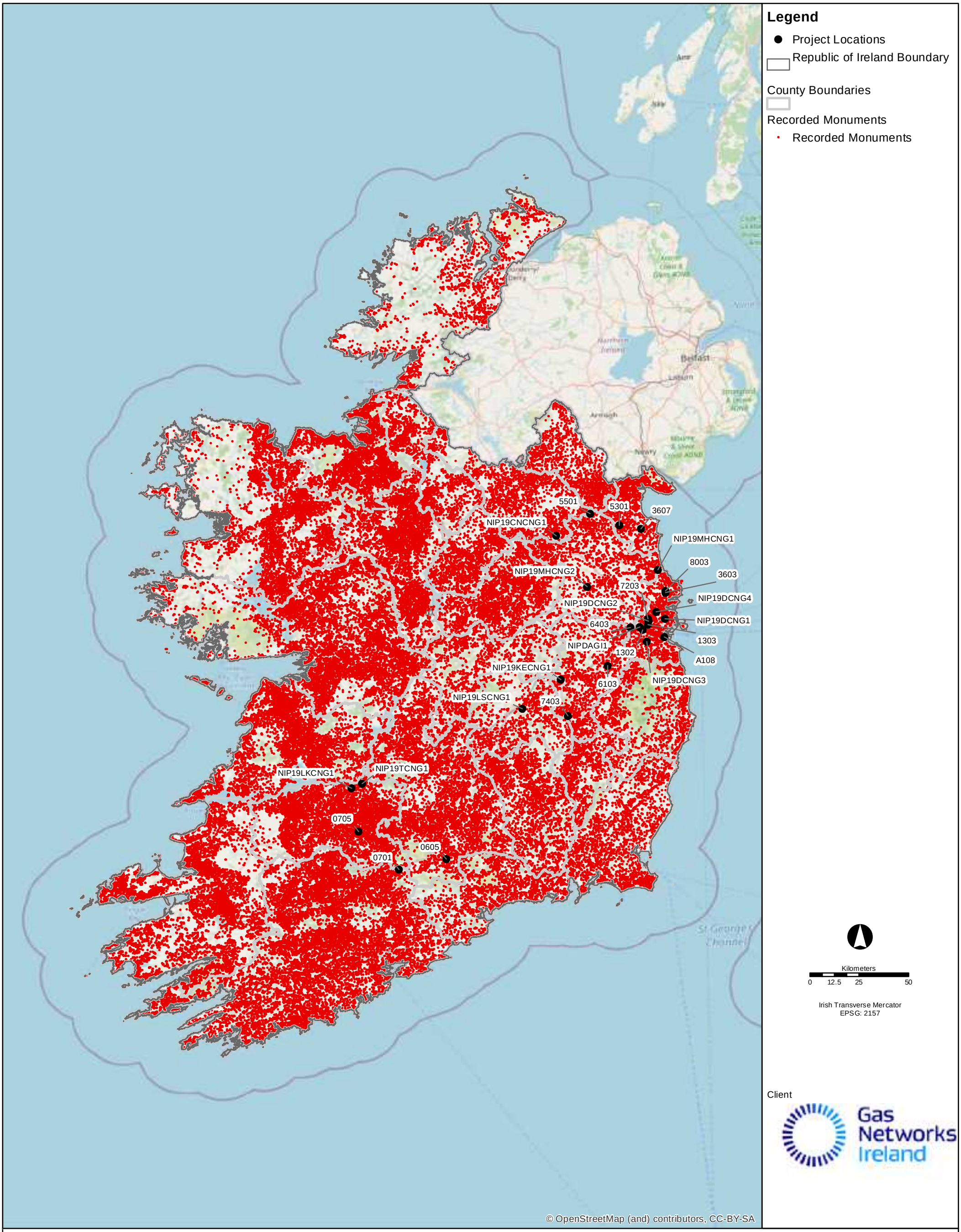
Scale
1:1,750,000

Drawing Status

Date

Figure No.
Fig A19

Issue



Consultant
ARUP
50 Ringsend Road
Dublin 4
D04 T6X0
Ireland
T +353 1 233 4455
F +353 1 668 3169
W www.arup.com
E dublin@arup.com

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title
Gas Networks Ireland - Network Implementation Plan

