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Environmental Impact Assessment Report

Sky Castle Ltd. – Moygaddy Mixed Use Scheme, Co. Meath & Co. Kildare

VOLUME 1: EIAR MAIN REPORT AND NON-TECHNICAL SUMMARY

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Prepared By:	**MKO** **Tuam Road** **Galway** **Ireland** **H91 VW84**

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1. NON-TECHNICAL SUMMARY

1.1 Introduction

This Environmental Impact Assessment Report (EIAR) has been prepared by MKO Planning & Environmental Consultants on behalf of Sky Castle Ltd, to accompany the six no. planning applications intended to be submitted as part of the proposed Moygaddy Mixed Use Development. Moygaddy is located within the northern Maynooth Environs, as set out in the Maynooth Environs Local Area Plan 2013-2019 (MLAP), which is incorporated into the Meath County Development Plan 2021-2027.

A comprehensive non-statutory Masterplan for the entire Moygaddy area in the Applicant's ownership has been developed, setting out proposals for buildings, open spaces and a movement and land-use strategy. The 'Proposed Development' for the purposes of this EIAR consists of six separate components of the overall Masterplan development of the applicant's landholding in Moygaddy. The Proposed Development lands are zoned for High Amenity, Community Infrastructure, Residential and Strategic Employment.

As part of the proposed Moygaddy Mixed Use Development, three planning applications will be submitted to Meath County Council as outlined below:

- **'Site A' – Strategic Employment Zone** which consists of three office buildings, public road widening and road realignment works, the delivery of approximately 365m of new public access road as part of the Maynooth Outer Orbital Road (MOOR) scheme, internal access road and associated pedestrian and cycle network, car parking and utility connection infrastructure;
- **'Site B' – Healthcare Facilities** which includes a nursing home and primary care centre as well public road widening and road realignment works, internal access road and associated car parking, pedestrian and cycle network and a pedestrian & cycle bridge.
- **The Maynooth Outer Orbital Road (MOOR)** which consists of approximately 1.5km of new distributor road, 2. no single span bridges, pedestrian and cycle improvement measures, 2 no. pedestrian and cycle bridges, upgrade works to existing road network and all associated utilities.

A planning application for a Strategic Housing Development (SHD) ('**Site C'**) will be submitted to An Bord Pleanála under the Strategic Housing Provisions of the Planning and Development (Housing) and Residential Tenancies Act, 2016:

- **'Site C' – Strategic Housing Development** will consist of 360 no. residential homes, a creche facility, scout den, internal access roads, approximately 500m of distributor road as part of the MOOR, 2 no. road bridges, pedestrian and cycle improvements, 2 no. pedestrian & cycle bridges, a public park, shared communal and private open space and all associated site development works.

Two planning applications will be submitted to Kildare County Council for infrastructure works required to connect the Proposed Development to services and utility infrastructure within Co. Kildare:

- The **Kildare Bridge** planning application includes road upgrade works to the existing R157 Regional Road, a proposed pedestrian / cycle bridge adjacent to the existing Kildare Bridge, as well as a proposed wastewater connection to the Maynooth Municipal Wastewater Pumping Station to the southeast of the Proposed Development.

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- The **Moyglare Bridge** planning application includes for the provision of a new integral single span bridge over the Rye Water River with associated flood plain works and embankments, as well as services and utilities connections.

While these developments will be subject to separate planning applications, it was considered prudent to consider all six applications together under one EIAR, due to the proximity, construction timelines and shared infrastructure between the developments. The above proposed developments within the Site A, Site B, Site C, MOOR, Kildare Bridge and Moyglare Bridge applications are collectively referred to as the 'Proposed Development' in this EIAR.

MKO was appointed as planning and environmental consultants on the Proposed Development and commissioned to prepare this EIAR in accordance with the requirements of the Environmental Impact Assessment (EIA) Directive as amended by Directive 2014/52/EU. The EIAR provides information on the receiving environment and assesses the likely significant effects of the project and proposes mitigation measures to avoid or reduce these effects. The function of the EIAR is to provide information to allow the competent authority to conduct the EIA of the Proposed Development.

The EIAR project team comprises a multidisciplinary team of experts with extensive experience in the assessment of projects and in their relevant area of expertise. Each chapter of this EIAR has been prepared by a competent expert in the subject matter.

The classification of impacts in this EIAR follows the definitions provided in the Glossary of Impacts contained in the following guidance documents produced by the European Commission (EC) and the Environmental Protection Agency (EPA):

- *'Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report'* (EC, 2017)
- *'Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (EPA, 2022).

This EIAR and all associated documentation will also be available for viewing at the offices of An Bord Pleanála, Meath County Council and Kildare County Council. The EIAR may be inspected free of charge or purchased by any member of the public during normal office hours at these locations. The EIAR will also be available to view online via the Department of Planning, Housing and Local Government's EIA Portal, which will provide a link to the planning authority's website on which the application details are contained.

1.2 Background to the Proposed Development

This section of the EIAR presents information on the strategic planning context for the Proposed Development, a description of the proposed development site and planning history, the scoping and consultation exercise carried out as part of the EIAR preparation, and details regarding the cumulative impact assessment process.

The Proposed Development site is largely located within the administrative area of Co. Meath, with a partial area of the EIAR study area (comprising the R157 Road and Dunboyne Road extending west of the Dunboyne Road Roundabout from the Kildare Bridge to the Maynooth Municipal Wastewater Pumping Station) located within the administrative boundary of Co. Kildare. The Proposed Development site is located on the northern edge of Maynooth town, off the Dunboyne Road and adjacent to the Carton House Estate. The Proposed Development lands are part of the overall Maynooth Environs lands and form part of the Moygaddy Masterplan area owned by the Applicant, Sky Castle Ltd.

The Proposed Development site is bounded by the River Rye Water along the southern boundary and agricultural fields to the north and west, while Carton House Demesne (Demense Wall - RPS Ref:

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91556) is located directly adjacent to the east. The Dunboyne Road (R157) and local road L2214-3/ /L6219 (included as part of the proposed Maynooth Outer Orbital Road (MOOR)) roads are located to the south-east and north/ north-west respectively. Access to the site is currently from the Dunboyne Road (R157) and the local road L2214-3/L6219.

In terms of policy context, the National Planning Framework (2018) (NPF) is the Government's high-level strategic plan for shaping the future growth and development of Ireland to the year 2040. The NPF includes ten National Strategic Outcomes implemented through the Strategic Investment Priorities, and includes:

- Compact Growth
- Enhanced Regional Accessibility
- Strengthened Rural Economics and Communities
- Sustainable Mobility
- A Strong Economy Supported by Enterprise, Innovation and Skills
- Sustainable Management of Water and Other Environmental Resources

The overview of the NPF set out in Section 2.2 states that it supports the sustainable growth of rural communities, to include development in rural areas and promotes new economic opportunities arising from digital connectivity and indigenous innovation. Section 3.2 of the NPF relates specifically to the Eastern and Midland Region, where it is stated that:

> "*managing the challenges of future growth is critical to this regional area. A more balanced and sustainable pattern of development, with a greater focus on addressing employment creation, local infrastructure needs and addressing the legacy of rapid growth, must be prioritised*" (our emphasis added).

The Regional Spatial Economic Strategy for the Eastern and Midland Region (RSES) 2019 - 2031 is the strategic plan and investment framework for the region and sets out the overarching regional policy objectives to help shape future growth. The regional policy objectives set down specifically for Maynooth in the RSES include the following:

> *"Support the continued development of Maynooth, co-ordinated with the delivery of strategic infrastructure including pedestrian and cycle linkages within the town and to the Royal Canal, DART expansion and road linkages forming part of the Maynooth Outer Orbital Route in a manner which supports future development and population growth and builds on synergies with Maynooth University promoting a knowledge-based economy"*(RPO 4.33).

And

> *"Support Maynooth as a key town to act as an economic driver for north Kildare and provide for strategic employment at key locations to improve the economic base of the town and provide for an increased number of local jobs"* (RPO 4.34).

It is specifically noted within the RSES, in relation to the Key Town of Maynooth, that:

> "*lands at Moygaddy within the Maynooth Environs of County Meath have also been identified for Science and Technology based employment*".

The policies and objectives of the Meath County Development Plan (CDP) 2021 - 2027 are, in principle, supportive of the proposed development. The site is located in the Maynooth Environs, and within the Dublin Metropolitan Area. Maynooth, which is located in Co. Kildare, on the Meath boundary, is noted as a Key Town in the Meath County Development Plan. The CDP advises that the population of the Maynooth environs located in Meath, where the Proposed Development site lies, is anticipated to grow to 1,000 persons by 2027 from 0 persons in 2016, with a household allocation of 500 units for this plan period. This Proposed Development which includes new healthcare and commercial

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office uses goes hand in hand with this population growth, which will be met by lands adjacent to the subject site.

Part of the application site, relating to road, services and pedestrian infrastructure extends into the administrative boundary of County Kildare, south of the Maynooth Environs lands. The extant County Development Plan (CDP) for County Kildare covers the period 2017 – 2023. Objective SO 1 supports the sustainable long-term growth of Maynooth, among other towns in the county.

The relevant planning history of the proposed development site, the planning applications in the vicinity of the site along with other applications within the wider area are set out in Section 2.2 of this EIAR.

An informal scoping exercise was undertaken as part of the EIAR preparation process. Scoping is the process of determining the content, depth and extent of topics to be covered in the environmental information to be submitted to a competent authority for projects that are subject to an Environmental Impact Assessment (EIA). This process is conducted by contacting the relevant authorities and bodies with interest in the specific aspects of the environment likely to be affected by the proposal. These organisations are invited to submit comments on the scope of the EIAR and the specific standards of information they require. Comprehensive and timely scoping helps ensure that the EIAR refers to all relevant aspects of the proposed development and its potential effects on the environment. In this way, scoping not only informs the content and scope of the EIAR, it also provides a feedback mechanism for the proposed design itself.

A Scoping Document providing details of the application site and the Proposed Development, was prepared by MKO and circulated on 9th of August 2021 to the relevant agencies, NGOs and other relevant parties. A summary of all scoping and consultation works, including pre-planning meetings with Meath County Council and Kildare County Council, is provided in Section 2.9 of Chapter 2 of the EIAR. Copies of all scoping responses are provided in Appendix 2-1.

1.3 Consideration of Reasonable Alternatives

This section of the EIAR contains a description of the site selection criteria and the reasonable alternatives that were considered for the Proposed Development. This section also outlines the design considerations in relation to the Proposed Development and indicates the main reasons for selecting the chosen option with regards to environmental impacts.

It is important to acknowledge that although the consideration of alternatives is an effective means of avoiding environmental impacts, there are difficulties and limitations when considering alternatives. Indeed, as is clear from the provisions of the EIA Directive itself, the requirement is to consider *"reasonable alternatives"* which are relevant to the project and its characteristics. In general terms, issues such as hierarchy, non-environmental factors and certain site-specific issues (zoning, ownership, etc.) may also be relevant to the consideration of reasonable alternatives by the developer.

Local planning policy objectives and zoning, proximity to Maynooth town and delivery of the Maynooth Orbital Outer Relief (MOOR) Road were key facilitators in the selection of the Moygaddy site for the proposed Mixed-Use development. Alternative sites or locations on unzoned lands were therefore not considered for the Proposed Development.

The design of the Proposed Development has been an informed and collaborative process from the outset, involving the designers, developers, engineers, environmental, hydrological and geotechnical, archaeological specialists and traffic consultants. The aim being to reduce potential for environmental effects while designing a project capable of being constructed and viable.

Throughout the preparation of the EIAR, the layout of the Proposed Development has been revised and refined to take account of the findings of all site investigations, which have brought the design from

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its first initial layout to the current proposed layout. The design process has also taken account of the recommendations and comments of the relevant statutory and non-statutory organisations and bodies as detailed in Section 2.9 of Chapter 2 in this EIAR.

The management of processes that affect the volumes and characteristics of emissions, residues, traffic and the use of natural resources has formed part of the consideration of reasonable alternatives through the project's development.

The construction works on the site will require the use of raw materials in the form of energy to supply plant and machinery, standard building materials including stone, metals, pipework, concrete, electrical, plumbing etc and raw materials are consumed to manufacture building materials. The use of these resources will be controlled by the employment of best practice construction techniques including waste management practices.

The processes to be employed during the construction of the Proposed Development, and described in Chapter 4 of this EIAR, are standard best practice for the construction industry in Ireland. There will be no novel processes or methods employed. Since the proposed processes represent industry standard best practice, alternative processes were not considered to be reasonable and were therefore not considered further in the EIAR.

Mitigation by avoidance has been a key aspect of the Proposed Development's evolution through the design process. Avoidance of the environmentally (including ecological, archaeological and hydrogeological) sensitive areas of the site limits the potential for environmental effects. The alternative to this approach is to encroach on the environmentally sensitive areas of the site and accept the potential environmental effects and risk associated with this.

The best practice design and mitigation measures set out in this EIAR will contribute to reducing any risks and have been designed to avoid any potential impacts on identified environmental receptors. The alternative is to either not propose these measures or propose measures which are not best practice and effective, neither of which are sustainable options.

1.4 Description of the Proposed Development

This section of the EIAR describes the development and its component parts (the 'Proposed Development') including a description of the site, proposed construction activities and methodologies as well as general construction and operational phase characteristics of the project.

Sky Castle Ltd. intends to submit to a total of six planning applications as part of the Moygaddy Mixed Use Development (henceforth referred to as the Proposed Development).

- A total of three planning applications will be submitted to Meath County Council as the relevant competent authority:
  - Of these three applications, one planning application seeks to provide for the first phase of a Strategic Employment Zone (referred to as **Site A**)
  - One planning application is for Healthcare Facilities which includes a Nursing Home and Primary Care Centre (referred to as **Site B**), and
  - One planning application is for the delivery of the proposed Maynooth Outer Orbital Road (**MOOR**).

- The planning application for the **Site C** - Strategic Housing Development (SHD) will be submitted to An Bord Pleanála under the Strategic Housing Provisions of the Planning and Development (Housing) and Residential Tenancies Act, 2016.

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- There will also be two separate planning applications submitted to Kildare County Council for shared infrastructure, proposed services and utilities connections to Maynooth town in Co. Kildare:
  - One planning application includes a proposed pedestrian / cycle bridge adjacent to the existing **Kildare Bridge**, as well as a proposed wastewater connection to the Maynooth Municipal Wastewater Pumping Station to the southeast of the Proposed Development site.
  - The second planning application to be submitted to Kildare County Council is located to the southwest of Site C (SHD) for the provision of an integral single span bridge over the River Rye Water at **Moyglare Bridge**, with associated flood plain works and embankments.

The Strategic Employment Zone (**Site A**) will include 3 No. office blocks (Block A: 5 storeys, Block B: 3 storeys, Block C: 3 storeys) and associated parking, site roads and associated site works. The proposals for Site A also include road upgrade works including the provision of a signalised junction on the R157 Dunboyne Road and the construction of a section of the Maynooth Outer Orbital Route (MOOR) and provision of associated pedestrian and cycle infrastructure, as well as a realignment of a section of the R157.

The Healthcare Facilities (**Site B**) will include a new 2-storey Nursing Home of 156 no. bedrooms and a new three-storey Primary Care Centre, and associated parking, site roads and associated site works. The proposals for Site B also include upgrade works to a section of the R157 Regional Road from the new site entrance south to Kildare Bridge on the R157 (representing a portion of the MOOR.

The proposed Strategic Housing Development (**Site C**) includes the construction of 360 no. residential homes comprising the following:

- 196 no houses (including 19 no. 2 beds, 156 no. 3 beds and 21 no. 4 beds).
- 102 no. duplexes (including 51 no. 1 beds and 51 no. 2 beds) set out in 6 no. blocks.
- 62 no. apartments (including 26 no. 1 beds and 36 no. 2 beds) set out in 2 no. blocks.

Site C also encompasses a public park and playground, a two-storey creche facility, a single-storey Scout Den facility, and all associated site parking, site roads (including pedestrian and cycling network) and associated site works.

The proposed **MOOR** development encompasses road upgrades and new road construction, namely the provision of approximately 1,700m of new distributor road comprising of 7.0m carriageway with turning lane where required, footpaths, cycle tracks and grass verges.

A detailed description of the component parts of each of the above 6 No. planning applications is provided in Chapter 4 of the EIAR. Details are also provided in Chapter 4 regarding the proposed construction phase operations, including phasing and access arrangements. Design stage Construction and Environmental Management Plans (CEMPs) are provided in Volumes 3a, 3b & 3c(i) Appendix 4-3 and Volumes 3d, 3e & 3f Appendix 4-2 of this EIAR. The CEMPs will be in place throughout the construction phase and will take account of all requirements specified by the Planning Authority during the planning process.

Information on construction methodologies is provided in Chapter 4, including soil excavation and redistribution, construction of site roads, excavation and services installation, building construction, bridge construction, headwalls, directional drilling and landscaping works. Details are also provided regarding site management, including waste management, control of dust and noise emissions, road cleaning, water supply, wastewater management, movement of aggregates and other materials, and construction traffic and plant.

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Chapter 4 of this EIAR also provides information in relation to the operational phase of the Proposed Development, including surface water drainage, wastewater infrastructure, water supply, access arrangements, and resource, waste management and energy use.

1.5 Population and Human Health

The key issues examined in this chapter of the EIAR include population trends, human health, employment and economic activity, land-use, residential amenity, community facilities and services, tourism, noise, and health and safety.

This socio-economic study of the receiving environment includes an examination of the population and employment characteristics of the area. Information regarding the population and general socio-economic data were sourced from the Central Statistics Office (CSO), the Meath County Development Plan 2021 - 2027, the Kildare County Development Plan 2017-2023, Fáilte Ireland and any other literature pertinent to the area.

The Proposed Development is a greenfield site, located in south County Meath and in the northeast environs of Maynooth town. The site of the Proposed Development lies predominately within the Rodanstown District Electoral Division (DED) while also lying partly in Maynooth DED. This Study Area (combined Rodanstown and Maynooth DEDs) has a population of 17,121 persons, as of 2016 and comprises a total land area of 63 km^2, (Source: CSO Census of the Population 2016). Rodanstown DED encompasses rural lands and so does not have any primary population centres. Maynooth DED includes a large town which acts as a primary population centre. Maynooth is classed under the Kildare County Development Plan 2017-2023 settlement hierarchy as a Large Growth II Smaller in scale but strong active growth town.

The population of the Study Area increased by 16.8% in the period between 2011 and 2016. This rate of population growth is significantly higher than that which was recorded at State level (3.8%), and at county level for both Co. Meath (5.9%) and Co. Kildare (5.8%) also.

Maynooth town, which is the closest urban area to the Proposed Development, possesses a number of amenities and community facilities, including GAA, Rugby and other sports clubs and recreational areas. There are a wide range of services available in the area, retail and personal services are centred in Maynooth town centre, with further industrial areas and business parks located in the environs of Maynooth town.

The closest primary school to the Proposed Development site is Gaelscoil Ruairi, which is located approximately 350m west of the proposed Moyglare Bridge. The nearest Secondary School, Maynooth Community College, is located approximately 150m west of the Proposed Development, close to the proposed Moyglare Bridge.

The area around the Proposed Development site has many opportunities for walking and cycling in the countryside. Carton House demesne is located directly adjacent to the east of the Proposed Development site, on the eastern side of the R157 Regional Road. Carton House demesne possesses 1,100 acres of woodland and walking trails. The Royal Canal Greenway runs 130 km from Maynooth to Longford. The Greenway is accessible from Maynooth Town Centre approximately 700m south of the Proposed Development site.

The closest significant tourist attraction to the Proposed Development is Moygaddy House, which is a protected structure. Moygaddy House is located directly adjacent to the north of Site C (SHD). Further to this, Moygaddy Castle Towerhouse is also located within the Proposed Development site, to the south of Moygaddy House within the area that is designated as a Public Park as part of the proposed Development. Moygaddy Castle is also a protected structure of cultural heritage and archaeological importance.

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The likely significant effects of the Proposed Development on Population and Human Health have been assessed for the construction and operational phases. The potential impacts and associated mitigation measures are addressed under the headings of Health and Safety, Employment and Investment, Population, Tourism and Amenity, Noise, Dust and Air Quality, Traffic and Residential Amenity. Where any potential negative impacts were identified with regard to Population or Human Health, mitigation measures have been incorporated into the design of the proposed development or will be implemented during the relevant phase of the project to avoid, reduce or offset this impact. No significant negative environmental effects will therefore occur on Population or Human Health as a result of the Proposed Development. The project will have a significant positive effect in terms of providing additional facilities for Employment and Investment, Residential Amenity, and improved links to Maynooth town and the surrounding area, including significantly enhanced pedestrian and cycling infrastructure.

1.6 Biodiversity

This chapter assesses the likely significant effects (both alone and cumulatively with other projects) that the proposed development may have on Biodiversity, Flora and Fauna and sets out the mitigation measures proposed to award, reduce or offset any potential significant effects that are identified.

Multidisciplinary walkover surveys were carried out across multiple dates in July/August 2021 and July/August 2022. The multidisciplinary surveys undertaken fall within the recognised optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith et al., 2011). A comprehensive walkover of the entire site was completed. Habitats were classified in accordance with the Heritage Council's *'Guide to Habitats in Ireland'* (Fossitt, 2000). Habitat mapping was undertaken with regard to guidance set out *in 'Best Practice Guidance for Habitat Survey and Mapping'* (Smith et al., 2011). Bat surveys were carried out in July/ August 2021 and August 2022, which falls within the optimum survey period for bat activity surveys, provided weather conditions are favourable (Collins, 2016).

The study area comprises primarily of Improved Agricultural Grassland (habitat code GA1) delineated by Treeline (WL2) and Hedgerow habitat (WL1). An area of Mixed Broadleaved Woodland (WD1) occurs within the centre of the site, adjacent to Moygaddy Castle. The Rye Water River flows along the southern boundary of the site and the Blackhall Little Stream flows through the centre of the site, merging with the Rye water River. Both watercourses are categorised as Eroding Upland Rivers (FW1). The Rye Water River to the east of Kildare Bridge is designated as part of the Rye Water Valley/Carton Special Area of Conservation (SAC). The woodland area along with large section of treeline and hedgerow will be retained as part of the proposed development. Any treeline and hedgerow loss has been compensated for by an extensive replanting proposal, which is outlined in the landscaping masterplan accompanying this application.

One active badger sett was recorded within the site along a mature treeline within the centre of site. This has been avoided through the design of the proposed development. Evidence of fox, pine marten and otter were recorded within the site. In addition, bat surveys were undertaken in 2021 as part of the detailed baseline assessment. No evidence of populations of these species being significant at more than a local level was recorded. No signs of any additional protected fauna were recorded within the study area during the field surveys.

The proposed development will not result in significant effects on surface water quality, groundwater quality or aquatic faunal species and habitats during the construction or operational phase of the proposed development. Any potential pathway for pollution has been robustly blocked through project design and mitigation. The proposed development will not result in any significant effect on any European designated sites or nationally designated sites, including the Rye Water Valley/Carton SAC. A Natura Impact Assessment has been prepared and will be submitted as part of the planning application.

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Provided that the proposed development is constructed and operated in accordance with the design, best practice and mitigation that is described within this application, significant impacts on ecology are not anticipated.

1.7 Land, Soils and Geology

This chapter provides a baseline assessment of the environmental setting of the Proposed Development in terms of land, soils, and geology, and discusses the potential impacts that the construction and operation of the Proposed Development will have. Where required, appropriate mitigation measures to limit any identified potentially significant impacts to soils and geology are recommended and an assessment of residual impacts and significance of effects provided.

A desk study of the site and the surrounding study area was completed in advance of undertaking a site walkover survey. The desk study involved collecting all the relevant geological data for the Proposed Development site and study area.

Site Investigations were carried out by Site Investigations Ltd. (SIL) between June and July 2021. The scope of works included cable percussive boreholes, rotary coreholes, trial pits, dynamic probes and laboratory testing of field samples. All fieldwork was carried out in accordance with BS 5930:2015, Engineers Ireland GI Specification and Related Document 2nd Edition 2016 and Eurocode 7: Geotechnical Design. The results of all site investigations are presented in the Appendices of this EIAR.

A visual inspection of the Proposed Development site was also undertaken by MKO in August 2021 and August 2022. The purpose of the site inspection was to investigate the site for any surface indications of impacts to land, soils and geology resulting from current land use and confirm the baseline conditions. Particular attention was paid to identifying any potential areas of soil erosion that may have arisen from the operation of agricultural machinery on the site. No evidence of any residual impacts to land, soils and geology was observed.