Drawing Title
Recorded Monuments

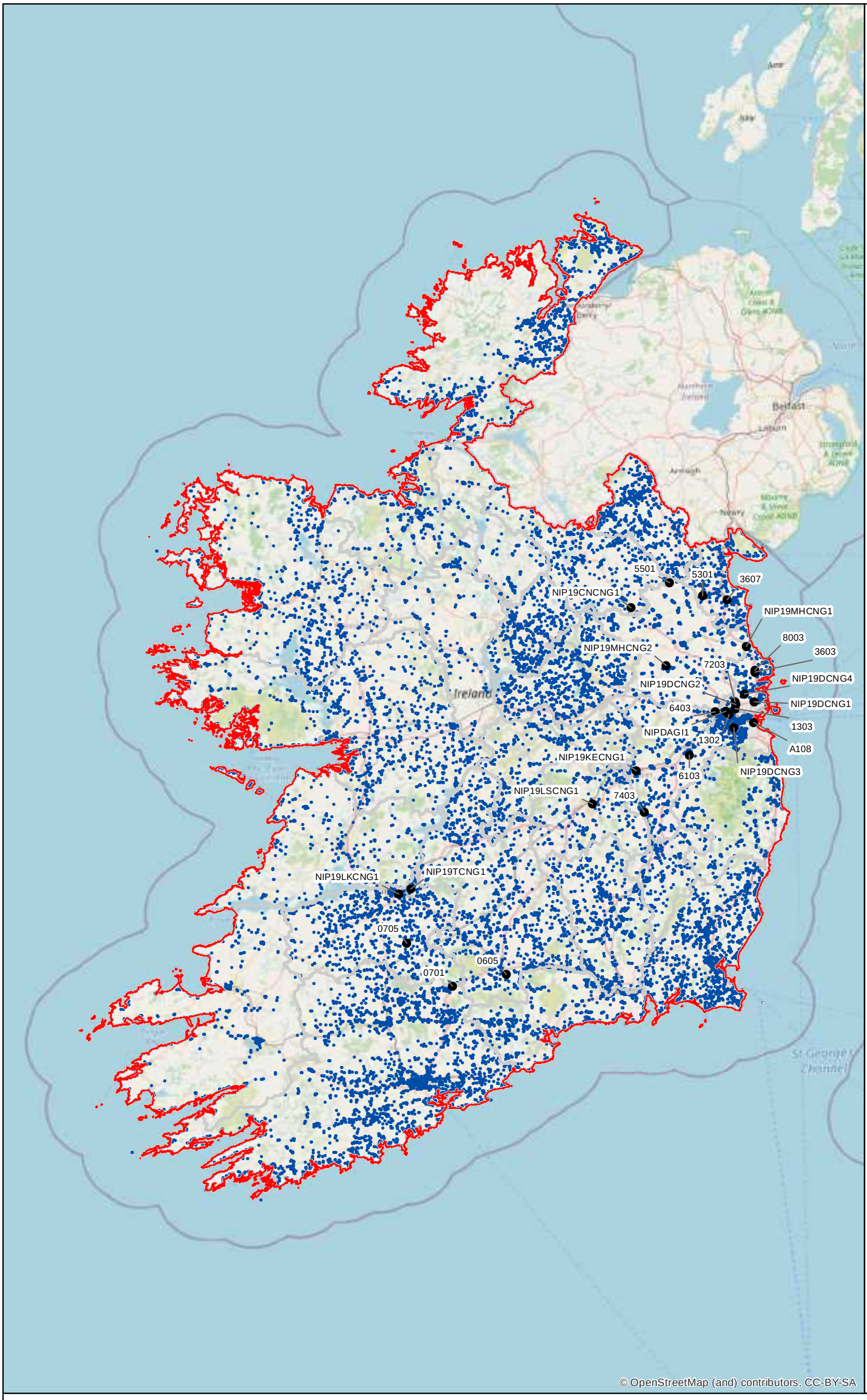
Scale
1:1,750,000

Drawing Status

Date

Figure No.
Fig A20

Issue



Legend

- Project Locations
- Republic of Ireland Boundary
- County Boundaries
- National Inventory of Architectural Heritage (NIAH)

Kilometers
0 12.5 25 50

Irish Transverse Mercator
EPSG: 2157

Client

Gas Networks Ireland

Consultant

ARUP

50 Ringsend Road
Dublin 4
D04 T6X0
Ireland

T +353 1 233 4455
F +353 1 668 3169
W www.arup.com
E dublin@arup.com

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title: Gas Networks Ireland - Network Implementation Plan

Drawing Title: National Inventory of Architectural Heritage Sites

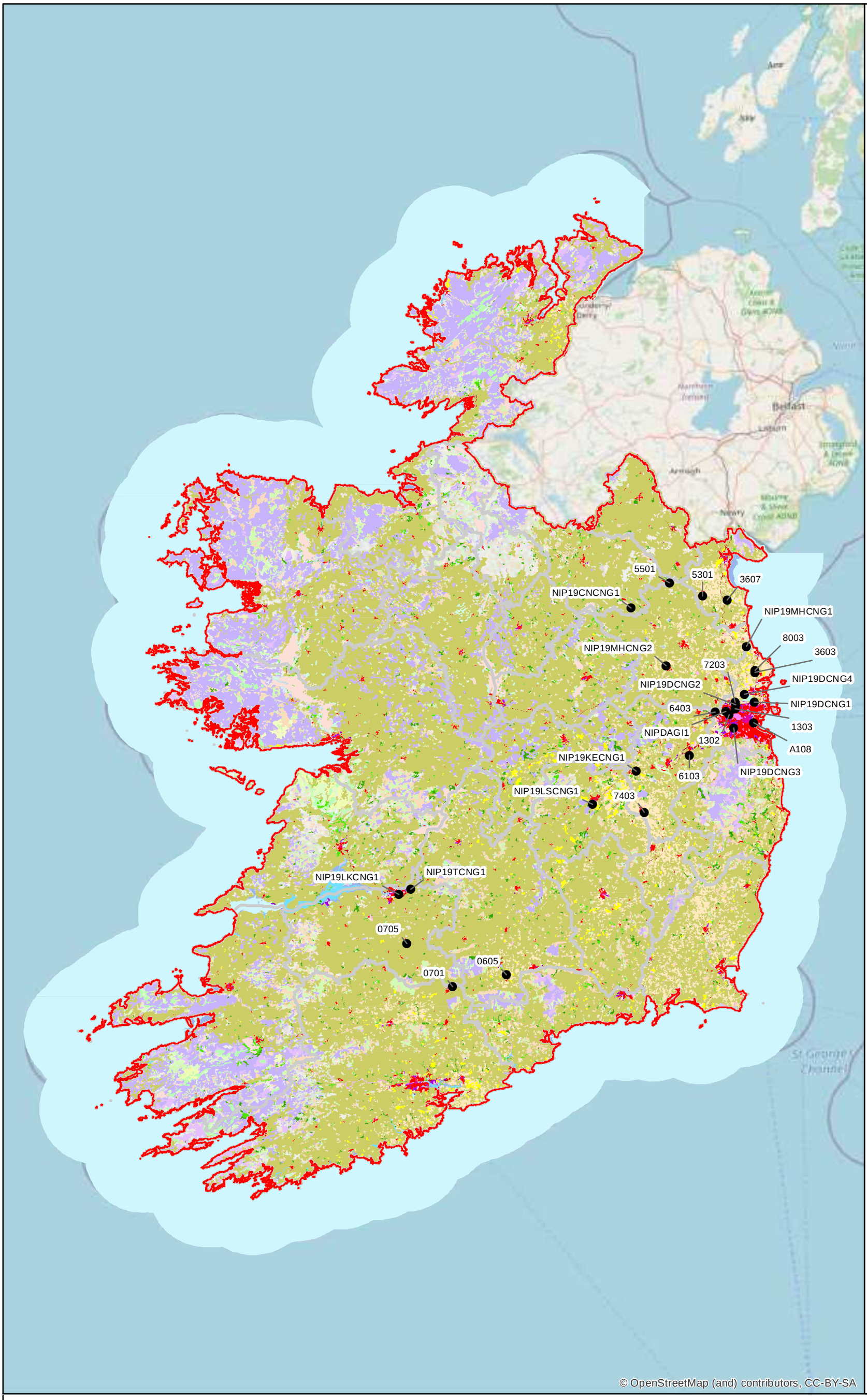
Scale: 1:1,750,000

Drawing Status:

Date:

Figure No.: Fig A21

Issue:



Legend

- Project Locations
- Republic of Ireland Boundary
- County Boundaries

CORINE Landcover 2018

- 111, Continuous urban fabric
- 112, Discontinuous urban fabric
- 121, Industrial or commercial units
- 122, Road and rail networks and associated land
- 123, Port areas
- 124, Airports
- 131, Mineral extraction sites
- 132, Dump sites
- 133, Construction sites
- 141, Green urban areas
- 142, Sport and leisure facilities
- 211, Non-irrigated arable land
- 222, Fruit trees and berry plantations
- 231, Pastures
- 242, Complex cultivation patterns
- 311, Broad-leaved forest
- 312, Coniferous forest
- 313, Mixed forest
- 321, Natural grasslands
- 322, Moors and heathland
- 324, Transitional woodland-shrub
- 332, Bare rocks
- 333, Sparsely vegetated areas
- 334, Burnt areas
- 411, Inland marshes
- 412, Peat bogs
- 421, Salt marshes
- 423, Intertidal flats
- 511, Water courses
- 512, Water bodies
- 521, Coastal lagoons
- 522, Estuaries
- 523, Sea and ocean

Kilometers
0 12.5 25 50

Irish Transverse Mercator
EPSG: 2157

Client

Gas Networks Ireland

Consultant

ARUP

50 Ringsend Road
Dublin 4
D04 T6X0
Ireland

T +353 1 233 4455
F +353 1 668 3169
W www.arup.com
E dublin@arup.com

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title: Gas Networks Ireland - Network Implementation Plan