According to Geological Survey of Ireland (GSI) mapping (www.gsi.ie), the Proposed Development site is predominantly underlain by soils which are largely derived from basic parent materials (surface water gleys/ basic poorly drained mineral [BminPD] soils). There is a small section of the Proposed Development site which is underlain by mineral alluvial (AlluvMin) soils along the banks of the Rye Water River. There is no proposed infrastructure in this area except for drainage infrastructure and road widening and upgrade works along the existing R157 Regional Road.

The Teagasc soils map (www.gis.teagasc.ie/soils/map) identifies the soil association within the wider region of the site as fine loamy drift with limestones. These soils are generally well drained and well suited to pastoral agricultural systems. Site Investigations reported average soil depths of approximately 2.6m across the Proposed Development site.

Based on the GSI bedrock map of the region, the site is underlain by the Lucan Formation (Dark Limestone and Shale) formation (LU) which consists of dark grey to black, fine-grained, occasionally cherty limestones that weather paler, usually to pale grey. There are also rare dark coarser grained calcarenitic limestones, sometimes graded, and interbedded dark-grey calcar. This formation spreads both east and west, encompassing large areas of counties Meath, Dublin, Kildare Westmeath and Offaly.

The Lucan Formation is classified by the GSI as a Locally Important Aquifer – Bedrock which is Generally Moderately Productive only in Local Zones (LI). There are no Geological Heritage sites within or close to the Proposed Development.

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The Proposed Development will require minor alteration of ground levels to ensure it is at an adequate level for the proposed surface water drainage and foul water drainage due to the relatively flat topography. Excavation of soil and subsoil will be required in preparation for the construction of building foundations, suitable sub-formation for road construction, trenching for foul and drainage water infrastructure and other services. The estimated amounts of excavations and earthworks required for the various components of the Proposed Development are described in the Construction & Environmental Management Plans appended to this EIAR.

Surface water management for the Proposed Development is designed to comply with the Greater Dublin Strategic Drainage Study (GDSDS) policies and guidelines and the requirements of Meath County Council.

Due to the nature of the proposals for Sites A, B and C, there will be a substantial water requirement once operational, primarily for washing and plumbing facilities. The existing Irish Water (IW) Mains within the Study Area are reported as having their source as the Dunboyne Water Supply Zone (WSZ). Sites A, B and C are located entirely within the Liffey and Dublin Bay (09) Water Framework Directive (WFD) Catchment. The Proposed Development will be subject to a New Connection Agreement with Irish Water, in accordance with their requirements. There is no proposed extraction of groundwater at the site for drinking water purposes.

It is proposed to provide a Pumping Station constructed to IW standards and specifications to the west of the proposed nursing home building at Site B within the Proposed Development. Site A to the northeast, Site B to the east and Site C to the west of the proposed pumping station will drain by gravity to the Pumping Station where it will then be pumped to the existing Irish Water network along the L1013 Local Road in County Kildare, approximately 1km south of the proposed pumping station.

Further details regarding surface water drainage, water supply and wastewater treatment are provided in the Engineering Services Reports provided in Appendix 4-9 of the EIAR.

Due to the shallow nature of the excavations, the design and mitigation measures to reuse excavated materials onsite and the 'low' value of the soil and rock resource the magnitude of the effect is considered to be a negative, direct, slight, likely, permanent impact on topsoil, subsoils and bedrock. No significant effects on land, topsoil, subsoil or bedrock will occur as part of the Proposed Development during the construction or operational phases.

1.8 Hydrology and Hydrogeology

This chapter of the EIAR identifies, describes, and assesses the potential effects of the Proposed Development on the local hydrological and hydrogeological environment (surface water and ground water).

A desk study and preliminary hydrological assessment of the site of the Proposed Development and the surrounding area was completed in advance of the site walkover. This involved collection of all relevant geological, hydrological, hydrogeological and meteorological data for the area.

The entire site of the Proposed Development lies within the Eastern River Basin District (RBD). With respect to regional hydrology, under the Water Framework Directive (WFD), the Proposed Development is located entirely within the Liffey and Dublin Bay (09) surface water catchment.

There are no streams or rivers which pass through the site boundary of either Site A or Site B. However, Site B is bounded by the Rye Water River which is within the Liffey_SC_080 sub catchment. The Blackhall Little Stream runs through the centre of Site C, while the site is bounded by the Rye Water River to the south. The MOOR crosses the Rye Water River at 2 no. locations to the west and south east of the site, and crosses the Blackhall Little Stream at 2 no. locations at the centre and north east of the site. The Kildare Bridge and Moyglare Bridge applications crosses the Rye Water River.

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A detailed Flood Risk Assessment has been prepared by JBA Consulting included as Appendix 8-1 to this EIAR. The Flood Risk Assessment identifies that there is a negligible risk of flooding at the Proposed Development.

Based on the GSI bedrock map of the region, the site is underlain by the Lucan Formation (Dark Limestone and Shale) formation (LU) which consists of dark grey to black, fine-grained, occasionally cherty limestones that weather paler, usually to pale grey. There are also rare dark coarser grained calcarenitic limestones, sometimes graded, and interbedded dark-grey calcar. This formation spreads both east and west, encompassing large areas of counties Meath, Dublin, Kildare Westmeath and Offaly.

Site Investigations were carried out by Site Investigations Ltd. (SIL) between June and July 2021. The scope of works included cable percussive boreholes, rotary coreholes, trial pits, dynamic probes and laboratory testing of field samples. All fieldwork was carried out in accordance with BS 5930:2015, Engineers Ireland GI Specification and Related Document 2nd Edition 2016 and Eurocode 7: Geotechnical Design. The results of all site investigations are presented in the Appendices of this EIAR.

Due to the nature of the Proposed Development, being near surface construction activities, combined with the nature of the hydrological regime and bedrock aquifer type, impacts on groundwater are generally negligible and surface water is generally the main sensitive receptor assessed during the impact assessment.

Due to the nature of the proposals for Sites A, B and C, there will be a substantial water requirement once operational, primarily for washing and plumbing facilities. The existing Irish Water (IW) Mains within the Study Area are reported as having their source as the Dunboyne Water Supply Zone (WSZ). Sites A, B and C are located entirely within the Liffey and Dublin Bay (09) Water Framework Directive (WFD) Catchment. The Proposed Development will be subject to a New Connection Agreement with Irish Water, in accordance with their requirements. There is no proposed extraction of groundwater at the site for drinking water purposes.

It is proposed to provide a Pumping Station constructed to IW standards and specifications to the west of the proposed nursing home building at Site B within the Proposed Development. Site A to the northeast, Site B to the east and Site C to the west of the proposed pumping station will drain by gravity to the Pumping Station where it will then be pumped to the existing Irish Water network along the L1013 Local Road in County Kildare, approximately 1km south of the proposed pumping station.

Further details regarding surface water drainage, water supply and wastewater treatment are provided in the Engineering Services Reports provided in Volumes 3a, 3b & 3c Appendix 4-9 of the EIAR.

The impact of the proposed road bridge and pedestrian / cycle bridge structure was further assessed by JBA Consulting, as part of a wider flood study of the Moygaddy Environs, with the conclusions indicating that the proposed bridge structures will have 'no impact on flood following its construction'.

Measures will be in place throughout the construction and operational phases, including implementation of a Construction and Environmental Management Plan (CEMP), to ensure there will be no significant effects to hydrology or hydrogeology. Design stage CEMPs are included in Appendix 4-3 of this EIAR. The CEMPs will be updated prior to the commencement of construction to incorporate all requirements of the Planning Authority.

1.9 Air and Climate

This chapter of the EIAR identifies, describes and assesses the potential significant direct and indirect effects on air quality and climate arising from the construction and operation of the Proposed Development. The Proposed Development site is currently a greenfield site, with small scale agriculture as the primary land-use.

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Air Quality

The Environmental Protection Agency (EPA) has designated four Air Quality Zones for Ireland:

- Zone A: Dublin City and environs
- Zone B: Cork City and environs
- Zone C: 16 urban areas (cities and large towns) with population greater than 15,000
- Zone D: Remainder of the country.

These zones were defined to meet the criteria for air quality monitoring, assessment and management described in the Air Framework Directive and Daughter Directives. The Proposed Development site lies within Zone D, which represents rural areas located away from large population centres. The EPA publishes Air Monitoring Station Reports for monitoring locations in all four Air Quality Zones. The most recent report on air quality in Ireland, *'Air Quality in Ireland 2020'* was published by the EPA in 2021. The air quality in the vicinity of the Proposed Development site is typical of that of rural areas in the east of Ireland, i.e., Zone D.

There are no statutory limits for dust deposition in Ireland. The German TA-Luft standard for dust deposition sets a maximum permissible emission level for dust deposition of 350 mg/m^2/day. Recommendations from the Department of the Environment, Health & Local Government apply the Bergerhoff limit of 350 mg/m^2/day to the site boundary of quarries. This limit value can also be implemented with regard to dust impacts from construction activities associated with the Proposed Development.

Measures, including a Construction and Environmental Management Plan, will be in place to ensure there will be no significant direct or indirect effects on air quality due to dust or exhaust emissions during the construction stage.

Climate

Ireland has a temperate, oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Casement, Co. Dublin, is the nearest weather and climate monitoring station to the Proposed Development site that has meteorological data recorded for the 30-year period from 1981 – 2010. The monitoring station is located approximately 19.3 km southeast of the Proposed Development site.

Meteorological data recorded at Casement over the 30-year period from 1981 – 2010 shows that the wettest months are October, November and January, with July being the driest month. July was also shown to be the hottest month with a mean temperature of 15.7 degrees Celsius. The mean annual wind speed at the station is 10.7 metres per second. The 30-year annual average rainfall is 754.2 mm/yr. this is considered to be slightly above average when compared to the annual average rainfall for Dublin (Merrion Square) which recorded annual average rainfall of 730 mm/yr over the same period.

The construction of foundations and buildings, site roads and associated infrastructure will require the operation of construction vehicles and plant on-site. Greenhouse gas emission, e.g., carbon dioxide (CO_2), carbon monoxide and nitrogen oxides associated with vehicles and plant will arise as a result of the construction activities. This potential impact will be slight, given the insignificant quantity of greenhouse gases that will be emitted, and will be restricted to the duration of the construction phase. Measures, including a Construction and Environmental Management Plan, will be in place to ensure there will be no significant direct or indirect effects on air quality or climate due to greenhouse gas emissions during the construction stage.

The proposed development has been designed to comply with the relevant Building Regulations, including thermal performance and energy saving measures. Solar PV panels will be located on the roof of buildings to offset any dependency and overuse of fossil fuel. The Proposed Development includes for the upgrade and provision of additional cycling and pedestrian infrastructure and bicycle

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parking facilities. The improved pedestrian and cycling infrastructure will provide alternative modes of transport for those living and working locally, which will reduce the dependency on vehicular transport and associated greenhouse gas emissions.

1.10 Noise and Vibration

The noise and vibration section of this EIAR has been compiled by Damian Brosnan of Damian Brosnan Acoustics. Potential noise and vibration impacts may be divided into the following categories:

- Construction phase noise impacts on surrounding receptors.
- Construction phase vibration impacts on surrounding receptors.
- Operational phase noise impacts on surrounding receptors.
- Noise impacts within the completed/operational development from external sources ('inward impacts').

Typical ambient noise levels across the local area were measured, and these were used to identify appropriate construction phase noise criteria. Likely construction plant were identified, and their noise emissions data used to predict likely noise levels at surrounding receptors. Predicted levels were assessed in the context of identified criteria, and mitigation measures identified where required. Potential sources of vibration during the construction phase were identified, and impacts assessed by reference to commonly applied criteria.

Noise sources associated with the operational phase of the Proposed Development were reviewed, and potential impacts assessed. Such impacts relate chiefly to traffic. An assessment of inward noise impacts was undertaken, and the requirement for enhanced façade treatments was assessed. Although this is typically only relevant to residential developments, it is also of benefit to the healthcare and office settings, particularly given that the proposed nursing home will accommodate elderly persons. The assessment was undertaken having regard to guidance set out in *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (Environmental Protection Agency, 2022).

There are two dwellings on the development site. The first of these is Moygaddy House, a vacant period dwelling with extensive outbuildings located near the L2214-L6219 junction. This will be retained as part of the development. The second is a small dwelling located nearby, 90m north of the junction. Although currently occupied, it is understood that the resident intends to vacate the dwelling prior to the commencement of construction. Neither of the dwellings on the site is therefore a noise sensitive receptor.

Offsite, receptors exist in several directions, particularly to the south and southwest at the fringes of Maynooth. Apart from the Carton House Hotel to the east, all identified receptors within 500m consist of residential dwellings. No other receptors such as creches, schools, care centres or nursing homes have been identified.

A baseline noise survey was carried out at the Proposed Development site. The main noise source audible at the measurement positions was distant traffic on the wider road network, which was continuously audible at all times in the background throughout daytime, evening and night-time periods.

Predictive noise modelling of expected construction noise sources associated with Site A, Site B, Site C, the MOOR, Kildare Bridge and Moyglare Bridge indicates that construction noise emissions will not exceed relevant criteria set out in *British Standard BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise (2014)* and the then National Roads Authority document *Good practice guidance for the treatment of noise during the planning of national road schemes (2014)*. Construction phase noise impacts will be imperceptible to not significant

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(increasing to slight to moderate at two dwellings adjacent to Kildare Bridge works), and will be temporary. Construction phase traffic noise impacts will be imperceptible. No construction vibration impacts are expected at offsite receptors.

Following completion, noise emissions arising within the completed development will be identical in character to emissions arising across the nearby fringes of Maynooth. Emissions will be urban-residential in character, and will not give rise to offsite impacts.

Noise impacts at offsite receptors attributable to vehicle movements on roadways within the completed site will be imperceptible. While increases in traffic on the surrounding road network will arise as a result of the development, much of the increase will be attributable to traffic using the proposed MOOR which will benefit the wider town. Increases associated with onsite traffic directly will be less than 2 dB, resulting in noise impacts at nearby receptors which are imperceptible. Increases associated with the MOOR will be approximately 3 dB at most, resulting in noise impacts at nearby receptors which are imperceptible to not significant.

At the completed development, inward noise emissions will arise from the surrounding road network, including the MOOR. The future noise risk is low across most of the site when assessed using ProPG guidance, increasing to medium at units directly fronting the MOOR road and the L6219 road. These properties will benefit from moderately enhanced glazing on units facing these roads. Road-facing facades at the primary care centre will also benefit from moderately enhanced glazing in order to attenuate night-time levels due to passing traffic.

Noise levels in amenity areas and at the proposed creche will be lower than relevant criteria. Apartment residents will benefit from onsite green spaces, thus offsetting traffic noise levels on balconies facing roadways.

Cumulative noise impacts resulting from a combination of Site A, Site B, Site C, the MOOR, Kildare Bridge ad Moyglare Bridge, as well as offsite sources, will be imperceptible.

1.11 Landscape and Visual

This chapter of the Environmental Impact Assessment Report (EIAR) addresses the potential landscape and visual impacts of the Proposed Development. The emphasis in this chapter is on the likely significant direct and indirect effects of the Proposed Development. The chapter includes the Landscape and Visual Impact Assessment (LVIA) methodology, a description of the existing landscape, as well as landscape policy and relevant guidance. It includes a description of Meath and Kildare County Council's landscape policy and relevant policy contained in the Maynooth Local Area Plan pertaining to the landscape setting in which the Proposed Development is located.

The landscape of the site and wider area is described in terms of its existing character, which includes a description of landscape value, the susceptibility of the landscape to change and a determination of landscape sensitivity. The landscape and visual impact assessment of the Proposed Development uses representative viewpoints and photomontages. Photomontages are photorealistic visualisations that superimpose an image of the Proposed Development upon a photograph or series of photographs. Photomontages are displayed in the photomontage booklet which forms Volume 2 of this EIAR. The potential impacts in both landscape and visual terms are then assessed, including cumulative impacts.

A Landscape Masterplan has been created for all lands within the Maynooth Environs which form the wider Moygaddy Masterplan Site. There is an objective to retain (where possible) existing field boundaries and mature native woodland, as well as provide additional planting of native species within the individual site boundaries.

The Landscape Plan aims to increase the recreational capacity of the lands at Moygaddy through the provision of pedestrian/cycle access routes which will link various areas of the wider Masterplan site, as

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well as along the MOOR. These safe access pathways will facilitate recreational amenity at various features within the Masterplan site, such as local watercourses (Rye Water and Blackhall Little) and Moygaddy Castle ruins.

The Proposed Development is located within a greenfield site which currently comprises a rural agricultural landscape as part of Moygaddy Stud Farm. Predominant landcover is improved grassland of open grazing pasture used for sheep and cattle, as well as horses in the northern fields of Moygaddy farm. The entirety of the Moygaddy Masterplan Area (as defined in the Maynooth Environs Written Statement) comprises 13 No. fields. Field cells are bounded by stone walls, wooden fencing and well-established vegetation in the form of mature hedgerows, scrub, gorse and mixed woodland. Mature broadleaf trees (e.g. Oak. Ash, Alder, Beech) are a common feature of the site, particularly along local watercourses, along field boundaries and at the centre of the site where Moygaddy house and the ruins of Moygaddy Castle are enclosed by mature woodland.

The remnants of Moygaddy castle, including the tower and other elements such as a well and old stone wall boundaries, are sensitive cultural heritage features within the site. The area containing these features is parkland surrounded by mature woodland. These lands are designated as H1 High amenity Areas in the Maynooth Environs Written Statement.

Although the wider landscape of Maynooth and its surrounding farmlands are generally very flat, the Proposed Development site comprises rolling pasture with localised topographical undulations. The River Rye Water flows easterly along the south-western perimeter of the Masterplan area. A steep embankment exists along the southern margins of the site as the landform rises and extends away from the Rye Water to the north-east.

This is a modified and managed working landscape, influenced by the ongoing livestock grazing at the Moygaddy Stud Farm. Other human influences include grid infrastructure such as metal pylons and overhead lines which cross the north-eastern extent of the Masterplan area, as well as a communication mast at Moygaddy House.

During the construction phase, potential landscape and visual effects will result as the site changes from an area of agricultural land to a construction site of considerable size. This is expected to be carried out across a period of approximately 3.5 years. Potential landscape effects include vegetation removal, earthworks and a subsequent change in character. These effects will include permanent negative effects, where vegetation is removed, and the land is re-graded, and short-term effects such as the activities of machinery, resulting in noise and dust in the landscape. Construction phase visual effects include potential negative effects on the nearby visual receptors as a result of the vegetation removal, earthworks and operation of machinery. These visual effects will be most pronounced in the immediate vicinity of the site. Cranes may be required to facilitate construction of the taller buildings of the Proposed Development (e.g. Office Block A – 5 storeys); these are likely to be visible from greater distances than other components of the construction phase and are accounted for in the determination of visual effects. The construction phase effects will be short term in duration.

The operational phase commences following completion of construction works. Mitigation, remedial and avoidance measures have been integral in the design of the Proposed Development. Strategic siting and design of infrastructure components reduce the potential landscape and visual effects of the Proposed Development and are therefore factored into the assessments of the Proposed Development. The Proposed Development has been designed with the intention of becoming a lasting benefit to the local area, and in this regard, all operational effects will be long-term.

A dedicated landscape design is included as part of the Proposed Development and is included in Volumes 3a, 3b 3c(i) Appendix 4-7 and Volumes 3d, 3e & 3f Appendix 4-5. An overriding principle of the proposed scheme's landscape design philosophy is to retain, where possible, the existing trees, hedgerows and field boundaries present on the site, creating a high-quality external setting. Retention of these trees and hedgerows will allow continued function as wildlife corridors for the area. As well as conserving important biodiversity corridors and providing visual screening from visual receptors,

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retention of existing field boundary vegetation will enable the site to retain some of its existing rural landscape character. Provision of pedestrian pathways and cycleways are also an important element of the landscape design. The implementation of these safe public access routes enhances the recreational value of the landscape (e.g. access to the Rye Water and Moygaddy Castle Ruins) as well as providing a platform to connect with Maynooth Town.

The designated landscape plan also includes planting of trees, shrubs and other vegetation. The planting will naturally mitigate the effects of the Proposed Development through replacement of green spaces and biodiversity which will be lost during the construction phase, as well as providing some additional visual screening of the Proposed Development from visual receptors. It is noted that this mitigation will improve over time as vegetation establishes following the commencement of the operational phase.

1.12 Cultural Heritage

The Cultural Heritage section of this EIAR has been prepared by Aegis Archaeology. This chapter comprises an assessment of the potential impact of the proposed development on the Cultural Heritage resource. Cultural heritage includes archaeology, architectural built heritage and any other tangible assets.

A desktop analysis of all baseline data and a comprehensive programme of field inspection of the Proposed Development site was undertaken. The assessment was based on GIS-based mapping, historic mapping, and available LiDAR imagery, to assist with an assessment of impacts.

One no. recorded monument is located within the Proposed Development site boundary, and 2 no. protected structures lie immediately adjacent to the Proposed Development site (less than 10m) , while 34 recorded monuments and 55 protected structures are situated within 2km of the Proposed Development site boundary. This is not considered to be a relatively high density of monuments and the relative proximity of the historic centre of Maynooth to the site affects this perceived density.

Of those monuments located within or immediately adjacent to the site boundary, none is predicted to be directly impacted by the development proposals. Any potential negative impacts to the potential archaeological features that may lie subsurface and are currently identified as anomalies in the geophysical survey undertaken as part of this EIAR, are ameliorated by a number of mitigation measures. These measures will include pre-development targeted archaeological testing followed by excavation by hand should features prove archaeological in nature, and construction stage monitoring.

Indirect effects on the setting of recorded monuments (RMPs) within 2km, and Record of Protected Structure (RPS) / National Inventory of Architectural Heritage (NIAH) features within 2km were included in order to assess impacts on setting in the wider landscape. Potential visual effects on recorded monuments, RPS and NIAH structures within 2km of the PDS are regarded as Slight-Not Significant.

An assessment of cumulative impacts was also undertaken taking into consideration projects within the vicinity of the Proposed Development site. This included other development projects listed in Chapter 2 of this EIAR. No direct cumulative impacts are predicted to occur.

1.13 Material Assets

This chapter of the EIAR takes into the account the details and findings of the following reports and assessments, which are presented in the Appendices of the EIAR:

- Volumes 3a, 3b 3c(i) Appendix 4-1: Mobility Management Plans, prepared by O'Connor Sutton Cronin Consulting Engineers;

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- Volumes 3a, 3b, 3c(i) Appendix 4-3 and Volumes 3d, 3e 3f Appendix 4-2: Construction and Environmental Management Plans (including Construction Traffic), prepared by O'Connor Sutton Cronin Consulting Engineers;
- Volumes 3a, 3b 3c(i) Appendix 4-4 and Volumes 3d, 3e 3f Appendix 4-3: Construction and Demolition Waste Management Plans, prepared by O'Connor Sutton Cronin Consulting Engineers;
- Volumes 3a, 3b 3c(i) Appendix 4-5: Operational Waste Management Plans, prepared by Byrne Environmental;
- Volumes 3a, 3b 3c(i) Appendix 4-9: Engineering Services Reports, prepared by O'Connor Sutton Cronin Consulting Engineers;
- Volumes 3a, 3b 3c(i) 3d Appendix 13-1: Traffic Impact Assessments, prepared by O'Connor Sutton Cronin Consulting Engineers;
- Volumes 3a, 3b 3c(i) Appendix 13-2: Road Safety Audits, prepared by Bruton Consulting Engineers.

Traffic

Site A (the Strategic Employment Zone) is located on the southernmost extent of Co. Meath, aligning with the county boundary to Co. Kildare. It is approximately 2km north of the town of Maynooth, Co. Kildare, and forms part of the larger strategic landbank on zoned lands known as Maynooth Environs. The site is immediately bound by:

- R157 Maynooth – Dunboyne Regional Road, to the east;
- Agricultural lands to the north and south; and
- Moygaddy Stream to the west.

Site B (the Healthcare Facilities) is located on the southernmost extent of Co. Meath, aligning with the county boundary to Co. Kildare. It is approximately 1.5km north of the town of Maynooth, Co. Kildare, and forms part of a larger strategic landbank on zoned lands known as Maynooth Environs. The site is immediately bound by:

- R157 Maynooth – Dunboyne Regional Road, to the east;
- Agricultural lands to the north and west; and
- River Rye Water, to the south.

Site C (the Strategic Housing Development, SHD) is located on the southernmost extent of Co.Meath, aligning with the county boundary to Co. Kildare, and is approximately 1.5km north of the town of Maynooth, Co. Kildare, and is immediately bound by:

- Agricultural lands to the east, north and west;
- River Rye Water to the south.

The planning application for the Maynooth Outer Orbital Road (MOOR) includes for the construction of c1.5km of new distributor road linking the existing R157 Regional Road, located to the east of Site B, to the Moyglare Hall road in Mariavilla, located southwest of the SHD (Site C) site. The distributor road will comprise of 7.0m carriageway with turning lanes where required, footpaths, cycle tracks and grass verges. Road upgrade works will also be required to facilitate the delivery of the MOOR, including approximately 750m section of proposed road upgrade works along the existing R157 Regional Road from the existing Kildare Bridge up to the new proposed signalised junction with the MOOR.

Access to the proposed MOOR will be via the R157 Regional Road to the south and east, with access also being provided from the L2214 and L6219 Local Roads to the north and west of the site. Access will also be provided to the MOOR via the proposed Moyglare Bridge to the south.

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The road network associated with the Kildare Bridge planning application can be broken-up in two distinct elements, mainly:

1. *Approximately 115m section of proposed road upgrade works along the existing R157 Regional Road between the existing Kildare Bridge and the Dunboyne Roundabout in County Kildare; and*
2. *Installation of new standalone pedestrian and cycle link adjacent to the Kildare Bridge.*

The main access to the Kildare Bridge site will be via the R157 Regional Road (Dunboyne Road).

The road network associated with the Moyglare Bridge planning application can be broken-up in two distinct elements, mainly:

1. *Installation of 2 no. new single span bridge over the River Rye and Blackhall Little Stream to facilitate the delivery of the MOOR; and*
2. *Construction of approximately 160m section of new access road linking the existing Moyglare Hall Road to the south of the site to the proposed single span bridge crossing the River Rye.*

The main access to the Moyglare Bridge Planning Application site will be via the existing Moyglare Hall Road to the south of the site.

The construction phase of the proposed development will have a short-term slight negative effect on the surrounding transport network. There will be no significant effects on the network. Traffic control measures will be in place throughout the construction phase, including a Construction and Environmental Management Plan (CEMP), which will be finalised upon agreement with the relevant Planning Authorities in advance of the commencement of construction.

Traffic modelling for the operational phase of the proposed development has been completed as part of the Traffic Impact Assessments in Volumes 3a, 3b, 3c(i) & 3d Appendix 13-1 of this EIAR. The traffic modelling results include the following key findings:

- Potential trip redistribution through Kilcloon / L2214 local road is negligible.
- Upgrade of the L6219 and R157 road junction will allow for redistribution of traffic away from Maynooth town.
- All key junctions within the study area have been modelled and found to have adequate capacity for the proposed development without any significant delays. Where some congestion or delays were identified during morning or afternoon peaks, this will be addressed by way of the junction upgrades and additional road capacity to be provided as part of the proposed development.

Upgrades will include new signalised junctions, road improvements, and provision of extensive new pedestrian and cycling facilities. Operation of the proposed development will be carried out in a phased manner initially.

The following benefits to the Maynooth Transport Strategy are expected as part of the proposed MOOR development:

- Improvements to the connectivity in the area of the development;
- Increase in capacity of roads and junctions in the immediate vicinity;
- Provision of dedicated pedestrian and cycle infrastructure, enabling a strong modal shift towards sustainable transport;
- The proposed development will also allow the BusConnects proposal to take account of the new infrastructure and further service the Maynooth area.

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Utilities and Services

This section of the EIAR sets out the impact assessment of the proposed development with regard to utilities and services, including electricity, telecommunications, gas, water supply, sewage, land-use and waste management.

The construction methodology detailed in Chapter 4: Section 4.4 of this EIAR describes the manner in which the Proposed Development will be constructed, including any excavations and installations of services. Prior to works, the area where excavations are planned will be surveyed and all existing services will be identified. All relevant bodies i.e., ESB, Bord Gáis, EirGrid, Irish Water, Meath County Council, Kildare County Council, etc. will be contacted and all drawings contacted and drawings for all existing services sought.

Any underground services encountered during the works will be surveyed for level and where possible will be left in place. If there is a requirement to move the service, then the appropriate body (ESB, Gas Networks Ireland, Irish Water, etc.) will be contacted, and the appropriate procedure put in place. Backfill around any utility services will be with dead sand/pea shingle where appropriate. All works will be in compliance with required specifications. Further details are provided in Section 4.4 of this EIAR and in the Engineering Services Reports in Volumes 3a, 3b, 3c Appendix 4-9.

Design stage Construction and Environmental Management Plans and Waste Management Plans have been prepared and will be updated prior to the commencement of construction works, to take account of all requirements of the Planning Authority. The waste hierarchy will always be employed to ensure that the least possible amount of waste is produced during the construction phase, through reuse, recovering and recycling.

During construction, water will be supplied on site by water tankers for general use. Unless a temporary water supply is secured from Irish Water, potable water will be provided in the form of bottled water for staff use during the construction phase (prior to connections to the municipal water supply).

Portable toilets will be provided for those working on the construction sites throughout the Proposed Development. Wastewater arising on-site from these toilets is stored in a sealed tank located within the portable toilets, and these will be emptied periodically (as required) by permitted waste contractors and transported to municipal wastewater treatment plants for treatment.

The Engineering Services Reports in Volumes 3a, 3b & 3c(i) Appendix 4-9 of this EIAR present the proposals for the proposed development with regard to Surface Water Drainage, Wastewater Drainage and Potable Water Supply. These elements have been taken into consideration throughout the design of the proposed development and will be implemented in line with all required legislation and relevant best-practice guidelines.

An operational phase Waste Management Plan has been prepared and will be updated prior to operation to take account of all requirements of the Planning Authority.

The project has received a confirmation of feasibility for connection to Irish Water assets. There is currently no existing wastewater infrastructure in the immediate vicinity of the site. The nearest public wastewater infrastructure is Maynooth's public Wastewater Pumping Station (WWPS).

Solar PV panels have been incorporated into building design throughout the development where appropriate, to facilitate the supply of renewable electricity for the energy demands of the buildings.

1.14 Interaction of Effects

Chapters 5 to 13 of this Environmental Impact Assessment Report (EIAR) identify the potential significant environmental effects that may occur in terms of Population and Human Health,

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Biodiversity, Land, Soils and Geology, Water (Hydrology and Hydrogeology), Air and Climate, Noise and Vibration, Landscape and Visual, Cultural Heritage (Archaeological, Architectural and Cultural Heritage) and Material Assets, as a result of the Proposed Development. However, for any development with the potential for significant environmental effects there is also the potential for interaction between these effects. The result of interactive effects may exacerbate the magnitude of the effects or improve them or have a neutral effect.

A matrix is presented in Chapter 14 to identify potential interactions of effects between the various aspects of the environment already assessed in this EIAR. The matrix highlights the potential for the occurrence of positive, neutral or negative effects during both the construction (C) and operational (O) phases. The matrix is symmetric, with each environmental component addressed in the chapters of this EIAR being placed on both axes of a matrix, and therefore, each potential interaction is identified twice.

The potential for interaction of effects has been assessed throughout this EIAR, as part of the impact assessment process. While the work on all parts of the EIAR was not carried out by MKO, the entire project and all the work of all sub-consultants was managed and coordinated by the company. This EIAR was edited and collated by MKO as an integrated report of findings from the impact assessment process, by all relevant experts, and effects that potentially interact have been assessed in detail in the individual chapters of the EIAR and summarised in Chapter 14.

Where any potential negative impacts have been identified during the assessment process, these impacts have been avoided or reduced by design and the proposed mitigation measures, as presented throughout the EIAR and highlighted in Chapter 15.

1.15 Schedule of Mitigation Measures

All mitigation measures relating to the construction and operational phases of the Proposed Development are set out in the relevant chapters of this EIAR. Chapter 15 of the EIAR presents a compilation of these measures, grouped according to environmental field/topic. The mitigation proposals are presented in Chapter 15 in a format which provides an easy to audit list that can be reviewed and reported on during the future phases of the project. The proposals for site inspections and environmental audits are set out in the Construction and Environmental Management Plans (CEMP) which are included as Appendix 4-3 of this EIAR. The tabular format in which the information is presented in Chapter 15, can be further expanded upon during the course of future project phases to provide a reporting template for site compliance audits.

It is intended that the CEMPs will be updated where required prior to the commencement of construction to include all mitigations and monitoring measures, conditions and or alterations to the EIAR and application documents should they emerge during the course of the planning process and would be submitted to the relevant Planning Authority for written approval prior to their adoption and implementation.

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1. INTRODUCTION

1.1 Introduction

This Environmental Impact Assessment Report ('EIAR') has been prepared by McCarthy Keville O'Sullivan Ltd. (MKO) on behalf of Sky Castle Limited, to accompany the six no. planning applications intended to be submitted, as part of the Moygaddy Mixed Use Development located within Co. Meath and associated utility and road infrastructure connections in Co. Kildare.

The 'Proposed Development' considered for the purposes of this EIAR consists of six separate components of the proposed development of the Applicant's landholding in Moygaddy Co. Meath which forms part of a larger project, the first phase of which will require six separate planning applications. Three planning applications will be submitted to Meath County Council as outlined below:

- **Site A – A Strategic Employment Zone** which consists of three office buildings, public road widening and road realignment works, the delivery of approximately 365m of new public access road as part of the Maynooth Outer Orbital Road (MOOR) scheme, internal access road and associated, pedestrian and cycle network, car parking and utility connection infrastructure,
- **Site B – Healthcare Facilities** which includes a nursing home and primary care centre as well public road widening and road realignment works, internal access road and associated car parking, pedestrian and cycle network and a pedestrian & cycle bridge.
- **The Maynooth Outer Orbital Road (MOOR)** which consists of approximately 1.7km of new distributor road, 2. no single span bridges, pedestrian and cycle improvement measures, 2 no. pedestrian and cycle bridges, upgrade works to existing road network and all associated utilities.

A planning application for a Strategic Housing Development (SHD) (**Site C**) will be submitted to An Bord Pleanála under the Strategic Housing Provisions of the Planning and Development (Housing) and Residential Tenancies Act, 2016.

- **Site C – Strategic Housing Development** which will consist of 360 no. residential homes, a creche facility, scout den, internal access roads, approximately 500m of distributor road as part of the MOOR, 2 no. road bridges, pedestrian and cycle improvements, 2 no. pedestrian & cycle bridges, a public park, shared communal and private open space and all associated site development works.

Two planning applications will be submitted to Kildare County Council for infrastructure works required to connect the Proposed Development to services and utility infrastructure within Co. Kildare. These planning applications to be submitted to Kildare County Council will include the following:

- The **Kildare Bridge** planning application includes road upgrade works to the existing R157 Regional Road, a proposed pedestrian / cycle bridge adjacent to the existing Kildare Bridge, as well as a proposed wastewater connection to the Maynooth Municipal Wastewater Pumping Station to the southeast of the Proposed Development in County Kildare.
- The **Moyglare Bridge** planning application includes for the provision of a new integral single span bridge over the Rye Water River with associated flood plain works and embankments, as well as services and utilities connections.

While these developments will be subject to separate planning applications, it was considered prudent to consider all six applications together under one EIAR, due to the proximity, construction timelines and shared infrastructure between the developments i.e. their functional interdependence. The

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proposed developments within Site A, Site B, Site C, MOOR, Kildare Bridge and Moyglare Bridge applications will be collectively referred to as the 'Proposed Development' henceforth.

The Proposed Development site is located in County Meath on the northern environs of Maynooth town, Co. Kildare. A comprehensive non-statutory masterplan for the entire Moygaddy area in the Applicant's ownership has been developed, setting out proposals for buildings, open spaces and a movement and land-use strategy. The '**Proposed Moygaddy Masterplan'** comprises four main parcels of zoned land, as well as a planned distributor road, currently intended to be developed as follows:

- **Site A: Strategic Employment Zone**, as per Meath County Development Plan (CDP, 2021-2027) and Maynooth Environs Local Area Plan (LAP, see Section 3 of Scoping Document for further details). This zone is proposed to be developed as a Biotechnology & Life Sciences Campus. The initial planning application in this area will be for 3 No. standalone office buildings, to be submitted to Meath County Council.
- **Site B: Community Infrastructure Use**, as per Meath CDP (2021-2027) and Maynooth Environs LAP. It is envisaged that the initial planning application within this area will comprise a Nursing Home and Primary Care Centre, to be submitted to Meath County Council. A separate, future planning application is also envisaged for a new public hospital on an adjoining site in collaboration with the HSE / Sláintecare.
- **Site C: Residential Use**, as per Meath CDP (2021-2027) and Maynooth Environs LAP. It is intended that a Strategic Housing Development planning application will be submitted to An Bord Pleanála for the first phase of residential development within this area. A creche/childcare facility, scout den and public park and playground will also be included as part of the SHD application.
- **Site D: Tourism / Community /Amenity Use**, as per Meath CDP (2021-2027) and Maynooth Environs LAP. It is intended that a hotel, sport and leisure facilities, retail and a cultural heritage centre will be delivered on this site, as part of a separate future planning application to be submitted to Meath County Council.
- **(MOOR) Maynooth Outer Orbital Road,** as per Meath CDP (2021-2027) and Maynooth Environs LAP. The MOOR consists of approximately 1.7km of a new distributor road linking the existing R157 Regional Road in the east to the Moyglare Hall road in Mariavilla to the southwest of the proposed Masterplan area. This planning application will be submitted to Meath County Council.

This EIAR has been prepared to accompany the first set of planning applications (as described above), and assesses all elements intended to be submitted to An Bórd Pleanala, Meath County Council and Kildare County Council cumulatively as one project. MKO have also prepared an Appropriate Assessment Screening Report and a Natura Impact Statement (NIS) for the Proposed Development.

The other elements of the Proposed Moygaddy masterplan, including the tourism/community infrastructure (Site D), and subsequent phases for each development which are to be brought forward under potential future planning applications, have been cumulatively assessed (in so far as is practical) alongside the Proposed Development. The EIAR study area for the Proposed Development, in context of the overall Proposed Moygaddy Masterplan area is shown on Figure 1-1.

The overall proposed Moygaddy Masterplan area will likely be constructed over a 10-to-15-year period, subject to separate planning approvals. The regional and national impact of the Proposed Development will include the provision of 300 jobs on a rolling basis during construction phases and will allow for approximately 1,000 full-time positions post-construction consisting of both office-based roles in the proposed commercial units (Site A), healthcare roles in the proposed primary care building, new public hospital and nursing home facility (Site B) as well as operational management and administration roles, and Site C will provide 360 no. residential homes to meet the local demand in the area.

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1.2 The Applicant

The applicants, Sky Castle Ltd. are the proposed developers of the site. Sky Castle Ltd. has employed an experienced multi-disciplinary Design Team to ensure that this development will be delivered to meet all the relevant planning, environmental and sustainability requirements. Sky Castle Ltd.'s management team have extensive planning and development, project management and construction finance experience, including the delivery of previous developments for numerous offices, hotels, retail, leisure and tourism, medical and residential projects throughout Ireland.

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Map Legend

- EIAR Study Boundary
- Moygaddy Masterplan Boundary

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Drawing Title: Proposed Development in Context of Moygaddy Masterplan

Project Title: Moygaddy Mixed-Use Development

Drawn By	Checked By
DOS	MW
Project No.	Drawing No.
210414	Figure 1-1
Scale	Date
1:15,000	29.08.2022

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

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1.3 Planning Background

There is very limited planning history associated with the Proposed Development lands as whilst the lands are zoned for development the site is comprised of undeveloped greenfield agricultural grassland. The planning history and background of the site is summarised in Chapter 2 of this EIAR.

The current statutory planning policy document for the subject lands is the Maynooth Environs Local Area Plan 2013-2019 (MLAP), which is incorporated into the Meath County Development Plan 2021-2027. The plan sets out the zoning and other specific objectives for all lands within the Maynooth Environs area of Co. Meath. The land use zonings for the MLAP are also reflected in the Kildare County Development Plan 2017-2023. The subject lands have a mix of land use zonings as Figure 1-3 and Figure 1-4 indicates below.

The Proposed Development lands are located in the northeast of the MLAP zoning map. The Proposed Development lands are zoned for High Amenity, Community Infrastructure, Residential and Strategic Employment uses. The current land zoning and Proposed Distributor Road under the MLAP have been key facilitators in the design process for the Proposed Development at Moygaddy.

The route alignment of the proposed MOOR has been heavily informed by the Part 8 Planning Application that was advanced previously by Meath County Council for the Maynooth Outer Orbital Route (P8/16003). Meath County Council decided to proceed with the proposed road scheme in 2016. However, the Part 8 scheme was subsequently withdrawn by Meath County Council. The proposed road layout as submitted is identified in Figure 1-2 below.

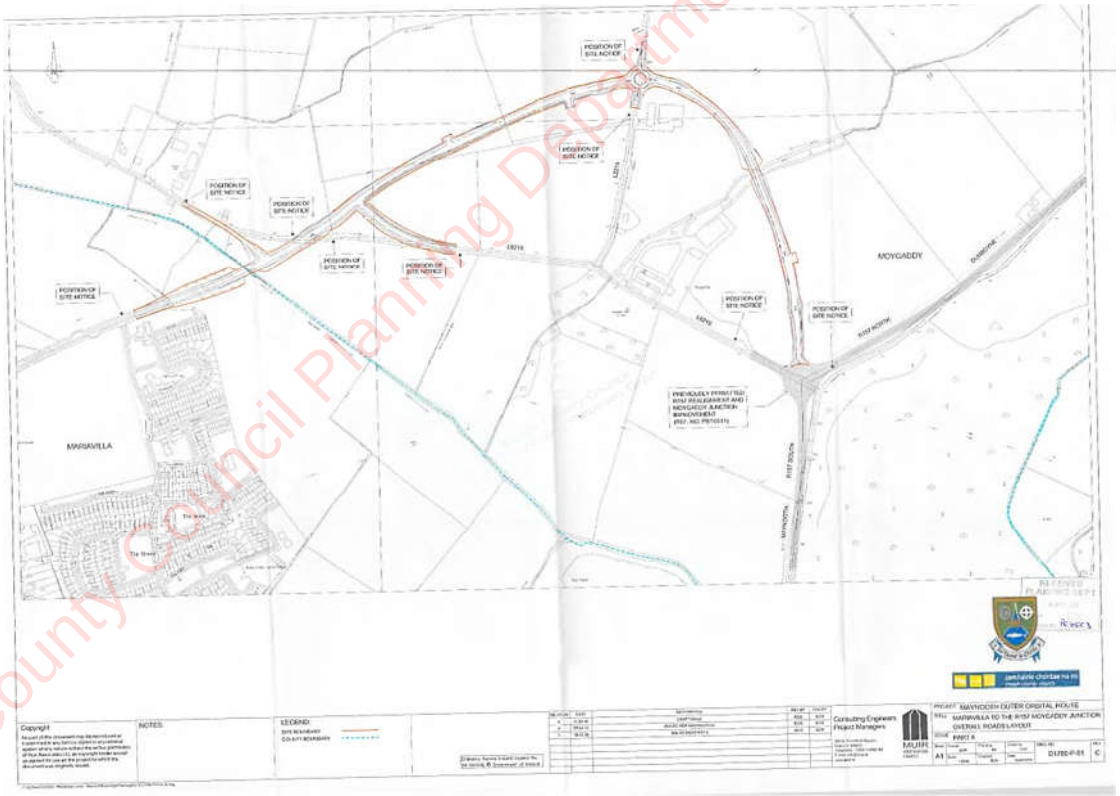

Figure 1-2: Proposed Road Layout of the MOOR Part 8 Scheme (Source: Meath County Council ePlanning P816003)

The current land zoning and Proposed Distributor Road under the MLAP have been key facilitators in the design process for the Proposed Development at Moygaddy.

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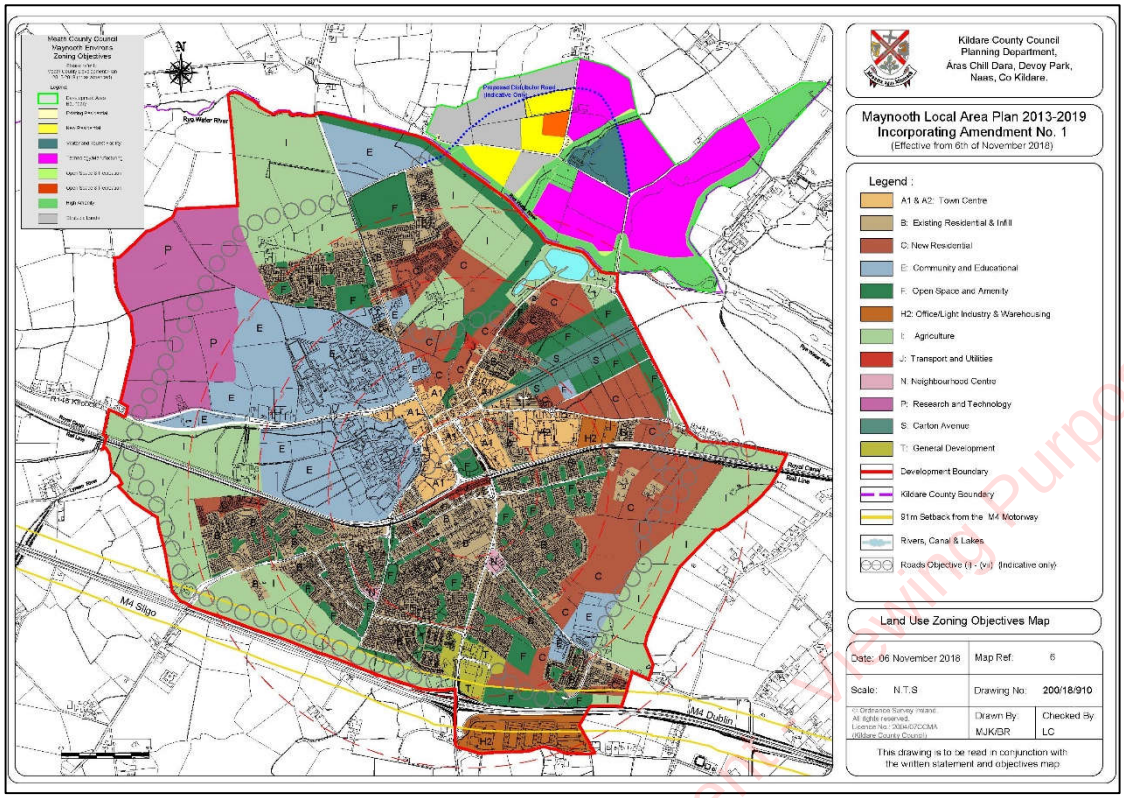

Figure 1-3 Land Use Zoning Map (Maynooth Local Area Plan 2013-2019)

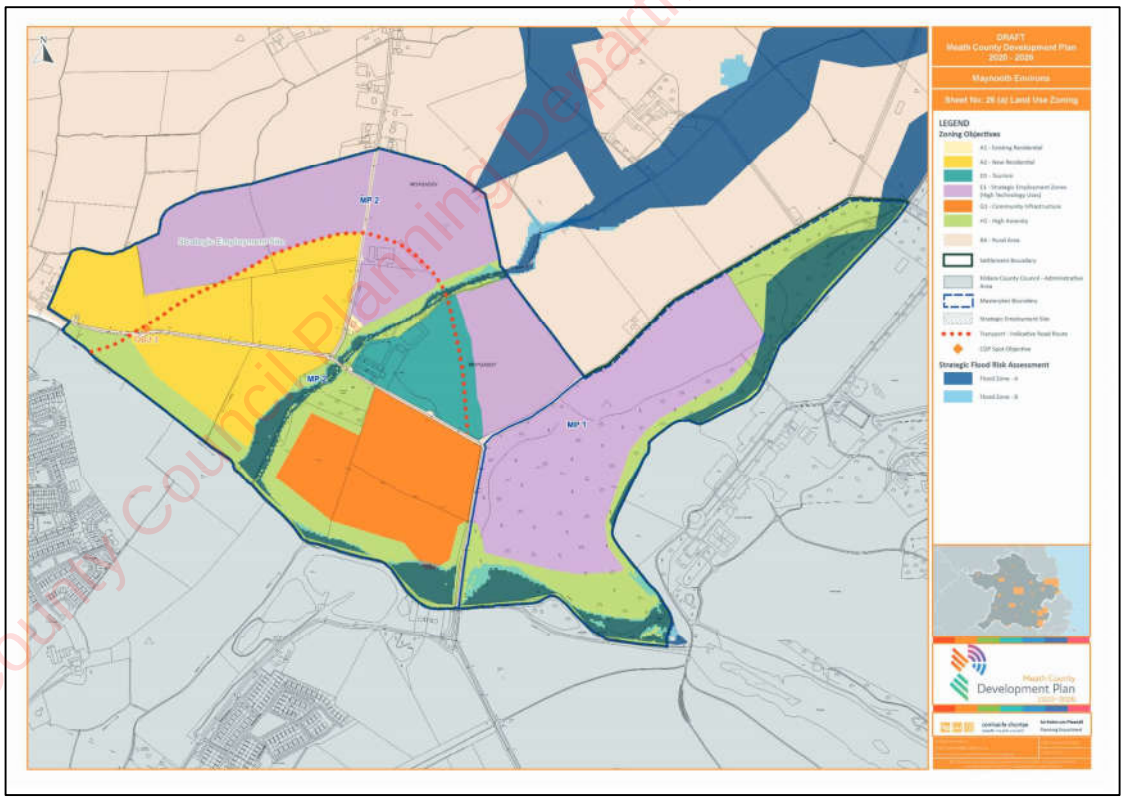

Figure 1-4 Land Use Zoning Map for Maynooth Environs (Meath County Development Plan 2021-2027)

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1.4 Legislative Context

1.4.1 Introduction

European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive'), was transposed into Irish planning legislation by the Planning and Development Acts 2000 to 2022 and the Planning and Development Regulations 2001 to 2022. The EIA Directive was amended by Directive 2014/52/EU which has been transposed into Irish law with the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018). Accordingly, this EIAR complies with the EIA Directive as amended by Directive 2014/52/EU. Regard has been had to the existing provisions of the Planning and Development Act 2000 to 2022 and the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018.

The EIA Directive, as amended by EU Directive 2014/52/EU requires Member States to ensure that a competent authority carries out an assessment of the likely significant effects of certain types of projects, as listed in the Directive's, prior to development consent being given for the project. The Environmental Impact Assessment (EIA) of the various components of the Proposed Development which will be submitted for consent will be undertaken by An Bord Pleanála, Meath County Council and Kildare County Council as the competent authorities in respect of the relevant planning applications.

Article 5 of the EIA Directive as amended by Directive 2014/52/EU provides where an EIA is required, the developer shall prepare and submit an environmental impact assessment report (EIAR). The information to be provided by the developer shall include at least:

a) *description of the project comprising information on the site, design, size and other relevant features of the project;*
b) *a description of the likely significant effects of the project on the environment;*
c) *a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;*
d) *a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;*
e) *non-technical summary of the information referred to in points (a) to (d); and*
f) *(f) any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.*

In addition, Schedule 6 to the Planning and Development Act 2000 to 2020 sets out the information to be contained in an EIAR., with which this EIAR complies.

MKO was appointed as environmental consultant on the Proposed Development and commissioned to prepare this EIAR in accordance with the requirements of the EIA Directive as amended by Directive 2014/52/EU.

The EIAR provides information on the receiving environment and assesses the likely significant effects of the project and proposes mitigation measures to avoid or reduce these effects. The function of the EIAR is to provide information to allow the competent authority to conduct the Environmental Impact Assessment (EIA) of the Proposed Development.

All elements of the overall project, including the associated infrastructure, have been assessed as part of this EIAR.

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1.4.2 EIA Screening

The relevant classes/scales of development that require Environmental Impact Assessment (EIA) are set out in Parts 1 and 2 of Schedule 5 of the Planning and Development Regulations 2001 to 2022, as amended.

Under section 172 of the Planning & Development Act 2000, as amended, an EIA shall be carried out:

- *if a proposed development is of a class specified under Part 1 of Schedule 5 of the Regulations and either such development would equal or exceed any relevant quantity, area or other limit specified in Part 1, or no quantity, area or other limit is specified in Part 1 in respect of the development concerned;*
- *if a proposed development is of a class specified in Part 2 of Schedule 5 of the Regulations (other than subparagraph (a) of paragraph 2) and either such development would equal or exceed any relevant quantity, area or other limit specified in Part 2, or no quantity, area or other limit is specified in Part 2 in respect of the development concerned;*
- *the proposed development would be of a class specified in Part 2 of Schedule 5 of the Regulations but does not equal or exceed, as the case may be, the relevant quantity, area or other limit specified in Part 2, and it is concluded, determined or decided, that the proposed development is likely to have significant effect on the environment*

With regards to the Proposed Development, the provisions of Part 2 of Schedule 5 require an EIA to be undertaken where it is proposed to carry out the following - "*Urban Development*", as per paragraph 10 (b)(iv) of Part 2 of the Schedule which would involve an area greater than either 2ha (*business district),* 10 ha (built up area) or 20ha (elsewhere).

Due to the proximity of each application in relation to one another, shared construction timelines, shared infrastructure and the total development area of these applications (greater than 30 Hectares), the 'Proposed Development' for the purposes of this EIAR, cumulatively exceeds the urban development threshold (greater than 10ha built up area) and the 20ha (elsewhere) threshold. The Proposed Development therefore ***exceeds*** the relevant area specified in Part 2 of Schedule 5 and is therefore subject to mandatory EIA.

Separately, the provisions of Part 2 of Schedule 5 require an EIA to be undertaken where it is proposed to carry out the following - "Construction of more than 500 dwelling units", as per paragraph 10 (b)(i). The Site C – Strategic Housing Development component of the Proposed Development is sub-threshold at 360 proposed homes however when considered cumulatively with the other components of the Proposed Development it is considered that an EIA is required.

While each individual application may on its own not necessarily be subject to EIA, as it either does not fall into a relevant class of activity or is sub-threshold, it is considered that the interconnection and interdependence between the various components going forward for consent is such that each should be subject to EIA.

The EIAR provides information on the receiving environment and assesses the likely significant effects of the project and proposes mitigation measures to avoid or reduce these effects. The function of the EIAR is to provide information to allow the competent authorities to conduct the Environmental Impact Assessment (EIA) of the various components of the Proposed Development that will be subject to the individual planning applications.

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1.4.3 Content of an EIAR

Article 5 of the EIA Directive provides that, where an EIA is required, the developer shall prepare and submit an environmental impact assessment report (EIAR) previously referred to as an Environmental Impact Statement ('EIS'). The information to be provided by the developer shall include at least:

a) a description of the project comprising information on the site, design, size and other relevant features of the project;
b) a description of the likely significant effects of the project on the environment;
c) a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
d) a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;
e) a non-technical summary of the information referred to in points (a) to (d); and (f) any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.

In addition, Article 94 of Schedule 6 to, the Planning and Development Regulation 2001 to 2022 sets out the information to be contained in an EIAR, with which this EIAR complies.

1.4.4 EIAR Guidance

The Environmental Protection Agency (EPA) published its 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' in May 2022 (which is intended to guide practitioners preparing an EIAR in line with the requirements set out in the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018). These guidelines have been used in the compiling of this EIAR.

In preparing this EIAR regard has also been taken of the provisions of the '*Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment*', published by the Department of Housing, Planning and Local Government (DHPLG) in August 2018 to the extent these guidelines are relevant having regard to the enactment of the revised EIA Directive.

The European Commission also published a number of guidance documents in December 2017 in relation to Environmental Impact Assessment of Projects (Directive 2011/92/EU as amended by 2014/52/EU) including '*Guidance on Screening'*, *'Guidance on Scoping'* and '*Guidance on the preparation of the Environmental Impact Assessment Report'*. MKO has prepared the EIAR in accordance with these guidelines also.

1.5 Brief Description of the Proposed Development

The Proposed Development includes the development of a Strategic Employment Zone (Site A) Healthcare Facilities (Site B), a Strategic Housing Development (Site C), a distributor road (MOOR), and planning applications for infrastructure and utilities connections in County Kildare, serving the Proposed Moygaddy Mixed-Use Development. Each of these sites are located adjacent to each other and share common utility and access infrastructure.

The Strategic Employment Zone (Site A) will consist of:

1) *The proposed development comprises 3 no. office blocks and all associated site development works (GFA: 20,633.26 sq.m) as follows:*
2) *Block A: 5 storey office building providing offices, stair and lift cores and plant rooms (GFA: 10,260.42 sq.m)*

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3) *Block B: 3 storey office building providing offices, stair and lift cores and plant rooms (GFA: 5,186.54 sq.m)*
4) *Block C: 3 storey office building providing offices, stair and lift cores and plant rooms (GFA: 5,186.30 sq.m)*
5) *The development includes a surface car park which includes 323 no. car parking spaces and 320 no. bicycle car parking spaces (including 16 no. accessible car parking spaces and 12 no. EV charging spaces)*
6) *Undertaking of road upgrade works including the provision of a signalised junction on the R157 Dunboyne Road and the construction of a section of the Maynooth Outer Orbital Route and provision of associated pedestrian and cycle infrastructure, as well as a realignment of a section of the R157. The works to the R157 adjoin the Carton Demense Wall which is a Protected Structure (RPS Ref 91556).*
7) *Vehicular access to the site will be provided via the R157 Dunboyne Road and provision is made for a secondary vehicular access via the proposed section of the Maynooth Outer Orbital Route.*
8) *Provision of water, foul and surface water drainage infrastructure including pumping station.*
9) *Provision of a new pedestrian & cycle bridge structure at the River Rye Water adjacent to the existing Kildare Bridge.*
10) *Provision of roof mounted solar PV panels on Office Blocks A, B & C.*
11) *Provision of 3 no. ESB Kiosks.*
12) *Provision of bin stores, bike stands, landscaping, boundary treatments and public lighting and all other site development works and services ancillary to the proposed development.*

The Healthcare Application (Site B) will consist of:

1) *Construction of a new two-storey Nursing Home of 156 no. bedrooms with a Gross Floor Area (GFA) of 8,576m^2, including vehicular pick up/drop-off area and service road;*
2) *Construction of a new three-storey Primary Care Centre (PCC) with a Gross Floor Area (GFA) of 3,049m^2;*
3) *The development includes a shared surface car park providing 161 no. car parking spaces (comprising of 151 no. standard car parking spaces and 10 no. accessible car parking spaces) and 160 no. bicycle parking spaces.*
4) *Provision of foul and surface water drainage including wastewater pumping station.*
5) *Connection to potable water supply at Kildare Bridge.*
6) *Provision of communal (semi-private) and public open space*
7) *Provision of hard and soft landscaping including amenity equipment, fencing and gates.*
8) *Provision of substation and public lighting.*
9) *Proposed road improvement and realignment works including:*

    i. *Construction of a new 2-way, 6m-wide access road from the R157 Dunboune Road to include a priority T-junction on the R157,*
    ii. *Upgrade works to a section of the R157 from the new site entrance south to Kildare Bridge on the R157 (representing delivery of a 15m-wide portion of the Maynooth Outer Relief Road (MOOR)), including creation of a new 2m-wide footpath, 3m-wide cycle lane and pedestrian and cycle link adacent to the Kildare Bridge,*
    iii. *Provision of pedestrian and cycle improvement measures along the R157 which abuts the Carton Demense Wall which is a Protected Structure (RPS Ref 91556)*

10) *All other site development works and services ancillary to the proposed development.*

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11) *A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) will be submitted to the planning authority with the planning application.*

The Strategic Housing Development (SHD: Site C) will consist of:

1) *Construction of 360 no. residential homes comprising:*
   196 no houses (including 19 no. 2 beds, 156 no. 3 beds and 21 no. 4 beds).
   102 no. duplexes (including 51 no. 1 beds and 51 no. 2 beds) set out in 6 no. blocks.
   62 no. apartments (including 26 no. 1 beds and 36 no. 2 beds) set out in 2 no. blocks.
2) *Provision of a public park and playground with associated 42 no. car parking spaces adjacent to Moygaddy Castle Towerhouse and pedestrian and cyclist links along the Rye Water River. The overall public open space (including the High Amenity Lands) equates to 7.98 hectares.*
3) *Provision of private open spaces in the form of balconies and terraces is provided to all individual apartments and duplexes to all elevations.*
4) *Development of a two-storey creche facility (514 sqm), outdoor play area and associated parking of 29 no. spaces.*
5) *Provision of a single storey Scout Den facility, including a hall, kitchen, meeting room and ancillary facilities (220sqm) and associated parking of 6 no. spaces.*
6) *Provision of 4 no. bridge structures comprising:*
   iv. *an integral single span bridge at Moyglare Hall over the Rye Water River to connect with existing road infrastructure in County Kildare and associated floodplain works and embankments.*
   v. *a new pedestrian and cyclist bridge at Kildare Bridge which will link the proposed site with the existing road network in County Kildare.*
   vi. *a new pedestrian and cycle bridge across the Blackhall Little Stream on the L6219 adjacent to the existing unnamed bridge.*
   vii. *a new pedestrian and cycle bridge over the Blackhall Little Stream linking the proposed residential site with the proposed Childcare Facility, Scout Den and Moygaddy Castle Public Park.*
7) *Provision of 500m of distributor road comprising of 7.0m carriageway with turning lane where required, footpaths, cycle tracks and grass verges. All associated utilities and public lighting including storm water drainage with SuDS treatment and attenuation.*
8) *Proposed road improvement and realignment works including:*
   realignment of a section of the existing L6219 local road, which will entail the demolition of an existing section of the road which extends to circa 2,500 sqm.
   Provision of pedestrian and cycle improvement measures along the L6219 which abuts the boundary of Moygaddy House which is a Protected Structure (RPS ref 91558).
   Provision of pedestrian and cycle improvement measures along the R157 which abuts the Carton Demense Wall which is a Protected Structure (RPS Ref 91556).
9) *Provision of 3 no. vehicular and pedestrian accesses from the L6219 local road and an additional vehicular and pedestrian access from the R157 to the Childcare and Scout Den facilities.*
10) *The proposed development will provide 283 no. of bicycle parking spaces, of which 200 no. are long term spaces in secure bicycle stores and 83 no. are short term visitor bicycle parking spaces. 12 no. bicycle spaces are provided for the creche and 12 no. bicycle spaces are provided for the Scout Den.*
11) *A total of 667 no. car parking spaces are provided on site located at surface level. The car parking provision includes 10 no. Electric Vehicle charging and Universally Accessible spaces allocated for the Apartment & Duplex units. All Houses will be constructed with provision for EV Charging.*
12) *Provision of site landscaping, public lighting, bin stores, 3 no. ESB unit substations, site services and all associated site development works.*
13) *A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) has been included with this application.*

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The planning application for the entire Maynooth Outer Orbital Road (Moor) will consist of:

1) *Provision of approximately 1,700m of new distributor road (MOOR Arc) comprising of 7.0m carriageway with turning lane where required, footpaths, cycle tracks and grass verges. All associated utilities and public lighting including storm water drainage with SuDS treatment and attenuation.*
2) *Proposed road improvement and realignment works including:*

   viii. *realignment of a section of the existing L6219 local road, which will entail the demolition of an existing section of the road which extends to circa 2,500 sqm.*
   ix. *Provision of pedestrian and cycle improvement measures along the L6219 and L22143 which abuts the boundary of Moygaddy House which is a Protected Structure (RPS ref 91558).*
   x. *Provision of pedestrian and cycle improvement measures along the R157 which abuts the Carton Demense Wall which is a Protected Structure (RPS Ref 91556).*
   xi. *Realignment of a section of the existing L22143 local road and R157, which will entail the demolition of an existing section of the road which extends to circa 3,200 sqm.*
   xii. *Provision of a new signalised junction at the realigned junction between the L22143 and R157.*
   xiii. *Provision of a new signalised junction between the L2214 local road and the MOOR with right-turn lanes on approaches.*
   xiv. *Reconfiguration of the L2214 section within the MOOR arc to a one-way from north to south with right-turn lanes, where applicable.*
   xv. *Reconfiguration of the northbound lane of the L2214 within the arc to a shared facility for use by pedestrians and cyclists.*
   xvi. *Addition of chicanes on the L6219 and L22143 local road to reduce traffic flow and encourage utilisation of the MOOR.*

3) *Provision of 4 no. bridge structures comprising:*

   i. *an integral single span bridge at Moyglare Hall over the River Rye Water to connect with existing road infrastructure in County Kildare and associated floodplain works and embankments.*
   ii. *a new pedestrian and cyclist bridge at Kildare Bridge which will link the proposed site with the existing road network in County Kildare.*
   iii. *a new pedestrian and cycle bridge across the Blackhall Little Stream on the L22143 adjacent to the existing unnamed bridge.*
   iv. *an integral single span bridge on the north-eastern section of the MOOR arc, over the Blackhall Little Stream, and associated floodplain works and embankments.*

4) *Provision of site landscaping, public lighting, site services and all associated site development works.*
5) *A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) has been included with this application.*

Planning Permission is sought by Sky Castle Ltd. for the development of a portion of the Maynooth Outer Orbital Road (MOOR) within Co. Kildare, on the county border to Co. Meath.

The proposed development will consist of the following:

1. *Provision of a new bridge structure comprising the following:*

   i. *a pedestrian and cycle bridge structure to be erected adjacent to the upstream/western side of the existing Kildare Bridge, with a 2m clearance, with the infrastructure tying into new infrastructure in Co. Meath.*

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ii. *This bridge will be a standalone, independent structure that will also support new water main assets*

2. *New wastewater rising mains to be installed underground adjacent the bridge structure, to the west.*
3. *New walkways and cycle track will tie-in with new infrastructure to be constructed by Cairn Homes and their Agents.*
4. *Provision of site landscaping, public lighting, site services and all associated site development works.*
5. *A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) has been included with this application.*

Planning Permission is sought by Sky Castle Ltd. for the development of a portion of the Maynooth Outer Orbital Road (MOOR) within Co. Kildare, on the county border to Co. Meath.

The proposed development will consist of the following:

1) *Provision of approximately 200m of new portion of distributor road comprising of 7.0m carriageway with footpaths, cycle tracks and grass verges. All associated utilities and public lighting including storm water drainage with SuDS treatment and attenuation. This new road section with pedestrian and cycle infrastructure will tie in with existing infrastructure just east of the roundabout which provides access to the Maynooth Community College and Moyglare Hall Estate.*
2) *Provision of a new bridge structure comprising the following:*
   iii. *an integral 50m single span bridge at Moyglare Hall over the River Rye Water to connect with existing road infrastructure in County Kildare and associated floodplain works and embankments.*
   iv. *The bridge will include pedestrian and cycle facilities*
   v. *Extension of the water main assets to serve new developments in Maynooth Environs*
3) *Provision of site landscaping, public lighting, site services and all associated site development works.*
4) *A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) has been included with this application.*

The planning applications for the Proposed Development are accompanied by a Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR). All elements of the Proposed Development have been assessed as part of this EIAR.

1.6 References to Proposed Development Site

For the purposes of this EIAR:

- Where the **'Proposed Development'** is referred to, this relates to the entirety of the project i.e., the Strategic Employment Zone (Site A), the Healthcare Facilities (Site B), the Strategic Housing Development (SHD) (Site C), the Maynooth Outer Orbital Road (MOOR), and services and utilities connecting into Kildare as detailed below. This relates to the primary study area for the development, as delineated by the EIAR Site Boundary in green as shown in Figure 1-1 and as detailed in Chapter 4 of the EIAR.
- Where the **'Strategic Employment Zone (Site A)'** is referred to, this includes the three proposed office buildings (two of which (Block A & Block B) will be built in phase 1 of the development while the most eastern building (Block C) will be built as part of phase 2 of the development) as well as approximately 865 meters of internal access roads and 323 no. car parking spaces and 320 no. bicycle car parking spaces (including 16 no. accessible car parking spaces and 12 no. EV charging spaces);

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- Where the **'Healthcare Facilities (Site B)'** is referred to, this includes the proposed Nursing Home Building, the proposed Primary Care Centre building, as well as approximately 585 meters of internal access roads and 151 no. standard car parking spaces, 10 no. accessible car parking spaces and 160 no. bicycle parking spaces;
- Where the **'Strategic Housing Development (SHD: Site C)'** is referred to, this includes 360 no. residential homes, a creche facility and scout den. Approximately 500m of the overall MOOR and all associated utilities will be delivered as part of the SHD (Site C) application. Pedestrian and cycle improvements along with a 4 no. bridge structures are included in this application along with shared communal and private open space, car and bicycle parking and all associated site development works.
- Where the **'Maynooth Outer Orbital Road (MOOR)'** is referred to, this relates to the proposed distributor road for Maynooth town which arcs through the Proposed Moygaddy Masterplan site. Approximately 1.7km of new distributor road, a single span bridge, 670m of pedestrian and cycle improvements a pedestrian/cycle bridge upgrade works on a section of the R157 Regional Road and the existing Kildare Bridge and all associated utilities are included.
- Where **Kildare Bridge** is referred to, this relates to the installation of a proposed standalone pedestrian and cycle link adjacent to the existing Kildare Bridge, upgrades to the road network on the R157 Dunboyne Road to link with the proposed new development and the laying of a rising main along the Dunboyne Road to join with the existing Maynooth wastewater pumping station.
- Where **Moyglare Bridge** is referred to, this relates to the provision of an integral single span bridge over the Rye Water River with associated flood plain works and embankments.

Individual topics for assessment purposes, i.e., each chapter, will indicate the study area used for that topic. The actual site boundaries for the purposes of the planning permission applications occupies a smaller area within the primary EIAR Site Boundary. The EIAR Site Boundary represents the area of study and not necessarily areas where proposed works will occur as part of the Proposed Development.

For clarity in this EIAR, the Strategic Employment Zone (Site A), the Healthcare Facilities (Site B), the Strategic Housing Development (Site C), the Maynooth Outer Orbital Road (MOOR), the Kildare Bridge and the Moyglare Bridge applications will all be assessed individually, as well as cumulatively with one and other (the Proposed Development) and in combination with other projects, including the planned future applications within the Moygaddy Masterplan, to aid the competent authority in carrying out an EIA. While the EIAR is structured in such a way as to make it more readable for each competent authority and allow them focus on the part of the project being brought forward to them for consent, the entirety of the application documentation is available and must be used to complete the EIA and AA for each consent decision. As always an EIA and AA must be completed by each competent authority using all of the information available to them within the application documentation.

The Proposed Development is described in detail in Chapter 4 of this EIAR.

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1.7 Need for the Proposed Development

The Proposed Development is located within the Proposed Moygaddy Masterplan lands, which in turn is located within the Maynooth Environs, as set out in the Maynooth Environs Local Area Plan 2013-2019 (MLAP), which is incorporated into the Meath County Development Plan 2021-2027. The plan sets out the zoning and other specific objectives for all lands within the Maynooth Environs area of Co. Meath. The Proposed Development lands are zoned for High Amenity, Community Infrastructure, Residential and Strategic Employment. It is an objective of the MLAP as outlined in the Meath County Development Plan (2021) to;

> ***MAY POLICY 2:*** *To ensure that the development of the Maynooth Environs is accommodated in an environmentally sensitive manner that will: Create a centre of excellence for innovation and employment; Protect the existing natural environment and built heritage and utilise it to frame new development and build a distinctive and attractive mixed-use place to work and live.*

> ***MAY POLICY 3:*** *To provide for high technology / biotechnology industries/medical uses inclusive of associated advanced manufacturing, office, research and development uses in a high-quality campus style environment on the strategic employment lands.*

The Proposed Development will provide numerous employment opportunities associated with the Offices planned in the Strategic Employment Zone and the Medical Facilities and Childcare Facilities planned in the Community Infrastructure in line with the policies and objectives of the Meath County Development Plan.

The MOOR distributor road is outlined as a key Policy Objective outlined in the Meath County Development Plan 2021 – 2027. The Meath CDP policy objectives relating to the MOOR are outlined in the draft Maynooth Local Area Plan and listed below:

> ***MAY OBJ 4****: To support and facilitate in conjunction with Kildare County Council and private developers and landowners, the construction of the Maynooth Outer Orbital Route.*

> ***MAY OBJ 5:*** *To require that the Maynooth Outer Orbital Route connects with the MOOR being delivered in the administrative area of Kildare County Council. Said route shall incorporate the construction of a sewer and ring main linking the sewer and trunk main in the Dublin Road to the residential development in the Mariavilla area.*

In addition, the Proposed Development, will also provide important healthcare facilities, through the delivery of a primary care centre and nursing home, which will provide employment and help to meet the increasing demand for primary care and services for older persons, due to the increased ageing of the national population, as outlined in the Health Service Capacity Review (2018) and the Sláintecare Implementation Strategy & Action Plan 2021 – 2023.

1.8 Purpose and Scope of the EIAR

The purpose of this EIAR is to document the current state of the environment in the vicinity of the Proposed Development site and to quantify the likely significant effects of the Proposed Development on the environment in accordance with the requirements of the EIA Directive, as amended. The compilation of this document served to highlight any areas where mitigation measures may be necessary in order to protect the surrounding environment from the possibility of any negative impacts arising from the Proposed Development.

It is important to distinguish the Environmental Impact Assessment (EIA) to be carried out by the competent authority, i.e., County Council or An Bord Pleanála, from the EIAR and the accompanying planning application. The EIA is the assessment carried out by the competent authority, which includes

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an examination that identifies, describes and assesses in an appropriate manner, in the light of each individual case and in accordance with Articles 4 to 11 of the Environmental Impact Assessment Directive, the direct and indirect effects of the Proposed Development on the following:

a. *Population and Human Health*
b. *Biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC*
c. *Land, Soil, Water, Air and Climate*
d. *Material Assets, Cultural Heritage and the Landscape*
e. *Interaction between the factors referred to in points (a) to (d)*

The EIAR submitted by the applicant provides the relevant environmental information to enable the EIA to be carried out by the competent authority.

1.9 Structure and Content of the EIAR

1.9.1 General Structure

This EIAR uses the grouped structure method to describe the existing environment, the potential impacts of the Proposed Development thereon and the proposed mitigation measures. Background information relating to the Proposed Development, scoping and consultation undertaken and a description of the Proposed Development are presented in separate sections. The grouped format sections describe the impacts of the Proposed Development in terms of population and human health, biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC; land, soils and geology, hydrology and hydrogeology, air and climate, noise and vibration, landscape and visual, cultural heritage and material assets such as traffic and transportation, together with the interaction of the foregoing.

The chapters of this EIAR are as follows:

- Introduction
- Background to the Proposed Development
- Consideration of Reasonable Alternatives
- Description of the Proposed Development
- Population & Human Health
- Biodiversity,
- Land, Soils and Geology
- Hydrology and Hydrogeology
- Air and Climate
- Noise and Vibration
- Landscape and Visual
- Cultural Heritage
- Material Assets – including Traffic
- Interaction
- Schedule of Mitigation

The EIAR also includes a Non-Technical Summary, which is a condensed and easily comprehensible version of the EIAR document. The non-technical summary is laid out in a similar format to the main EIAR document and comprises a description of the Proposed Development followed by the existing environment, impacts and mitigation measures presented in the grouped format.

The photomontage booklet, pertaining to Chapter 11: Landscape and Visual, is included as Volume 2 of this EIAR.

Appendices to the chapters listed above are included in Volume 3 of this EIAR.

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1.9.2 Description of Likely Significant Effects and Impacts

As stated in the '*Guidelines on the Information to be contained in Environmental Impact Statements'* (EPA, 2022), an assessment of the likely impacts of a Proposed Development is a statutory requirement of the EIA process. The statutory criteria for the presentation of the characteristics of potential impacts requires that potential significant impacts are described with reference to the extent, magnitude, complexity, probability, duration, frequency, reversibility and trans-frontier nature (if applicable) of the impact.

The classification of impacts in this EIAR follows the definitions provided in the Glossary of Impacts contained in the following guidance documents produced by the European Commission (EC) and the Environmental Protection Agency (EPA):

- *'Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report'* (EC, 2017)
- *'Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (EPA, 2022).

Table 1-1 presents the glossary of impacts as published in the EPA guidance documents. Standard definitions are provided in this glossary, which permit the evaluation and classification of the quality, significance, duration and type of impacts associated with a Proposed Development on the receiving environment. The use of pre-existing standardised terms for the classification of impacts ensures that the EIA employs a systematic approach, which can be replicated across all disciplines covered in the EIAR. The consistent application of terminology throughout the EIAR facilitates the assessment of the Proposed Development on the receiving environment.

Table 1-1 Table 1-1 Impact Classification Terminology (EPA, 2022)

Impact Characteristic	Term	Description
Quality	Positive	A change which improves the quality of the environment
	Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative	A change which reduces the quality of the environment
Significance	Imperceptible	An effect capable of measurement but without significant consequences
	Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight	An effect which causes noticeable changes in the

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Impact Characteristic	Term	Description
		character of the environment without affecting its sensitivities
	Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends
	Significant	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
	Very significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
	Profound	An effect which obliterates sensitive characteristics
Extent & Context	Extent	Describe the size of the area, number of sites and the proportion of a population affected by an effect
	Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions
Probability	Likely	Effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented
	Unlikely	Effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented
Duration and Frequency	Momentary	Effects lasting from seconds to minutes

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Impact Characteristic	Term	Description
	Brief	Effects lasting less than a day
	Temporary	Effects lasting less than a year
	Short-term	Effects lasting one to seven years
	Medium-term	Effects lasting seven to fifteen years
	Long-term	Effects lasting fifteen to sixty years
	Permanent	Effect lasting over sixty years
	Reversible	Effects that can be undone, for example through remediation or restoration
	Frequency	Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)
Type	Indirect	Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway
	Cumulative	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
	'Do Nothing'	The environment as it would be in the future should the subject project not be carried out
	Worst Case'	The effects arising from a project in the case where mitigation measures substantially fail
	Indeterminable	When the full consequences of a change in the environment cannot be described

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Impact Characteristic	Term	Description
	Irreversible	When the character, distinctiveness, diversity, or reproductive capacity of an environment is permanently lost
	Residual	Degree of environmental change that will occur after the proposed mitigation measures have taken effect
	Synergistic	Where the resultant effect is of greater significance than the sum of its constituents

Each impact is described in terms of its quality, significance, extent, duration & frequency and type, where possible. A 'Do-Nothing' impact is also predicted in respect of each environmental theme in the EIAR. Residual impacts are also presented following any impact for which mitigation measures are prescribed and any interactions between the impacts are assessed. The remaining impact types are presented as required or applicable throughout the EIAR.

Any potential interactions between the various aspects of the environment assessed throughout this EIAR are presented in Chapter 14: Interaction.

1.10 Project Team

The companies and staff listed in

Table 1-2 were responsible for completion of the EIAR in respect of the Proposed Development. Further details regarding project team members are provided below.

The EIAR project team comprises a multidisciplinary team of experts with extensive experience in the assessment of projects and in their relevant area of expertise. The qualifications and experience of the principal staff from each company involved in the preparation of this EIAR are summarised in Section 1.10.1 below. Each chapter of this EIAR has been prepared by a competent expert in the subject matter. Further details on project team expertise are provided in the Statement of Authority at the beginning of each impact assessment chapter.

Table 1-2 EIAR Project Team

Consultants	Principal Staff Involved in Project	EIAR Input
MKO Tuam Road, Galway, H91 VW84	Michael Watson David Naughton Daire O'Shaughnessy Lorraine Meehan Eoin O'Sullivan Niamh McHugh Colm Ryan Pamela Harty Meabhann Crowe Sean McCarthy	Planning application preparation, EIAR co-ordinators/Project Managers; Scoping and Consultation; Preparation of EIAR Sections and Natura Impact Statement: › Chapter 1: Introduction › Chapter 2: Background to the Proposed Development, including Planning Policy and Scoping and Consultation

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Consultants	Principal Staff Involved in Project	EIAR Input
	Owen Cahill John Hynes Pat Roberts Sarah Mullen Colin Murphy Aoife Joyce Jack Workman Jack Smith Joseph O'Brien	› Chapter 3: Site Selection and Reasonable Alternatives › Chapter 4: Description of the Proposed Development › Chapter 5: Population and Human Health, including Residential Amenity and vulnerability to Accidents and Disasters. › Chapter 6: Biodiversity – Flora and Fauna › Chapter 7: Land, Soils and Geology › Chapter 8: Hydrology and Hydrogeology › Chapter 9: Air and Climate › Chapter 11: Landscape and Visual including Preparation of Photomontages › Chapter 13: Material Assets (Traffic and Transportation, Services and Utilities › Chapter 14: Interaction of the Foregoing › Chapter 15: Schedule of Mitigation and Monitoring Measures
Damian Brosnan Acoustics	Damian Brosnan	Noise and Vibration Consultants; Baseline Noise Survey; Preparation of EIAR Section: › Chapter 10: Noise and Vibration
Aegis Archaeology 32 Nicholas Street, King's Island, Co. Limerick	Frank Coyne	Archaeological Consultants; Preparation of EIAR Section: › Chapter 12: Archaeological, Architectural and Cultural Heritage
O'Connor Sutton Cronin & Associates 9 Prussia Street, Dublin 7	Anthony Horan, Mark Killian, Andrew McDermott Wian Marias	Civil Engineers MOOR Design Flood Risk Assessment Construction & Environmental Management Plan Engineering Report & Drainage Design
Davey-Smith Architects 13 The Seapoint Building, 44/45 Clontarf Road, Clontarf, Dublin 3	David Smith, Eric Govin	Architects for Site A (Strategic Employment Zone)
Crawford Architecture The Building Block, Bridge Street, County Sligo	John Crawford, Annabel Gilmartin	Architects for Site B (Healthcare Facilities)

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Consultants	Principal Staff Involved in Project	EIAR Input
McCrossan O'Rourke Manning Architects No. 1 Grantham Street, Dublin 8	James Coakley Stephen Manning	Architects for Site C (Strategic Housing Development)
Ronan MacDiarmada & Associates Tootenhill Cottages, Rathcoole, Co. Dublin	Ronan MacDiarmada, Peter Lynch	Landscape Architect
Parkbourne Consultancy Coliemore House, Coliemore Road, Dalkey, Co. Dublin	Bryan McCormack,	M & E Consultant
Byrne Environmental Consulting Ltd Redbog, Skryne Road, Dunshaughlin, Co. Meath	Ian Byrne	Waste Management & Environmental Consultants
3D Design Bureau 65 Rock Rd, Blackrock, Dublin	Ferran Villa Marcus Sestulis Pawel Redlinski	Photomontage and Visual Specialists
Hydro-Environmental Services 22 Lower Main Street, Dungarvan, Co. Waterford	Michael Gill Conor McGettigan Jenny Law	Water Framework Assessment Report

1.10.1 Project Team Members

1.10.1.1 MKO

Michael Watson – Project Director

Michael Watson is Project Director and head of the Environment Team at MKO. Michael has extensive experience as project strategy advisor and coordinator on large multi-disciplinary project teams on complex projects requiring EIS/EIAR, Environmental Protection Agency (EPA) Licence applications, hydrogeological assessments, environmental due diligence and general environmental assessment on behalf of clients in the renewable energy, waste management, public, commercial and industrial sectors nationally.

Michael's key strengths include project strategy advice, project management and liaising with the relevant local authorities, EPA and statutory consultees as well as coordinating the project teams and sub-contractors. Michael is a key member of the MKO senior management team, and as head of the

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Environment Team has responsibilities to mentor various grades of team members, foster a positive attitude and promote continuous professional development for employees.

Michael is also a Chartered Environmentalist (CEnv) and Professional Geologist (PGeo) with 20 years' experience completing geology, hydrology and hydrogeological assessments, site/ground investigations, Phase 1 and 2 Contaminated land assessments and designing for the protection of waters during construction projects.

David Naughton – Project Environmental Scientist

David Naughton is a Project Environmental Scientist with MKO Ltd. with over five years of consultancy experience. David graduated with an honours B.Sc. degree in Environmental Science from NUIG in 2016. David is experienced in report writing and has been involved in the production of several EIS/EIARs for various renewable energy projects including onshore wind energy developments and large-scale solar energy developments. David has experience as an Environmental Clerk of Works (ECoW) including monitoring, oversight and reporting of the implementation of all planning and environmental requirements for on-site developments. David has a wide range of ecological experience including bird surveys, vegetation surveys and habitat identification. David is also very accomplished in GIS software systems for use in interpreting ecological and environmental data, including QGIS, Mapinfo and ArcGIS. David's key strengths and areas of expertise lie in report writing, project management, applications of GIS systems and SUA (drone) surveying. Since joining MKO David has been involved in a wide range of projects, acting as project manager for many onshore wind projects and other large-scale developments, providing a pivotal contact link between clients and the project team members.

Daire O'Shaughnessy – Project Environmental Scientist

Daire O'Shaughnessy is a Project Environmental Scientist with MKO having first joined the company in January 2019. Daire graduated with an honours B.Sc. (Hons) in Environmental Science from the University of Limerick. Daire is experienced in report writing and has been involved in the production of several EIS/EIARs for various renewable energy projects including onshore wind energy developments. Daire has experience as an Environmental Clerk of Works (ECoW) including monitoring, oversight and reporting of the implementation of all planning and environmental requirements for on-site developments. Daire is experienced in GIS software systems, primarily for use in on-shore wind farm design and environmental data interpretation. Daire's key strengths lie in EIAR production, GIS and construction environmental planning.

Lorraine Meehan – Senior Environmental Scientist

Lorraine Meehan is a Senior Environmental Scientist with MKO, with over 13 years of experience. Key project experience includes the project management of EIAs for renewable energy projects up to 100 Megawatts (MW) in scale, electricity infrastructure, roads, waste management facilities, and municipal services projects.

Lorraine's key strengths and responsibilities relate to the efficient and effective management of projects, including coordination of multidisciplinary project teams, engagement with the relevant authorities, stakeholders and members of the public on proposed and ongoing projects, organisation of extensive scoping and consultation exercises, and coordination and production of final project outputs, including Environmental Impact Statements / Environmental Impact Assessment Reports, Strategic Environmental Assessment (SEA) Environmental Reports, and Constraints & Feasibility and Site Selection Studies. Within MKO, Lorraine is also involved in the training of junior members of staff and review of outputs, and completes mapping, desk studies and report-writing for a range of development and strategy-related projects.

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Eoin O'Sullivan – Senior Environmental Scientist

Eoin O'Sullivan is a Senior Environmental Consultant with MKO with over 13 years of experience in the assessment of a wide range of energy and infrastructure related projects and working in the fields of environmental and human health risk assessment, waste management, waste policy and permitting. Eoin has wide experience in the project management of large scale infrastructural projects and brownfield developments which includes all aspects of geo-environmental and geotechnical investigation. Eoin holds a BSc (Hons) in Environmental Science & Technology and a MSc in Environmental Engineering. Prior to taking up his position with MKO in July 2017, Eoin worked as a Chartered Senior Engineer with CGL in Surrey, UK. Prior to this Eoin worked as a Project Engineer with RPS Consulting Engineers in Belfast. Eoin has wide experience in the project management of large scale brownfield developments and has routinely undertaken detailed quantitative risk assessment for the protection of controlled waters and ground gas risk assessments. Eoin has also experience in completing PPC Permit Applications and in the preparation of Environmental Impact Statements/Environmental Impact Assessment Reports for renewable energy projects, quarries and a number of non-hazardous landfill sites and anaerobic digesters for both public and private clients. Other key strengths and areas of expertise include remediation options appraisals, remediation method assessments and waste management planning. Eoin is a Chartered Member of the Chartered Institute of Water and Environmental Management and Chartered Environmentalist with the Society of Environment.

Niamh McHugh – Graduate Environmental Scientist

Niamh is a Graduate Environmental Scientist with MKO Ltd having graduated in 2021. Niamh graduated with an honours B.Sc. degree in Environmental Science from NUI, Galway in 2021. Niamh is experienced in report writing and has been involved in the production of EIARs and SEAs for various projects including Watercourse Maintenance Programmes and Onshore Wind Energy developments. Niamh has carried out a wide range of ecological surveying work through her college education, including small mammal surveys, bat surveys and freshwater invertebrate surveys. Niamh also has considerable experience using QGIS mapping software for a wide variety of projects. Niamh's key strengths lie in the areas of report writing and communication, applications of GIS mapping software. Since joining MKO Niamh has been involved in a wide range of projects, acting as a graduate environmental scientist.

Colm Ryan – Senior Project Planner

Colm Ryan is a Senior Project Planner with McCarthy O'Sullivan Ltd. with over 10 years of experience in both private practice and local authorities. Colm holds BA (Hons) in Geography & Irish and Masters in Civic Design Town & Regional Planning. Prior to taking up his position with McCarthy Keville O'Sullivan in May 2017, Colm worked as a Senior Planner with Lightsource Renewable Energy Ltd. and held previous posts with Partnerships for Renewables, South Kesteven District Council, Planning Aid, Frank O Gallachoir & Associates in Bray and Laois County Council. Colm is a chartered town planner with specialist knowledge in renewable energy, mixed use development and residential. Colm's key strengths and areas of expertise are in large scale renewable energy development particularly in the ground mounted solar, delivery of local community engagement processes on contentious planning applications, management of community and developers interest through the planning process and post or pre-planning due diligence. Since joining MKO as a Senior Planner Colm has been overseeing and managing a wide range of development projects such as large scale solar applications, site feasibility work for potential wind energy projects, large scale housing and mixed use schemes. Within MKO Colm plays a large role in the management of staff members including several aspects of business development. Colm has proven negotiation skills and stakeholder relationship building across numerous development projects in Ireland and the UK and is a corporate member of the Irish Planning Institute.

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Pamela Harty – Senior Planner

Pamela is a Senior Planner with MKO with over 12 years of experience in both private practice and local authorities. Prior to taking up her position with MKO in 2015, Pamela worked as a Senior Planner with SLR Consulting Ltd. and held previous posts with Moray Council in Scotland, the Heritage Council of Ireland, Kilkenny Borough Council and North Tipperary County Council. A chartered member of both the Irish Planning Institute and Royal Town Planning Institute, Pamela has project managed a range of strategy and development projects across the Ireland and the UK. Pamela has extensive experience in strategic planning, regeneration, development consultancy, statutory plan preparation, environmental impact assessment, community engagement, urban design and master-planning. Pamela's key strengths and areas of expertise are in project management, development management/master-planning, socio economic impact assessments and collaborative planning. Since joining MKO Pamela has been involved as a Senior Planning Consultant on a significant range of energy infrastructure, commercial, student housing and Strategic Housing Development. Within MKO Pamela plays a large role in the management and confidence building of junior members of staff and works as part of a large multi-disciplinary team to produce EIA Reports.

Meabhann Crowe – Project Planner

Meabhann Crowe is a Project Planner with MKO with over 12 years private sector experience. She is a fully chartered member of the Royal Town Planning Institute (MRTPI). Meabhann holds a BA (Hons) in Geography, Sociological and Political Science and a Masters in Urban and Regional Planning. Prior to taking up her position with McCarthy Keville O'Sullivan in October 2018, Meabhann was employed as an Associate Director with Colliers International in their Edinburgh office, prior to which she was employed for several years with Halliday Fraser Munro. In her time in the industry Meabhann has been active on a number of instructions across a broad spectrum of mixed-use, residential, commercial, renewable energy and retail projects.

Meabhann brings particular expertise in initial development feasibility appraisals and development strategies. Her experience in managing large multi-disciplinary teams in the preparation of local and major planning applications across residential, mixed-use and retail developments means she has a wealth of knowledge to draw on in the early stages of development. She has particular experience in preparing and managing site strategies which include both responding to emerging planning policy whilst also preparing and progressing planning applications and appeals.

Sean McCarthy – Senior Planner

Sean McCarthy is a Senior Planner with McCarthy O'Sullivan Ltd. with over 7 years of experience in both private practice and local authorities. Sean holds BSc. (Hons) in Property Studies and a Masters in Regional & Urban Planning. Prior to taking up his position with McCarthy Keville O'Sullivan in September 2015, Sean worked as a Planning Officer with the Western Isles Council in Scotland in the UK and prior to that worked as a Graduate Planner with Tipperary County Council. Sean is a chartered town planner with specialist knowledge in one off rural housing, renewable energy developments, quarry consents and retail planning,

Since joining MKO Sean has been involved as a Project Planning Consultant on a significant range of energy infrastructure, commercial, housing, retail and residential projects in addition to project managing circa 26MW of solar energy planning applications through the statutory planning system, with more projects in the pipeline. Sean holds chartered membership of the Royal Town Planning Institute.

Áine Bourke – Project Planner

Áine Bourke is a Project Planner with MKO with 6 years of experience as a planner in private practice. Áine holds BA (Major) in Geography & English and Masters in Planning and Sustainable Development

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(MPlan). Prior to taking up her position with MKO in May 2020, Áine worked as a Planner in the UK with Vail Williams LLP, where she gained experience as a graduate through to planner level following the successful completion of her Assessment of Professional Competence (APC) and promotion to Chartered Member of the Royal Town Planning Institute. Áine held previous positions as a clerical officer at Cork City Council, assisting the Planning Department with field research, and as a student intern with Tipperary County Council. Áine is a chartered town planner with experience across a range of sectors including commercial, residential, healthcare, tourism and industrial, as well as having experience with providing development advice and appraisals to clients, conducting strategic land searches, submitting planning applications for residential, commercial, tourism and health sector clients, along with providing strategic planning advice, preparing planning appeals, attending client meetings and conducting site visits. Áine's key strengths and areas of expertise are in development management, provision of planning advice and project management of small and medium sized projects. Since joining MKO Áine has been working alongside with the wider planning team, working on various projects including Strategic Housing Developments, providing planning advice, lodgement and management of a range of Planning Applications, preparing Development Plan submissions and preparing Development Potential Reports.

Áine holds chartered membership with the Royal Town Planning Institute and chartered membership with the Irish Planning Institute.

Owen Cahill – Project Environmental Scientist – Health & Safety Manager

Owen is an Environmental Engineer with over 12 years of experience in the environmental management and construction industries. Owen is also the MKO Health & Safety Officer with the responsibility for managing Occupational Safety and Health matters in the Galway Office. Owen holds BSc. (Hons) and MSc. in Construction Management and a Master's in environmental engineering. Owen has also successfully completed a Managing Safely Course approved and validated by the Institution of Occupational Safety and Health. Prior to taking up his position with McCarthy Keville O'Sullivan in October 2013, Owen worked as an Environmental Officer with Kepak and prior to which he held a post with Pentland Macdonald Contaminated Land & Water Specialist in Northern Ireland. Prior to working in planning and environmental consultancy, Owen was employed within the construction industry where he gained significant experience on a variety of civil, residential and commercial projects. Owen's wide ranging multi sector experience has provided him with specialist knowledge and understanding of the challenges in the planning and delivery of developments with the minimum environmental impact and with practicality and constructability in mind.

Owen's key strengths and areas of expertise are in project management, environmental impact assessment, wind energy & solar energy construction & environmental management planning and waste permit management. Since joining MKO Owen has been involved as a Project Manager on a range of energy infrastructure, commercial, residential, waste facility and quarry projects as well as managing the licensing requirements of a number of EPA licensed facilities. Within MKO Owen plays a large role in the management and confidence building of junior members of staff and works as part of a large multi-disciplinary team to produce EIS Reports. Owen is Full Member and Chartered Environmentalist with the Institute of Environmental Management & Assessment.

John Hynes – Ecology Director

John Hynes is a Senior Ecologist and director of the Ecology team with MKO with over 10 years of experience in both private practice and local authorities. John holds a B.SC in Environmental Science and a M.Sc. in Applied Ecology. Prior to taking up his position with McCarthy Keville O'Sullivan in March 2014, John worked as an Ecologist with Ryan Hanley Consulting Ltd. and Galway County Council. John has specialist knowledge in Flora and Fauna field surveys. Geographic Information Systems, data analysis, Appropriate Assessment, Ecological Impact Assessment and Environmental Impact Assessment. John's key strengths and areas of expertise are in project management. GIS and impact assessment. Since joining MKO John has been involved as a Senior Ecologist on a significant

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range of energy infrastructure, commercial, national roads and private/public development projects. Within MKO John plays a large role in the management and confidence building of junior members of staff and works as part of a large multi-disciplinary team to produce EIS Reports. John has project managed a range of strategy and development projects across the Ireland and holds CIEEM membership.

Pat Roberts – Principal Ecologist

Pat Roberts is the Principal Ecologist at MKO. Pat joined MKO (then Keville & O'Sullivan Associates) in 2005 following completion of a B.Sc. in Environmental Science. He has extensive experience of providing ecological services in relation to a wide range of developments at the planning, construction and monitoring stages. He has wide experience of large scale industrial and civil engineering projects. He is highly experienced in the completion of ecological baseline surveys and impact assessment at the planning stage. He has worked closely with construction personnel at the set-up stage of numerous construction sites to implement and monitor any prescribed best practice measures. He has designed numerous Environmental Operating Plans and prepared many environmental method statements in close conjunction with project teams and contractors. He has worked extensively on the identification, control and management of invasive species on numerous construction sites.

Pat has worked as project manager and ecologist on numerous ecological assessments completed by the company to date, including a wide range of work within sensitive ecological areas.

Sarah Mullen – Ecologist

Sarah Mullen is an Ecologist with McCarthy O'Sullivan Ltd. with over 5 years of experience in consultancy. Sarah holds a B.Sc. (Hons) in Botany, an M.Sc. in Biodiversity and Conservation and a Ph.D. in Botany, in which she investigated the role of biodiversity in the functioning of plant-pollinator interactions in semi-natural grassland habitats. Prior to taking up her position with McCarthy Keville O'Sullivan in September 2018, Sarah worked as an Ecologist with Ryan Hanley Ltd. where she gained experience in multidisciplinary ecological surveys, ecological impact assessment and appropriate assessment. Sarah also has experience working with Indigo Development and Change, a conservation focused NGO in South Africa and with the German branch of the Global Biodiversity Information Facility (GBIF) in the Museum für Naturkunde in Berlin. Sarah's key strengths and areas of expertise are in terrestrial flora and fauna ecology, including vegetation surveys, habitat mapping, invasive species surveys, mammal surveys, Appropriate Assessment and Ecological Impact Assessment. Since joining MKO Sarah has been involved as an ecologist on various energy infrastructure, commercial and water services projects Within MKO Sarah plays a large role in preparing Ecological Impact Assessment reports and Stage 1 and Stage 2 Appropriate Assessment reports. Sarah holds membership with the Chartered Institute of Ecology and Environmental Management.

Colin Murphy – Project Ecologist

Colin Murphy is a graduate ecologist with MKO who took up his position in March 2020. Colin holds an B.Sc. degree in Ecology and Environmental Biology from University College Cork and an M.Sc. degree in Ecosystem Science and Policy from University College Dublin. Colin's key strengths and areas of expertise are in habitat and ecological surveying, report writing, GIS and data analysis/interpretation. Colin has a broad range of ecological experience in vegetation surveys, freshwater invertebrate surveys and pollinator surveys. Colin also has experience in hydromorphological surveying using the MoRPH surveying technique.

Aoife Joyce – Ecologist

Aoife Joyce is an Ecologist with MKO Planning and Environmental Consultants with experience in research, consultancy and drilling contractors. Aoife is a graduate of Environmental Science (Hons.) at

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NUIGalway, complemented by a first class honours MSc in Agribioscience. Prior to taking up her position with MKO in May, 2019, Aoife worked as an Environmental Scientist with Irish Drilling Ltd. and held previous posts with Inland Fisheries Ireland and Treemetrics Ltd. She has a wide range of experience from bat roost identification, acoustic sampling, sound analysis, soil and water sampling, Waste Acceptability Criteria testing, electrofishing, mammal and habitat surveying to GIS, Environmental Impact Assessments (EIAs) and mapping techniques. Since joining MKO, Aoife has been involved in managing bat survey requirements for a variety of wind farm planning applications, as well as commercial, residential and infrastructure projects. This includes scope, roost assessments, deploying static bat detectors and weather stations nationwide, dawn and dusk bat detection surveys, acoustic analysis, mapping, impact assessment, mitigation and report writing. Within MKO, she works as part of a multidisciplinary team to help in the production of ecological reports and assessments. Aoife is a member of Bat Conservation Ireland and CIEEM and holds a current Bat Roost Disturbance licence.

Jack Workman – Environmental Scientist and LVIA specialist

Jack Workman is an Environmental Scientist and Landscape and Visual Impact Assessment (LVIA) specialist with MKO. Jack joined the company in February 2020 and his primary role at MKO is within the landscape team where he produces the Landscape Visual Impact Assessment chapter of Environmental Impact Assessment reports. Jack holds an MSc. in Coastal and Marine Environments (Physical Processes, Policy & Practice) from NUIG, where he was awarded the Prof. Máirín De Valéra distinction in science research award. Prior to taking up his position with MKO, Jack worked as a Geospatial Analyst and Research Assistant with NUIG and also held previous posts in the coastal engineering sector with Royal Haskoning DHV and Saltwater Technologies. Jack has specialist knowledge in Landscape Visual Impact Assessment, GIS, UAV remote sensing and coastal and marine environmental science. Jack's key strengths and areas of expertise are in geospatial analysis, planning, and Environmental Impact Assessment reporting. Since joining MKO Jack has been involved as an environmental consultant on Landscape Visual Impact Assessments. Jack holds a graduate membership with the Chartered Institute of Water and Environmental Management.

Jack Smith – Environmental Scientist and LVIA specialist

Jack is an Environmental Scientist with MKO having joined the company in May 2021. Jack holds a BCL (Hons) Law, an LLM (International Environmental and Energy Law), and a MSc (Hons) in Environmental Science where he focused his studies on Renewable Energy and Marine Spatial Planning. Jack's key strengths and expertise are in geographic information systems, data analysis, report writing and landscape and visual impact assessment. Since joining MKO, Jack has been involved in a range of projects, including residential developments, quarries, wind energy developments and solar energy developments. In his role as an environmental scientist within the Landscape Team, Jack works with other members of the team in the preparation and production of Landscape and Visual Impact Assessment chapters of EIA reports.

Joseph O'Brien – CAD & Mapping Technician

Joseph O'Brien holds the position of CAD Technician with MKO since joining the Company in June 2016. Prior to joining MKO, Joseph worked as a free-lance Modelmaker and CAD Technician. His previous experience included designing various models and props through CAD and then made them for various conventions such as Dublin Comic Con and Arcade Con. Joseph holds a BA Honors Level 8 in Modelmaking, Design and Digital Effect from the Institute of Art Design and Technology and also holds a City & Guilds Level 3 in 2D and 3D AutoCAD. Joseph is responsible for mapping and drawings completed by the company and is proficient in the use of MapInfo GIS software in addition to AutoCAD and other design and graphics packages.

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1.10.1.2 Damian Brosnan Acoustics

Damian Brosnan

Damian Brosnan has been working in acoustics since 1996. He holds a Postgraduate Diploma in Acoustics & Noise Control from the Institute of Acoustics, and an MSc in Applied Acoustics from the University of Derby. Damian is a member of the Institute of Acoustics (MIOA), and is secretary of their Irish branch. He is also a member of Engineers Ireland, and a member of ACASITI, a recently formed association of Irish professional acoustic consultants. Damian has worked on several hundred noise projects to date, including a number of large scale residential and commercial developments.

1.10.1.3 Aegis Archaeology – Consultant Archaeologist

Frank Coyne

Frank Coyne MA graduated from University College Galway in 1989 with a BA (honours) degree in archaeology and history. He graduated from the City of Birmingham University with an MA (Distinction) in Conservation of the Historic Environment in 2021. He is licensed to carry out archaeological excavations in Ireland since 1996 and has 26 years of experience in the provision of archaeology and cultural heritage services to public and private sector clients. He is a director of Aegis Archaeology Ltd which was established in 1998 and has undertaken major archaeological projects from pre-planning assessment stage to archaeological excavation (preservation by record) of sites. Frank Coyne won the 2020 Donald Insall award in the UK, and also the HSBC award for 'Best Conservation Management Plan' for Mutton Lighthouse in Galway.

1.10.1.4 O'Connor Sutton Cronin & Associates

Mark Killian

Mark Killian graduated from the National University of Galway, Ireland (NUIG) with a BA of Science degree under the discipline of Civil Engineering. He graduated from Trinity College Dublin in 2009 with an MA in Engineering. He has been a chartered member of 'Engineers Ireland, 2017' since 2002 and he's gained 15 years of experience in design and delivery of sustainable drainage systems associated with a range of civil engineering projects. Mark is involved in the Sustainable Drainage Systems role and his expertise encompasses the whole design process: from concept and feasibility, through to construction; coordinating and understanding the demands of multi-disciplinary design teams on traditional employer design, and contractor design and build schemes. He has worked on numerous projects designing and co-ordinating drainage and water services infrastructure on residential and commercial developments.

Anthony Horan

Anthony Horan graduated with BA in Civil engineering in University College Dublin. He completed a post graduate diploma in Project Management in Trinity College Dublin. Additionally, Anthony holds a post graduate certificate from University College Dublin in Road Safety Auditing, PSDP Training with ACEI and a course in Designing for Safety in Construction (EI accredited). He is recognised as a chartered engineer with Engineers Ireland and has held the position of manging director in OCSC for 20 years. He has extensive experience in managing a wide array of civil and multidisciplinary engineering projects. Anthony has expertise in managing design teams,
running procurement processes and managing schemes on site. Anthony has managed schemes through all stages of development from inception through to final account.

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Wian Marais

Wian Marais graduated with BA in Civil Engineering in 2011 and graduated in 2020 with honours in a MA in Engineering (Transportation). Wian is recognised as a professional engineer under the Engineering Council of South Africa (Reg no. 20180415) and the Institute of Municipal Engineering of Southern Africa. Wian has extensive knowledge in traffic engineering, traffic modelling/ simulation, geometric design and transportation planning. Wian has held the position of Senior Roads & Traffic Engineer for one year in O'Connor Sutton Cronin & Associates. Wian has experience in traffic & transport assessment and traffic redistribution within mixed-use developments.

1.10.1.5 Davey-Smith Architects

David Smith (MRIAI, Dip Arch, BArch Sc.)

David is a founding director of DSA and has wide experience working on medium and large scale residential and mixed-use developments, infill and brown-field site development, urban design and masterplanning.

David graduated from DIT Bolton Street in 2000 with an Honours Degree in Architecture and has worked with FKL Architects, DTA Architects and Joe McSweeney Architects, before forming DSA with Greg Davey in 2010. From 2006-2008 David was President of the Architectural Association of Ireland and has also sat on the Council of the Royal Institute of Architects of Ireland.

David is a Registered Architect, a member of the RIAI and Honorary Member of the AAI. David is also a founding director of Delphi Architects + Planners.

Eric Govin (DPLG, CNOA, MRIA)

Eric Govin graduated in 1998 from the School of Architecture Paris-La-Vilette and following 15 years in a Dublin practice as an Associate Director joined Davey Smith Architects in 2016. He has a particular interest in new technologies and materials, and he is a Certified a Passive House Designer & Graphisoft BIM manager.

1.10.1.6 Crawford Architecture

John Crawford (MRIAI, ARIAS, DipArch, B.Sc Hons)

John Crawford established Crawford Architecture in May 2017 having previously held the role of Director within Reddy Architecture between the years 2002-2017. John has over 21 years of industry experience in Scotland and Ireland. Since founding the practice John has built a reputation for medium to large scale apartment and housing developments, office fit outs, due diligence, surveys, apartment and office refurbishments and remedial works. John is also a qualified PSDP. Notable projects in which John has been involved in include, Baker's Yard, Bruce House and Hansfield developments in Co. Dublin. John has also been involved in award winning buildings such as NUIG Library Offices, Cuisine de France HQ and Eircom HQ.

Annabel Gilmartin (MRIAI, PGDip, March, BA Hons)

Annabel Gilmartin joined Crawford Architecture in May 2017 and has worked across a range of sectors including residential, workplace and leisure. Annabel has 6 years of industry experience in both London and Ireland and has seen projects from feasibility through to construction stage; most recently working on a 61-unit apartment building in central Dublin. Annabel is a highly skilled concept designer, has advanced knowledge of Revit and has a detailed knowledge of residential architecture and experience planning apartment buildings and housing estates.

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1.10.1.7 McCrossan O'Rourke Manning Architects (MCORM)

James Coakley

James is a Registered Architect with the Royal Institute of the Architects of Ireland (MRIAI) with significant experience in large-scale residential, mixed-use and Masterplanning developments from design through to completion. Having completed his Bachelor of Architecture Honours degree in the University of Limerick, he later went on to complete a Professional Diploma in Architecture in University College Dublin, undertaking his professional exams and registering as an architect in 2021.

Prior to joining MCORM, he worked in a number of leading Architecture and Engineering practices in the south-east of Ireland over the previous 4 years. This included the detailed design and completion of many commercial and residential projects of varying scales across Ireland and the UK, which provided him with invaluable knowledge and insight in the construction industry. Since joining MCORM in 2018, James has worked on multiple significant schemes of different complexities from the early stages of design feasibility, planning, procurement and post-planning construction projects through to completion. He has extensive experience of working in and leading multi-disciplinary design teams whilst managing the day-to-day running of a number of projects within the firm. His role also involves continuous engagement with project management to identify key deliverables within ascertainable timeframes and budgets. A sample of these projects are outlined below, indicating the strong contribution that James and the team at MCORM bring to this project.

Stephen Manning

Following graduation from UCD in 1989, Stephen worked with a prominent Architectural practice in Dublin until he joined MCORM in 1992. He was made a partner with the firm in 1997. He has been Managing Director of MCORM Architects since 2011.

Stephen has vast experience on Residential Design, Urban Design, Master Planning, Mixed Use Design and Retail Design. As part of the Department of Housing, Planning, Community and Local Government Housing Delivery Costs and Planning Standards Committee, he advised the group in particular on issues of housing and apartment typology and the impact of the chosen typologies on density and housing layout efficiencies. Stephen has gained a reputation over the past 25 years within the profession as a thought leader in the development of design solutions for sustainable communities. He maintains a hands on approach dealing directly with clients and public authorities particularly at the master planning, conceptual and design stages of the Practice's projects. He has a keen interest in evolving Urban Design and Regeneration. The projects below have been developed based on the Urban Design Manual and also on national and international fore fronting influences.

1.10.1.8 Ronan MacDiarmada & Associates

Ronan MacDiarmada & Associates Ltd was established in 2001 to meet the need for practical landscape architectural solutions. Ronan has over twenty-eight years' experience working with a variety of multi-disciplinary teams across a broad spectrum of clients, with vast experience in Landscape Master Planning, Public Realm, Commercial, Residential, and Institutional projects particularly in the healthcare, nursing home, hospitality, service station and educational spheres. Clients value our ability to identify potential difficulties and problem solve with creative and dynamic solutions.

Ronan MacDiarmada

Ronan was considering sustainability in his designs long before sustainability became a key feature of planning so it's no surprise RMDA Ltd were the first Landscape Architect Practice in Ireland to sign up to the All-Ireland Pollinator Plan. The team of Landscape Architects and Designers in RMDA Ltd will always endeavour to use existing hedgerows and trees or aspects of the native landscape. Biodiversity

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and sustainability are a core principle. We are committed to increasing biodiversity appropriate management techniques to the management of Parks and Open Spaces.

Peter Lynch

Peter Lynch is a Landscape Architect with RMDA, joining the team in August 2020. Peter graduated with an honours B.Sc degree in Landscape Architecture from UCD in 2019 and has since gained experience in a wide range of projects across the private and public sectors, from the initial design concept through to construction phase. Peter has been involved in multiple high-profile projects, public realm, and park developments, and is a team member on many large-scale residential projects such as Barnhill, Belcamp, Hansfield, Moygaddy & Lissywollen

With a background in landscape construction and maintenance, Peter brings a practical understanding to the projects teams he works with. Peter's strengths lie in using a broad range of digital tools, report writing, and drawing techniques for concept design, developing drawings and formatting landscape rationales.

1.10.1.9 Parkbourne Consultancy

Bryan McCormack

Bryan has worked in the Building Services industry for over 30 years. He has delivered a large range of commercial, industrial and business critical infrastructure projects to a successful completion. As part of Parkbourne he delivers high quality engineering solutions which include energy aware designs which fit within the client's requirements. Bryan started the practice and is the primary contact for a number of our prestige clients. He has considerable experience working with multinational clients and designs teams in the delivery of a range of projects in Ireland, Europe & USA. Bryan is a member of Institute of Engineering and Technology (IET).

1.10.1.10 Byrne Environmental Consulting Ltd

Ian Byrne MSc MIOA

Ian Byrne, Principal Consultant, MSc Environmental Protection, Dip. Environmental & Planning Law, Member of the Institute of Acoustics has over 24-years experience as an environmental consultant.

Byrne Environmental Consulting Ltd specialise in the provision of waste management consultancy services to our Clients. We have a long established reputation in preparing Operational and Construction Waste Management plans for Large Residential Developments (LRD), Strategic Housing Developments (SHD), Student Residential Developments, Mixed-Use Developments, Commercial and Retail Developments, and Healthcare developments. We typically design a sustainable waste management strategy for the operational phase of the development where waste generation is minimised and re-use and recycling is maximised by designing the appropriate waste management infrastructure into the development.

1.10.1.11 3D Design Bureau

Ferran Villa - Lead 3D Artist/Generalist and Team Lead

Ferran Villa has over 18 years of experience in the field of 3D Visualisation, 16 of which has been with 3D Design Bureau. With a Bachelor's degree in multimedia, his role within the company is as a full time 3D artist/generalist, specialized in the production of both technical verified view montages and presentation imagery for planning applications. He has been team lead for the visualisation team for

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over 10 years ensuring high standards are met in the delivery of planning imagery and that existing and new processes are adhered to. Ferran has experience and expert knowledge of the industry standards software and systems used in the production of imagery for planning applications. Ferran's key strength are in accurate placement of digital 3D models in baseline photography through the methodologies employed by the company along with lighting, texturing and composition of digital models for the technical and accurate representation of imagery for planning applications.

Marcus Sestulis - Operations Manager

Marcus has over 9 years experience working in the AEC sector with 3D Design Bureau with previous experience in the field of surveying and project management. Starting as a Business Development Officer and being highly involved in the rebranding of the company in 2013, Marcus also worked as a 3D/BIM modeller giving him the hands on experience and knowledge of workflows, processes and procedures on the production side of the company. He has been working now for over 5 years as the company's main project and operation manager. Marcus is a logic driven individual who excels in the delivery of a large number of projects on a weekly/monthly basis working under high pressure and tight timeframes. His role also includes quality assurance ensuring all work produced is to the standards of excellence, both visually and technically, expected by the company, it's clients and 3rd Party project design teams. Marus's key strengths lie in the ability to remain calm under the pressure of this industry, continuously deliver on expectations set by the company and clients and to manage up to 15 industry professionals across various teams within 3DDB. He is also works very closely with MD Nicholas Polley ensuring that the company stays up to date on constantly changing trends within the industry and is overseeing the process of the company becoming BIM Level 2 Certified.

Pawel Redlinski - BIM Modeller and Team Lead

As a qualified architect (master degree – M.Arch) with a Postgraduate Diploma in Collaborative BIM, Pawel has gained valuable knowledge and experience of the AEC sector working with 3D Design Bureau over the past 6 years. His role within the organisation is as BIM modeller and team lead for the modelling team. His experience and qualifications has allowed him to help the modelling team grow in terms of technical ability and refinement of processes and procedures. He leads a very strong technically gifted modelling team that excel in producing accurately detailed digital 3D models for both planning and marketing purposes. The modelling team is the main foundation of all the services and deliverables provided by the company.

Pawel has worked on a large number residential and commercial projects and has helped implement a number of key processes and strategies within the modelling team to ensure that methodologies employed by the company remain at the pinnacle of what they do.

Pawel is also currently overseeing process of the company becoming BIM Level 2 certified alongside our operations manager Marcus Sestulis certification process of the company

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1.10.1.12 Hydro-Environmental Services (HES)

Michael Gill (BA, BAI, Dip Geol., Msc, MIEI)

Michael Gill is an Environmental Engineer and Hydrogeologist with over 18 years' environmental consultancy experience in Ireland. Michael has completed numerous hydrological and hydrogeological impact assessments for a variety of development types across Ireland. He has substantial experience in surface water drainage design and SUDs design and surface water/groundwater interactions.

Conor McGettigan (BSc, MSc)

Conor McGettigan is a junior Environmental Scientist, holding an M.Sc. in Applied Environmental Science (2020) from University College Dublin. Conor has also completed a B.Sc. in Geology (2016) from University College Dublin. In recent times Conor has assisted in the preparation of hydrological and hydrogeological impact assessments for a variety of developments.

Jenny Law (BSc)

Jenny Law is a master's student in Applied Environmental Geoscience. Jenny holds a BSc in Earth and Ocean Science. In recent times Jenny has assisted in the preparation of hydrological and hydrogeological impact assessments for a variety of developments.

1.11 Viewing and Purchasing of the EIAR

Due to the nature of the EIAR and the assessment of all 6. no applications contained within, the EIAR will be made available to An Bord Pleanála, Meath County Council and Kildare County Council.

Copies of this EIAR will be available online, including the Non-Technical Summary (NTS), on the Planning Section of An Bord Pleanála website, https://www.pleanala.ie/en-ie/home under the relevant Planning Reference Number (to be assigned on lodgement of the application)

Copies of this EIAR will be available online, including the Non-Technical Summary (NTS), on the Planning Section of the Meath County Council website, https://www.meath.ie/council/council-services/planning-and-building/planning-permission/view-or-search-planning-applications under the relevant Planning Reference Number (to be assigned on lodgement of the application).

Copies of this EIAR will be available online, including the Non-Technical Summary (NTS), on the Planning Section of the Kildare County Council website, http://webgeo.kildarecoco.ie/planningenquiry under the relevant Planning Reference Number (to be assigned on lodgement of the application).

This EIAR and all associated documentation will also be available for viewing at the offices of An Bord Pleanála, Meath County Council and Kildare County Council. The EIAR may be inspected free of charge or purchased by any member of the public during normal office hours at the following address:

An Bord Pleanála,
64 Marlborough Street,
St. Rotunda,
Dublin 1

Meath County Council,
Planning Department,
Buvinda House,
Dublin Road,
Navan,

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County Meath.

Kildare County Council,
Planning Department,
Áras Chill Dara,
Devoy Park,
Naas,
Co. Kildare

The EIAR will be available to view online on its dedicated SHD website www.moygaddycastleSHD.com

The EIAR will also be available to view online via the Department of Planning, Housing and Local Government's EIA Portal, which will provide a link to the planning authority's website on which the application details are contained. This EIA Portal was recently set up by the Department as an electronic notification to the public of requests for development consent which are accompanied by an EIAR. (https://www.housing.gov.ie/planning/environmental-assessment/environmental-impact-assessment-eia/eia-portal).

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2. BACKGROUND TO THE PROPOSED DEVELOPMENT

2.1 Site of the Proposed Development

2.1.1 Site Location

The Proposed Development is largely located within the administrative area of County Meath, with a partial area of the EIAR study area (comprising the R157 Road and Dunboyne Road extending west of the Dunboyne Road Roundabout from the Kildare Bridge to the Maynooth Municipal Wastewater Pumping Station) located within the administrative boundary of County Kildare. The Proposed Development is on the northern edge of Maynooth town, off the Dunboyne Road and adjacent to the Carton House Estate. The Proposed Development lands are part of the overall Maynooth Environs lands and form part of the proposed Moygaddy Masterplan area owned by the Applicant, Sky Castle Limited (Sites 'A' 'B', and 'C', 'MOOR', 'Kildare Bridge works' and 'Moyglare Bridge' of the overall proposed Masterplan area).

The Proposed Development is bounded by the River Rye Water along the southern boundary and agricultural fields to the north and west, while Carton House Demesne (Demense Wall - RPS Ref: 91556) is located directly adjacent to the east. The Dunboyne Road (R157) and local road L2214-3/ /L6219 (included as part of the proposed Maynooth Outer Orbital Road (MOOR)) roads are located to the south-east and north/ north-west respectively. Access to the site is currently from the Dunboyne Road (R157) and the local road L2214-3/L6219.

The Proposed Development is located approximately 500m north of Maynooth town at its closest point, Co. Kildare. Maynooth is identified in the RSES as a key town with the assets and capacity to grow in a sustainable manner while minimising impacts on the receiving environment.

The Proposed Development is located on the southernmost extent of County Meath in an area known as the Maynooth Environs. The Proposed Development lands are located within the Dublin Metropolitan Area Strategic Plan (MASP), within a radius of 20km from Dublin City Centre. The Proposed Development is also situated within the M-4 strategic corridor, circa 2km from the motorway and railway networks (see **Figure 2-1** below). The extent of the red line boundaries of the Proposed Development for Site A (Strategic Employment Zone), Site B (Healthcare Facilities), Site C (Strategic Housing Development) and the Maynooth Outer Orbital Road (MOOR) are illustrated on **Figures 2-2, 2-3, 2-4** and **2-5** below.

The administrative area of Kildare County Council is located immediately adjacent to and south of the subject lands and two further infrastructure related planning applications form part of the Proposed Development here. These are:

Kildare Bridge – which includes a proposed new pedestrian and cycle link from the Proposed Development to the existing pedestrian and cycle link on R157, a new pedestrian/cycle bridge structure to improve accessibility across the Kildare Bridge, installation of a new wastewater rising main routed along the R157 and underneath the Rye Water and along the public road towards the Maynooth Municipal Wastewater Pumping Station and all ancillary infrastructure works. The extent of the Kildare Bridge works area within Co. Kildare is illustrated on **Figure 2-6** below.

Moyglare Bridge – which includes an integral single span bridge over the River Rye Water with associated flood plain works and embankments, as well as construction of approximately 160m section of new access road linking the existing Moyglare Hall Road to the south of the site to the proposed single span bridge crossing the River Rye Water, with associated services and utilities connections. The

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indicative extent of the Moyglare Bridge Proposed Development area within Co. Kildare is illustrated on **Figure 2-7** below.

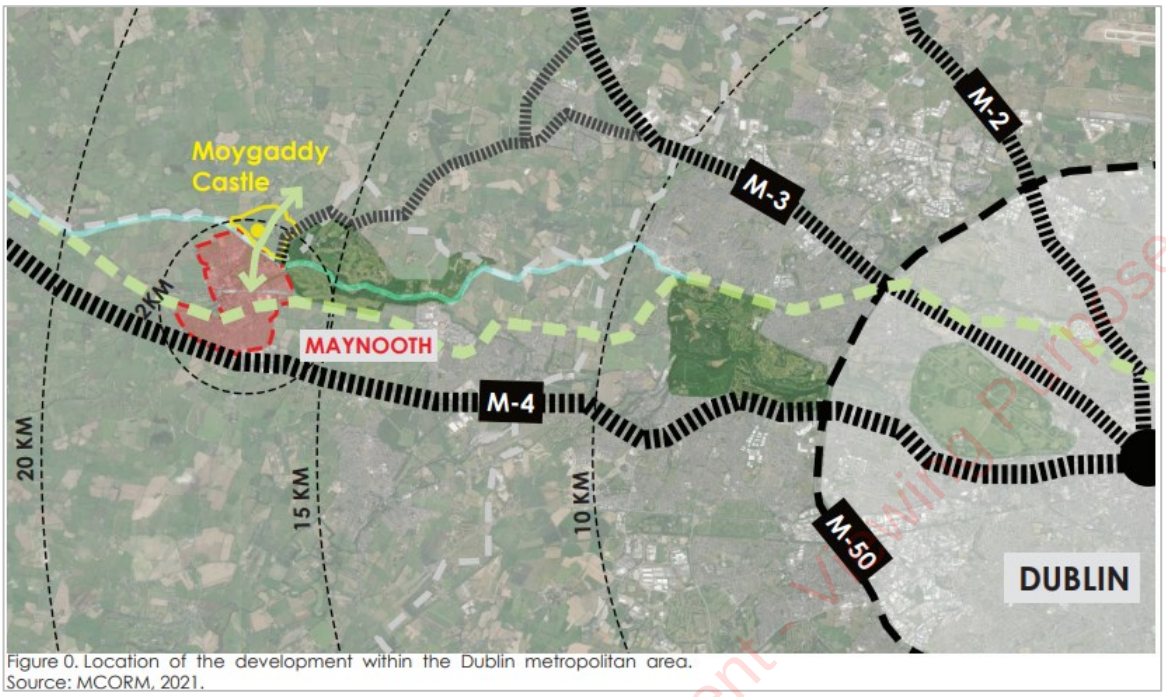

Figure 0. Location of the development within the Dublin metropolitan area.
Source: MCORM, 2021.

Figure 2-1: Location of the development within the Dublin Metropolitan Area. Source: MCORM Architects Design Statement

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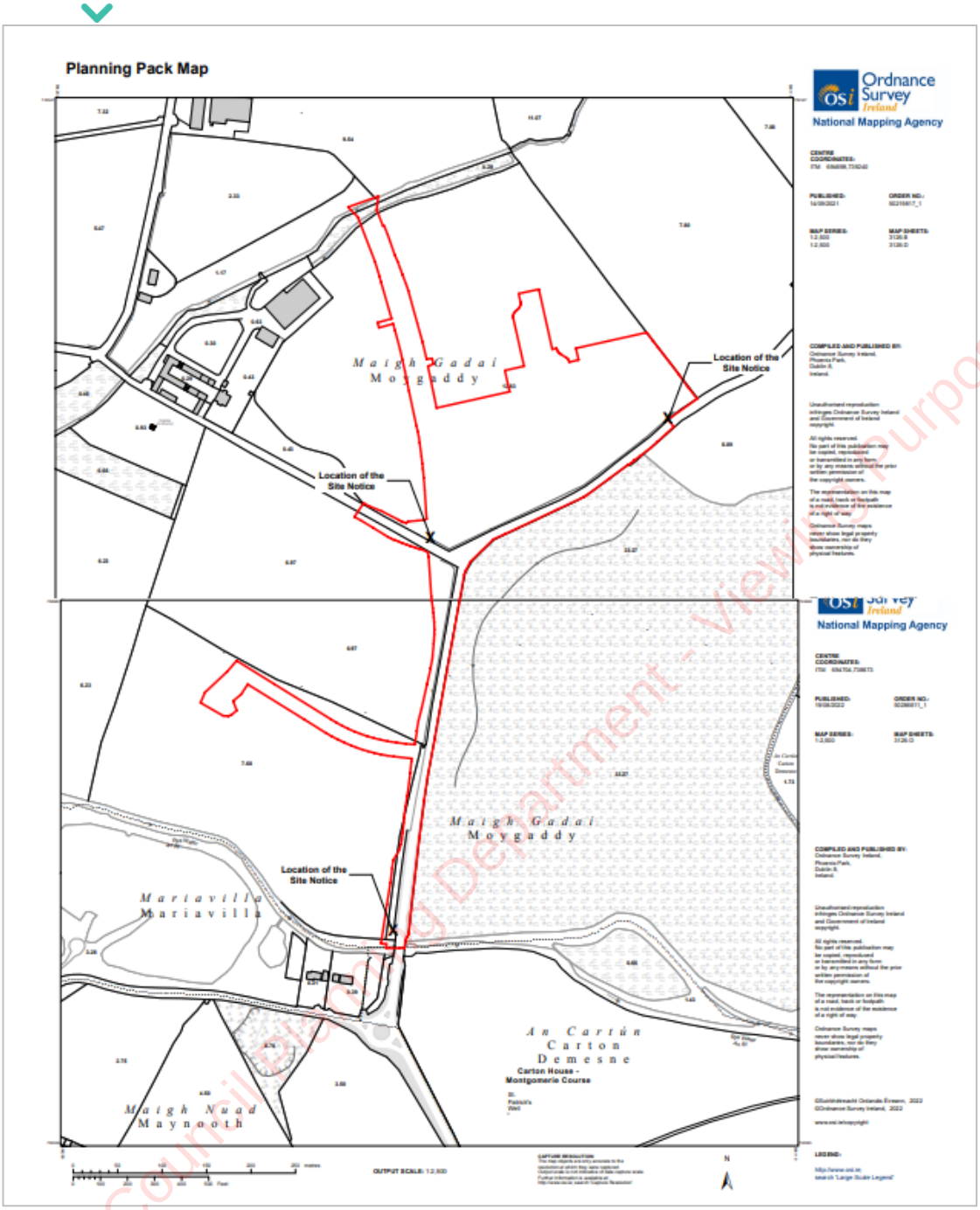

Figure 2-2: Site Location Plan – Site A – Strategic Employment Zone. Source: Davey Smith Architects Overall Site Existing Plan

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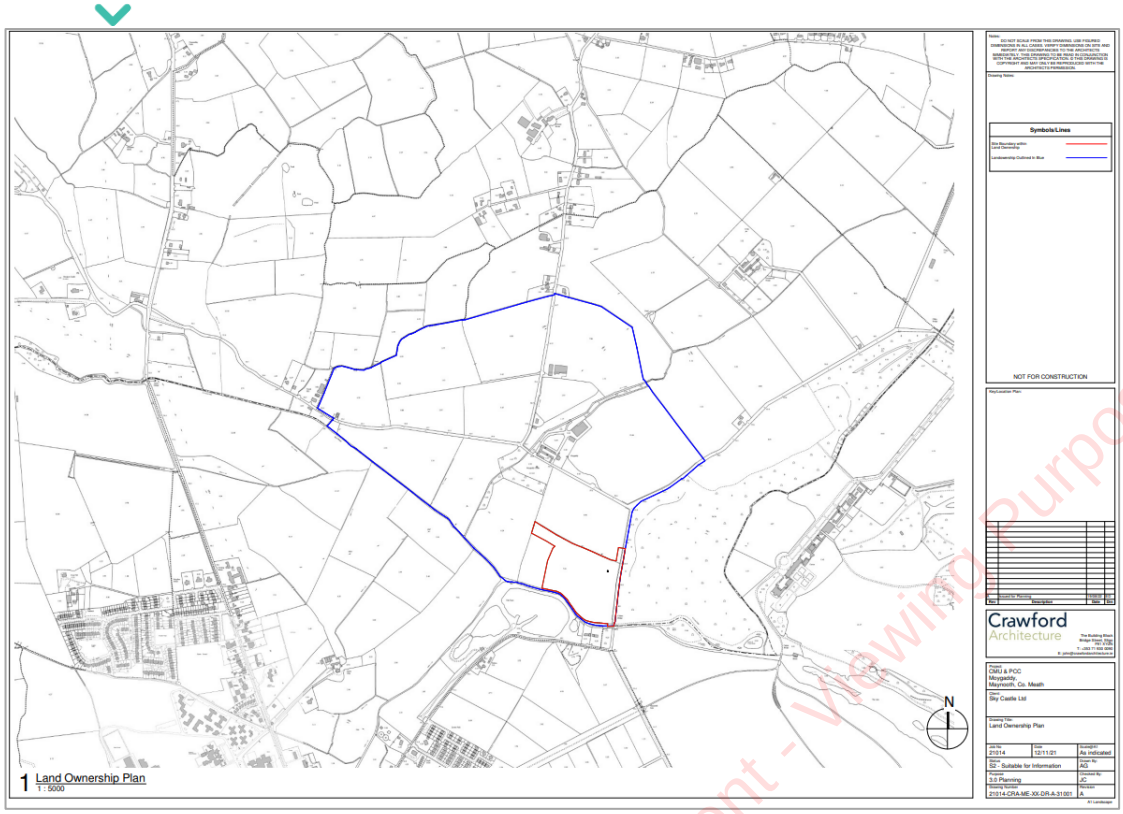

Figure 2-3: Land Ownership Map – Site B – Healthcare Facilities. Source: Crawford Architecture Land Ownership Map

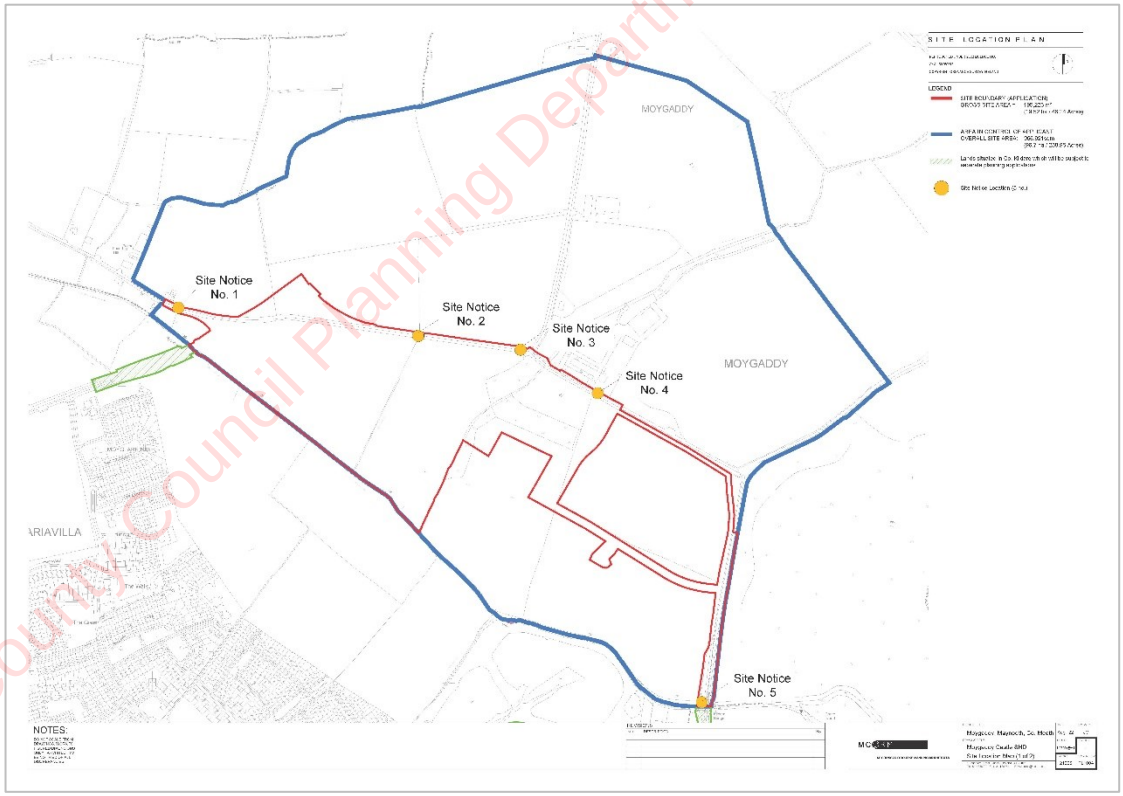

Figure 2-4: Site Location Map – Site C Strategic Housing Development. Source: MCORM Architects

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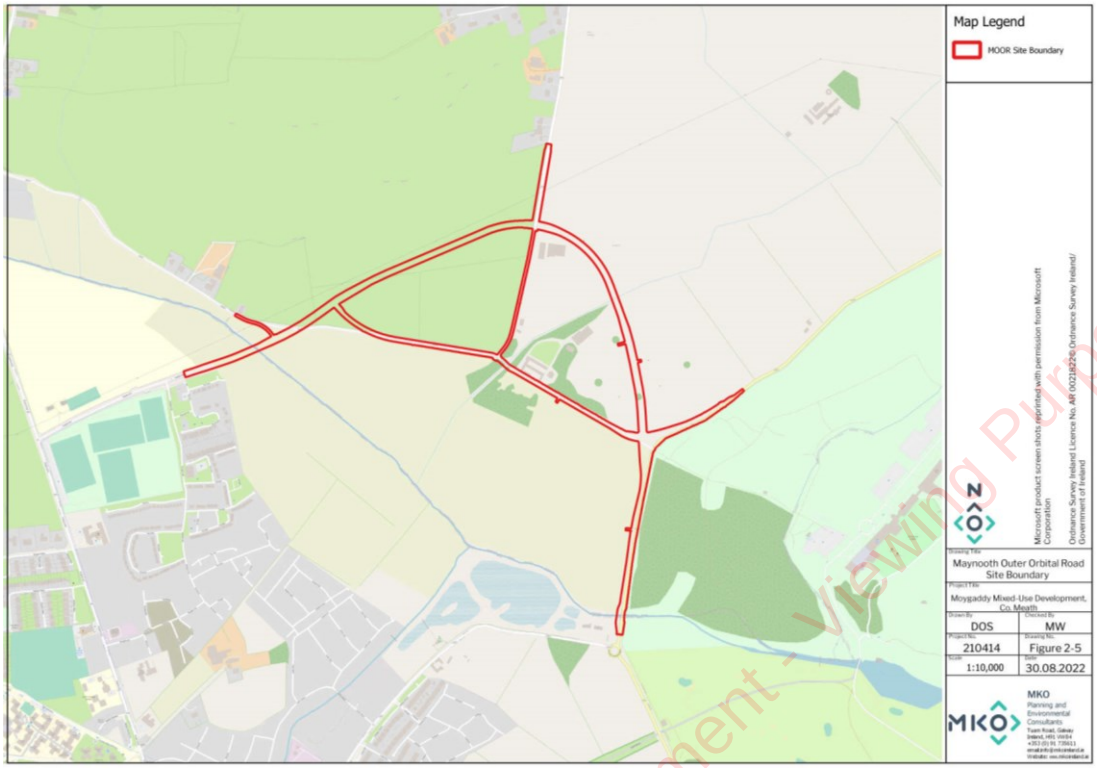

Figure 2-5: Site Location Map - MOOR Application. Source: MKO

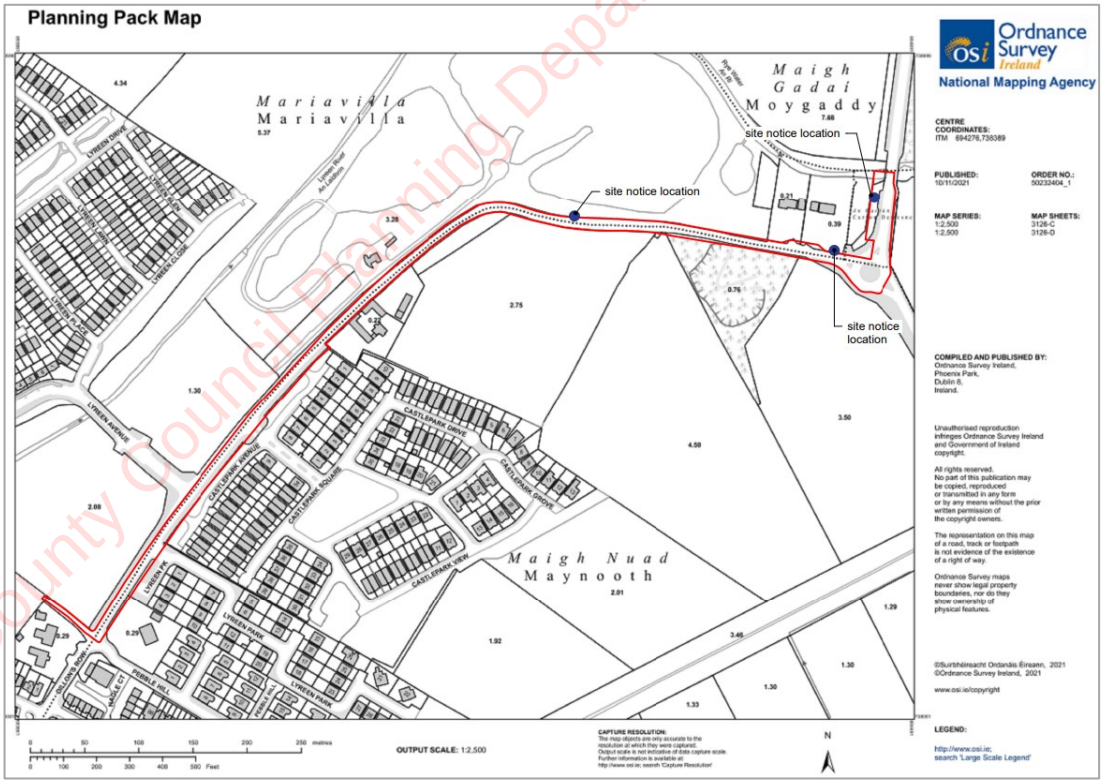

Figure 2-6: Site Location Plan – Kildare Bridge Works. Source: Crawford Architecture

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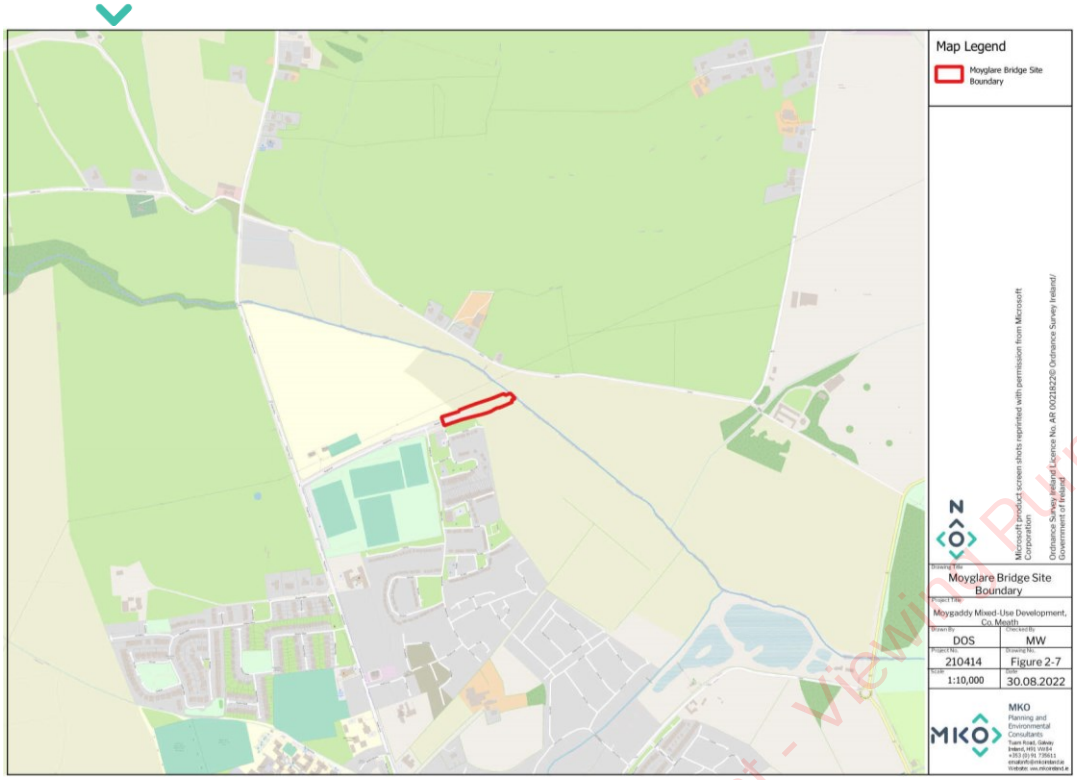

Figure 2-7: Site Location Plan - Moyglare Bridge Application. Source: MKO

2.1.2 Physical Characteristics of the Site and Surrounding Lands

The Proposed Development site area is comprised of a substantial area of greenfield lands which are in agricultural use. It is bounded by the Dunboyne Road (R157) to the east, greenfield agricultural lands to the north and west, and the River Rye Water to the south. The site is also transected by the Blackhall Little stream which runs north to south and by the L2214-3/L6219 running east to west, splitting the proposed Health Facilities and Strategic Employment Zone areas (Sites B and A respectively) which will form separate planning applications but are considered together for the purposes of this EIAR.

Carton House is located to the east of the Proposed Development. There is a large area of broadleaf woodlands within the Carton House grounds, which is directly adjacent to the Proposed Development site. A number of other facilities are also located within the Carton House grounds, including a hotel, golf club and driving range.

The existing field boundaries within the Proposed Development boundaries comprise agricultural hedgerows. The site boundary for the proposed Site A is approximately 6.8 hectares (ha). The site is bounded by the R157 Regional Road to the east, the L2214-3/L6219 Local Road to the west, and farmland to the north, south and west. Site A is currently a green-field site which supports small-scale agriculture. The site is relatively flat with a topography ranging from approximately 56m OD (Ordnance Datum) in the south of the site to 60m OD in the centre and north of the site. The Blackhall Little stream is located to the north of the site, more than 250m north of the proposed office buildings and associated infrastructure. The proposed 360m section of the Maynooth Outer Orbital Road (MOOR) will run in a northwest direction from the Strategic Employment Zone (Site A) towards the Blackhall Little stream. The MOOR will run right up to the southern boundary of the stream, and a new single span bridge is proposed as a watercourse crossing which will be constructed as part of the MOOR component of the Proposed Development.

The site boundary for the proposed Site B is approximately 7.94 hectares (ha). The site is bounded by the Rye Water River to the south and the R157 regional road to the east. The site is currently a green-

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field site which supports small-scale agricultural practices. The areas to the north and west of the site are also used for small scale agriculture. The site is relatively flat where infrastructure is proposed although the topography slopes gradually down towards the Rye Water River to the south. The topography ranges from approximately 56m OD (Ordnance Datum) in the north of the site to 46m OD at the southern boundary of the site at the Rye Water River. The River Rye Water is located to the south of the site, more than 45m south of the closest proposed infrastructure.

The Grid Reference co-ordinates for the approximate centre of the Proposed Development lands are ITM 294703, 239040.

There is a vast range of facilities, amenities and services in the local surrounding area, particularly in Maynooth to the south of the subject site. There are a number of primary and secondary schools in Maynooth which are located within approximately 3km of the site, with Maynooth University being located 3km from the Proposed Development. Nearby retail within Maynooth town, includes the Carton Retail Park (2km from the Proposed Development) and Manor Mills shopping centre (2km from the Proposed Development). The Royal Canal Greenway also runs through Maynooth, with access from Straffan Road to the south of the Glenroyal Hotel approximately 2km from this Proposed Development.

Habitats found within the Proposed Development include agricultural grassland, broadleaved woodland, scattered trees, lowland depositing river and hedgerow/treeline, with no environmental or ecological designations noted on the site. The Rye Water Valley/ Carton SAC is located directly to the east of the Proposed Development. This area is also a proposed Natural Heritage Area (pNHA). This area has been identified as H1 High Amenity in the land use zoning objectives map where it is an objective, '*To protect and improve areas of high amenity*'.

There is a National Monument (Mogaddy Castle) and a Protected Structure (Moygaddy House) located approximately 250m and 200m east of the Proposed Development respectively. These are set out as follows:

- Moygaddy Castle and tower house (ref: ME053-001): "*Situated on a slight rise with a small NE-SW stream in its valley c. 60m to the NW and the NW-SE Rye Water stream is c. 500m to the SW... The castle was conserved by the fifth Duke of Leinster in 1892 as it was in danger of collapsing and so close to his principal residence at Carton, Co. Kildare (FitzGerald 1903-05, 2-30). As it survives this is a three storey tower house (ext. dims c. 5.5m NW-SE; 4.65m NE-SW) with a modernised parapet and a buttress supporting the E angle.*"
- Moygaddy House (RPS ref: 91558): "*Three-bay two-storey over basement house, built c. 1850, hipped roof with and pilastered porch, ranges of outbuildings forming narrow rectangular courtyard. Gates, piers and boundary walls*".

2.1.3 Existing Site Access

The Proposed Development lands are accessible from the exiting Dunboyne Road (R157), which forms the eastern boundary of the Proposed Development lands of both Site A and Site B.

2.1.4 Proposed Site Roads

The Proposed Development includes for the construction of new internal site access roads and road widening and road realignment works the existing L2214-3/L6219 Local Road and R157 Regional Road. Also included as part of the Proposed Development is the delivery of the MOOR.

The Proposed Development includes the following road construction and upgrade works;

Strategic Employment Zone (Site A)

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- Construction of approximately 865m of proposed internal road network servicing the proposed Strategic Employment Zone;
- Approximately 515m section of proposed road upgrade and road realignment works along the existing R157 Regional Road, to facilitate the planned future Maynooth Outer Orbital Route (MOOR) distributor road linking the overall proposed Moygaddy Masterplan area to Maynooth town;
- Approximately 63m section of proposed road upgrade works along the existing L2214-3/L6219 Local Road, to facilitate the proposed new junction/crossroads as part of future Maynooth Outer Orbital Route (MOOR) distributor road; and
- Delivery of approximately 380m of the Proposed MOOR. The complete delivery of the MOOR will be subject to a separate planning application and permissions of future planning applications for the overall Moygaddy proposed Masterplan area.

Healthcare Application (Site B)

- Construction of approximately 400m of proposed internal road network servicing the proposed nursing home and primary care centre; and
- Approximately 240m section of proposed road upgrade works along the existing R157 Regional Road.

SHD Application (Site C)

- Provision of 500m of distributor road comprising of 7.0m carriageway with turning lane where required, footpaths, cycle tracks and grass verges.

- Proposed road improvement and realignment works including:

  i. realignment of a section of the existing L2214-3/L6219 local road, which will entail the demolition of an existing section of the road which extends to circa 2,500 sqm.
  ii. Provision of pedestrian and cycle improvement measures along the L2214-3/L6219 which abuts the boundary of Moygaddy House which is a Protected Structure (RPS ref 91558).
  iii. Provision of pedestrian and cycle improvement measures along the R157 which abuts the Carton Demense Wall which is a Protected Structure (RPS Ref 91556).

- Provision of 3 no. vehicular and pedestrian accesses from the L2214-3/L6219 local road and an additional vehicular and pedestrian access from the R157 to the Childcare and Scout Den facilities.

The location and extent of the proposed access road being submitted for consideration (MOOR Application) can be seen on **Figure 2-5** above.

2.1.5 Site Entrances

The main access to the proposed Strategic Employment Zone (Site A) will be via a new entrance from the existing R157 Regional Road, creating a new T-junction.

The main access to the proposed Healthcare Facilities (Site B) will be via a new entrance to the west of the existing R157 Regional Road, opposite Carton House Woods creating a new T-junction.

The main access to the proposed SHD (Site C) will be via 3 no. vehicular and pedestrian accesses from the L2214-3/L6219 local road and an additional vehicular and pedestrian access from the R157 to the Childcare and Scout Den facilities.

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The local roads network has been assessed and is confirmed to be capable of supporting the entire development without the delivery of the MOOR which is addressed in Chapter 13 of this report. The delivery of all components and construction materials to the site will be via the site entrances described above. From here, the vehicles will use the internal site roads to access the proposed infrastructure locations within the site. An outline Traffic Management Plan is included in the CEMP in **Appendix 4-3** of this EIAR.

2.2 Planning History

This section sets out the relevant planning history of the site and its immediate surrounds. This section considers the planning history of both Meath County Council, the local planning authority on which the majority of these planning applications are situated on (Sites A, B, C and the MOOR), and Kildare County Council, which two of the planning application, as it relates to road works and improvements, are situated on.

2.2.1 Planning Applications within the Application Boundary

A review of the Meath County Council online planning application mapping system indicates the following planning applications have been made in respect of the subject sites. The planning history laid out in Table 2-1 relates to the application history of Site A – Strategic Employment Zone, Site B – Healthcare Facilities and Site C – SHD Application.

Table 2-1: Planning History on the subject sites

Reference	Description and Decision	Decision
22/960	The development within the Meath County Council administrative area will consist of: a) Provision of approximately 1.9km new pipeline (approximately 9.8km total development length within Kildare and Meath) and associated infrastructure (air valves, scour valves, ventilation columns etc.)	Awaiting Decision – due 13/09/2022
22784	The development within the Kildare County Council administrative area will consist of: (a) Permanent Mechanical, Electrical, Instrumentation, Control and Automation (MEICA) upgrade works, upgrade of the existing chemical dosing system and ancillary works at the Maynooth Wastewater Pumping Station (WWPS) site in the townland of Mariavilla; and, (b) Provision of approximately 7.9km new pipeline (approximately 9.8km total development length within Kildare and Meath) and associated infrastructure (air valves, scour valves, flow meter, ventilation columns etc.) between the Maynooth WWPS and existing Irish Water infrastructure along the R149 in the townland of Confey	Further Information Requested on 22/08/2022
P8/16003	Maynooth Outer Orbital Route, Mariavilla to R157 Moygaddy Junction Part 8 application. Development comprises of a single carriageway road which forms part of the Maynooth Outer Orbital Route and extends from the eastern end of the northern access	Part 8 – Deemed Withdrawn

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Reference	Description and Decision	Decision
	road in the Moyglare Estate, Mariavilla in County Kildare to the Moygaddy Junction on the R157 in County Meath - an overall distance of approximately 1.7km. The development ties into the proposed roundabout at the Moygaddy Junction on the R157 which forms part of the previously permitted R157 Realignment and Moygaddy Junction Improvement Scheme (reference no. P8/10011).	
DA800091-Moygaddy, Co.Meath	Construction of an office and research facility building ranging in height from single to three storeys with a total floor space of 4667.3sq.m. and all associated ancillary site works on a site of 8.054ha. The development consisted of: (1) A single to three-storey building consisting of : (a) storage, offices, meeting rooms, research facility, catering and staff welfare facilities at ground floor level (1946.4sqm), (b) storage, offices, managers offices, meeting rooms, staff welfare facilities and conference room (1674.9sqm) and associated roof terraces (304.9sqm), at first floor level, (c) storage, offices meeting room, research room and toilets (1046.0sqm) and associated roof terraces (69.8sqm), at second floor level. (2)A 2-storey glazed entrance reception area accommodating an entrance lobby and incorporating a pedestrian link at first floor level (3) Parking provision to accommodate 224 no. car park spaces, including a set-down area, 5 bus spaces and 73 bicycle spaces (4) Provision of a sewage treatment system consisting of 2 no. above ground treatment tanks, 2 no. underground pumping stations and a percolation area of 2500 sq.m in size (5) Upgrade an existing well, provision of a new water pipe, provision of a new water treatment plant housed in a building of 60sqm in addition to a bunded storage tank (6) A surface water attenuation pond (7) Construction of an internal access road and upgrading of existing road access onto the CR571, and the provision of a proposed new roundabout, including minor realignments to the CR571 and R157, to replace the existing CR571/R157 priority junction and (8) all associated hard and soft landscaping.	Granted - subject to 37 no. conditions 7th October 2008
DA140050	Extension of Duration of application ref no. DA800091 – for the construction of an office and research facility building.	Granted March 18, 2014

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Reference	Description and Decision	Decision
		The permission expired on 18/02/2019
DA40559	Development which will consist of a 120 bedroom hotel with conference centre, leisure centre/function rooms and night club facilities, in 5 levels over basement and, executive stay hotel suites, comprising of 24 units in 6 no. 2 storey blocks, consisting of 12 two bedroom suites and 12 one bedroom suites and holiday cottages, comprising of 24 no 3 bed units in 4 no. 2 storey blocks and the provision of 274 no. surface car parking spaces and associated site works and landscaping with site access from existing entrance to public road and foul sewer connection to new private treatment works	Refused 23rd February 2005

2.2.2 Planning Applications within the Vicinity of the Application Sites

Those applications from the Planning Application Registers for both Kildare and Meath County Councils, which are within, approximately, a 500m radius of the sites are included below. This 500m radius has been applied to capture the planning history within the surrounding area of Sites A, B, C, the MOOR, the Kildare Bridge Works and the Moyglare Bridge sites, which is considered a reasonable distance to capture sufficient information on the planning history of the surrounding area. The 500m radius for Site A, Site B, Site C, the MOOR, the Kildare Bridge Works and the Moyglare Bridge sites are illustrated in **Figures 2-8, 2-9, 2-10, 2-11, 2-12 and 2-13** below.

Figure 2-8: 500m radius from centre of Site A – Strategic Employment Zone. Source: Google Earth

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Figure 2-9: 500m radius from centre of Site B – Healthcare Facilities. Source: Google Earth

Figure 2-10: 500m radius from centre of Site C – SHD. Source: Google Earth

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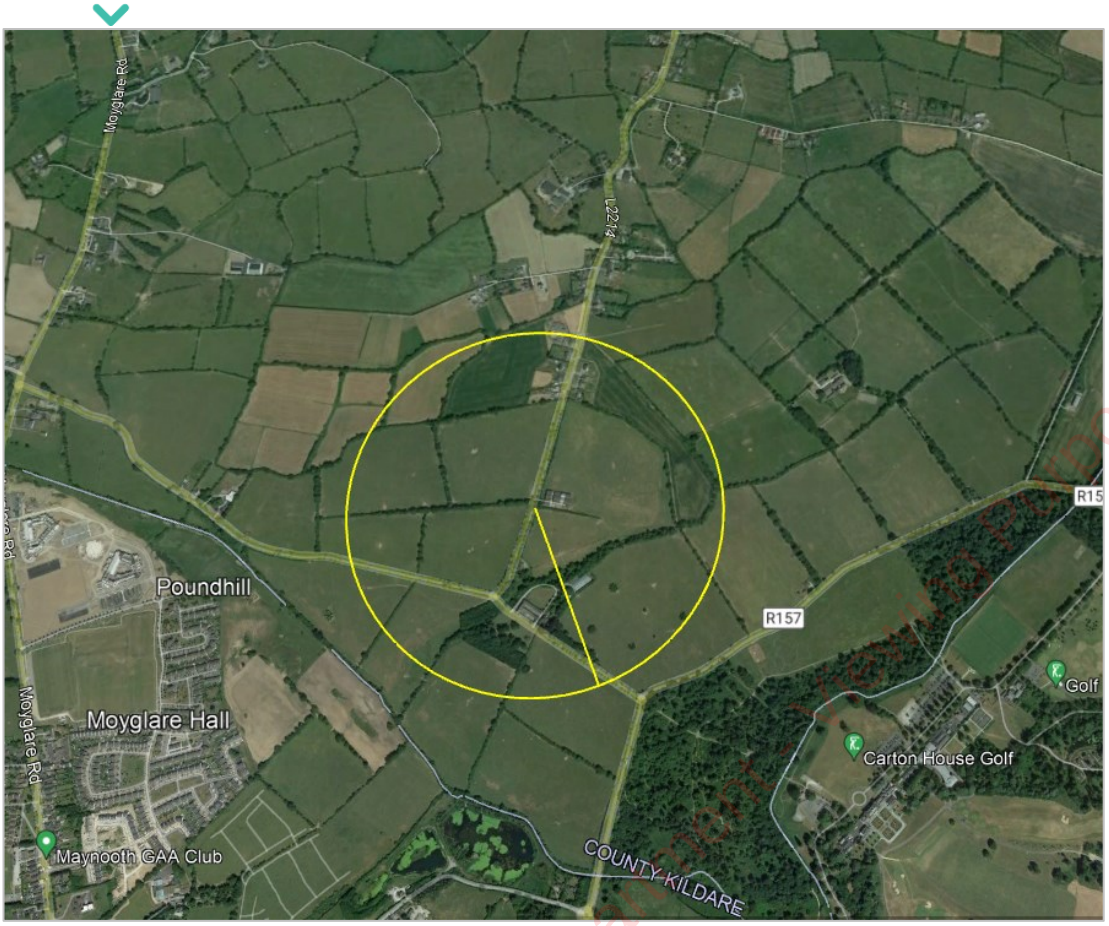

Figure 2-11: 500m radius from approximate centre of MOOR. Source: Google Earth

Figure 2-12: 500m radius from approximate centre of Kildare Bridge Works. Source: Google Earth

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Figure 2-13: 500m radius from approximate centre of Moyglare Bridge Site. Source: Google Earth

2.2.2.1 Site A – Strategic Employment Zone

Table 2-2: Planning History within 500m Radius of Site A

Application Reference	Description	Decision
Kildare County Council		
22784	Development will consist of: Permanent Mechanical, Electrical, Instrumentation, Control and Automation (MEICA) upgrade works, upgrade of the existing chemical dosing system and ancillary works at the Maynooth Wastewater Pumping Station (WWPS) site in the townland of Mariavilla; and, (b) Provision of approximately 7.9km new pipeline (approximately 9.8km total development length within Kildare and Meath) and associated infrastructure (air valves, scour valves, flow meter, ventilation columns etc.) between the Maynooth WWPS and existing Irish Water infrastructure along the R149 in the townland of Confey	Further Information Requested on 22/08/2022
081103	The provision of an c.30 metre long pedestrian/cycle bridge across the Glashrooneen river from a point adjacent to the existing surface car park to the north west of carton house to a point on adjoining lands in carton demesne Moygaddy etc	KCC: Granted ABP: Refused (06/05/2009
Meath County Council		
DA140050	EXTENSION OF DURATION OF PLANNING PERMISSION REF. NO. DA/800091 - global studio 4667.3 sq. metres	Granted (20/03/2014)

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Application Reference	Description	Decision
DA800091	The construction of an office and research facility building ranging in height from single to three storeys with a total floor space of 4667.3sq.m. and all associated ancillary site works on a site of 8.054ha. The development will consist of : (1) A single to three-storey building consisting of : (a) storage, offices, meeting rooms, research facility, catering and staff welfare facilities at ground floor level (1946.4sqm), (b) storage, offices, managers offices, meeting rooms, staff welfare facilities and conference room (1674.9sqm) and associated roof terraces (304.9sqm), at first floor level, (c) storage, offices meeting room, research room and toilets (1046.0sqm) and associated roof terraces (69.8sqm), at second floor level. (2)A 2-storey glazed entrance reception area accommodating an entrance lobby and incorporating a pedestrian link at first floor level, (3) Parking provision to accommodate 224 no. car park spaces, including a set-down area, 5 bus spaces and 73 bicycle spaces, (4) Provision of a sewage treatment system consisting of 2 no. above ground treatment tanks, 2 no. underground pumping stations and a percolation area of 2500 sq.m in size, (5) Upgrade an existing well, provision of a new water pipe, provision of a new water treatment plant housed in a building of 60sqm in addition to a bunded storage tank, (6) A surface water attenuation pond, (7) Construction of an internal access road and upgrading of existing road access onto the CR571, and the provision of a proposed new roundabout, including minor realignments to the CR571 and R157, to replace the existing CR571/R157 priority junction and (8) all associated hard and soft landscaping. Further Information/Revised Plans from that previously submitted under Planning Ref no DA/800091 have been submitted to the Planning Authority	Granted subject to 37 no. conditions (19/02/2009)
DA801926	10 year permission for the construction of a SMART (south Meath Area Research and Technology) Park to compromise educational and research/technology uses associated with the National University of Ireland, Maynooth (NUM) as well as employment and residential uses and ancillary neighbourhood centre. The development comprises as follows - 3 no. blocks (ranging in height from 3 to 4 storeys) associated with NUM as follows: 1 no. Innovation Centre (c. 2,615 sqm GFA) 1 no. Sports Science building (c. 3,309 sqm FGA) and 1 no. Research Centre (c. 3,278 sqm. GFA) The total GFA of the NUM element of the proposed scheme is c.9,202 sqm. 2 no. office buildings ranging in height from 2-4 storeys of c. 2,761 sq.m and c. 2,395 sqm. GFA 1 no. own door 3-storey office building, to comprise 24 no. office units fo c. 3,275 sqm. GFA. The total GFA of office floorspace is c. 8,431 sqm. The provision of 130 no. residential units including 1 no. block of 14 apartments (5 storeys) comprising 5 no. 1-bed ~Apartment units (c. 58 sqm. GFA) 9 no. 2-bed apartment units (c. 92 and c. 94 sqm GFA) and 116 no. house ranging in height form 2-3 storeys comprising 4 no. 2-bed houses (c. 104 sqm. GFA) 87 no. 3-bed houses (ranging in size from c. 139.5 sqm to c. 171.5 sqm GFA) 17 no. 4-bed houses (ranging in size from c. 175 to c. 180.5 sqm. GFA) and 8 no. 5-bed houses (c. 204.5sqm.	MCC: Granted subject to 57 no. conditions ABP: Refused (20/11/2009)

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Application Reference	Description	Decision
	GFA) 26 no. residential units above will form part of an academic village associated with NUM. the total GFA of the residential element of the proposed scheme is c. 19,282 sqm. The provision of a neighbourhood centre comprising 1 no. 2-storey commons building (c. 277 sqm. GFA) 1 no. 2-storey cafe/restaurant unit (c. 178 sqm. GFA) 1 no. retail unit (c. 295 sqm. GFA) 1 no. 2-stroey creche facility (c. 530 sqm. GFA) The total GFA of the Neighbourhood Centre is c. 1280 sqn. The provision of 1 no. single storey Security /Central Communications building of c. 77 sqm. GFA Permission is also sought for the realignment of a c. 470 metre portion of the RA57 *(to be widened to c. 8 metres in width) and the provision of a new roundabout at the realigned junction of the R157, the CR571 and the revised entrance to Carton Demesne at the Moygaddy Gate (a Protected Structure). The application also seek permission for the associated demolition and subsequent reconstruction of c. 480 metre portion of the Carton Demesne Wall (a Protected Structure) on an alignment generally to the south of the existing wall. The works to the Dem	
da40559	Development which will consist of a 120 bedroom hotel with conference centre, leisure centre/function rooms and night club facilities, in 5 levels over basement and, executive stay hotel suites, comprising of 24 units in 6 no. 2 storey blocks, consisting of 12 two bedroom suites and 12 one bedroom suites and holiday cottages, comprising of 24 no 3 bed units in 4 no. 2 storey blocks and the provision of 274 no. surface car parking spaces and associated site works and landscaping with site access from existing entrance to public road and foul sewer connection to new private treatment works	MCC: Refused ABP: Refused (27/07/2005)

2.2.2.2 Site B – Healthcare Facilities

Table 2-3: Planning History within 500m Radius of Site B

Application Reference	Description	Decision
Kildare County Council		
22784	Development will consist of: Permanent Mechanical, Electrical, Instrumentation, Control and Automation (MEICA) upgrade works, upgrade of the existing chemical dosing system and ancillary works at the Maynooth Wastewater Pumping Station (WWPS) site in the townland of Mariavilla; and, (b) Provision of approximately 7.9km new pipeline (approximately 9.8km total development length within Kildare and Meath) and associated infrastructure (air valves, scour valves, flow meter, ventilation columns etc.) between the Maynooth WWPS and existing Irish Water infrastructure along the R149 in the townland of Confey.	Further Information Requested on 22/08/2022

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Application Reference	Description	Decision
22237	For development at this site within the townland of Maynooth adjacent to the "Limewalk" (also known as Carton Avenue), Maynooth, Co. Kildare. The development will consist of the provision of a shared pedestrian/cycle path between the permitted residential development under ABP-310865-21 and the Limewalk to include stone bridge and all associated layout and site development and landscape works. Revised by Significant Further Information which consists of the reduction in width of pedestrian/cycle path to 2m along with revised bridge design, lighting and associated changes to planting	Granted subject to 12 no. conditions (25/07/2022)
22221	For development at a site of c. 0.114 hectares within previously permitted development at Dunboyne Road, Maynooth. The development will consist of revisions to Planning Reg. Ref. ABP 310865-21 comprising: replace 4 No. 3-bed terrace homes and 2 No. 3-bed semi-detached homes with 6 No. 3-bed terraced homes and associated car parking - no additional units are proposed; and associated works	Granted subject to 4 no. conditions. (13/06/2022)
21310865	STRATEGIC HOUSING DEVELOPMENT (ABP Decision): 194 residential units (119 houses and 75 apartments), creche of c.305 sq. m.	Granted subject to 31 no conditions (01/11/2021)
211498	For (a) change of use of the existing building from use as a reception building for a catch and release fisheries facility to a new proposed use as a Gym, (b) to reconfigure the internal layout of the existing building, and to extend the building with a low profile lean-to type structure (maximum height 4.438 m) to the North-East (110.541 sq/mts), to provide male and female changing rooms with toilet and shower facilities, an entrance hall, fitness room and reception area, (c) move the existing previously permitted entrance (pl. ref. 15/1178) to a new proposed location West of the existing entrance, (d) re-configuration of existing fully permeable surface parking facilities to incl. 52 no, std. car parking bays, 2 no. mobility impaired parking bays and a covered bicycle shelter with a capacity for min. 6 no. bicycles, and (e) all associated site works and services to facilitate the proposed development	Decision due (28/09/2022)
18712	For development to outbuildings within the curtilage of the Protected Structure, Pebble Hill House. Development consists of works to the outbuildings comprising the reinstatement of blocked door and window openings to the north and south elevations; enlargement of existing window opening to south elevation; provision of new windows to all window openings; repairs to existing roof and provision of new rainwater goods; removal of 2 no. rooflights and provision of 6 no. new conservation rooflights; stabilising works to west wall; removal of any cementitious render and provision of new lime render	Granted subject to 5 no. conditions (22/10/2018)

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Application Reference	Description	Decision
151178	The existing site opening onto the Dunboyne Road/Doctor's Lane and permission to construct a recessed entrance and all ancillary site works.	Granted subject to 7 no. conditions (24/08/2016)
14637	For development at this site (a virtually complete development, Planning Ref. 06/1925) to the southwest. The proposed residential development which will consist of the erection of 112 two storey houses: - 40 No. two storey detached 4 bed houses Type A; 72 No. two storey semi-detached 3/4 bed houses Types B or C, and a proposed single storey crèche facility to size of 470 sq. Metres to also accommodate this development and the adjoining Castlepark existing development to the south west. Site development works include new site access from the Dunboyne Road, the removal of the dangerous road bend by the proposed road realignment including new public footpath along the site frontage with footpath extending from Castlepark to the existing roundabout. Installation of new pump station and outfall foul drain and a new surface water attenuated drain, site layout services, footpaths/verges, roads, landscaped open space areas, public lighting, two metre high screen walling between private and public areas with finishes to match the houses. Services facilities and access provision to service the existing house adjoining this development	Refused (16/07/2015)
081101	Provision of pedestrian/cyclist bridge of 17 metres in length over the River Rye Water from a point adjacent to crane island within the carton demesne to a point on adjoining lands in carton etc.	KCC: Granted ABP: Refused (30/11/2009)
981433	Ancillary buildings and car parking in connection with the provision of two put and take fishing lakes bounded by the Dunboyne Road and Rye Water River	Further Information Requested – no decision /notice of withdrawal available.
981434	Provision of two lakes for a put and take fishery adjoining the Dunboyne Road and Rye Water River	Granted subject to 17 no. conditions (02/05/1999)
992010	Single storey visitor reception building complete with toilets, office and tea room, access road, entrance to site and associated car parking and signage at the Put and Take Fishery	Granted subject to 17 no. conditions (08/03/2000)
Meath County Council		
DA140050	EXTENSION OF DURATION OF PLANNING PERMISSION REF. NO. DA/800091 - global studio 4667.3 sq. metres	Granted (20/03/2014)

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Application Reference	Description	Decision
DA800091	The construction of an office and research facility building ranging in height from single to three storeys with a total floor space of 4667.3sq.m. and all associated ancillary site works on a site of 8.054ha. The development will consist of : (1) A single to