Scale: 1:1,750,000

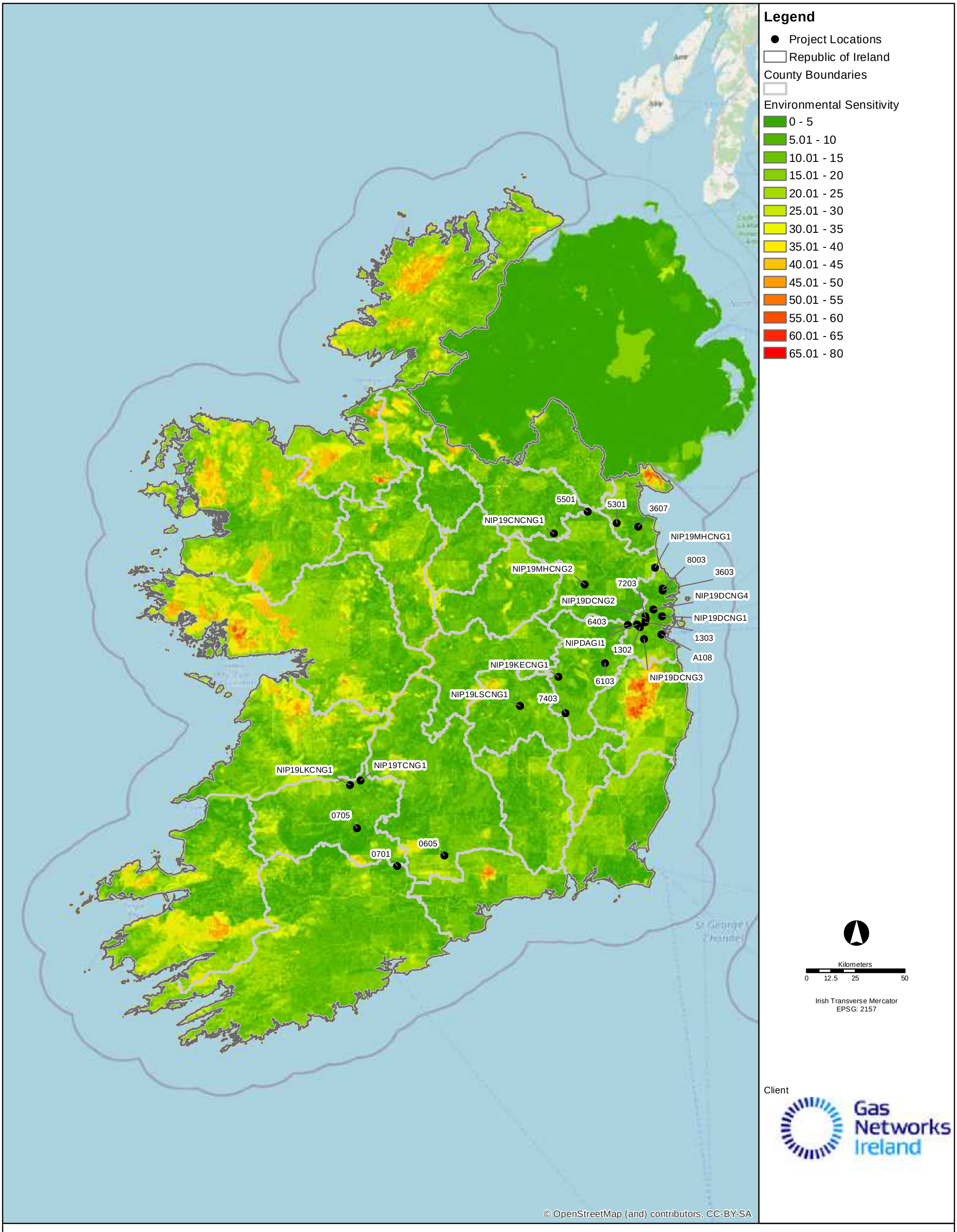
Date:

Drawing Title: CORINE Landcover

Drawing Status:

Figure No.: Fig A22

Issue:



Client

Gas Networks Ireland

Consultant

ARUP

50 Ringsend Road T +353 1 233 4455
Dublin 4 F +353 1 668 3169
D04 T6X0 W www.arup.com
Ireland E dublin@arup.com

Issue	Date	By	Chkd	Appd
	8/27/2020	LM		

Project Title: Gas Networks Ireland - Network Implementation Plan

Scale: 1:1,750,000

Date:

Drawing Title: Environmental Sensitivity Map

Drawing Status:

Figure No.: Fig A23

Issue: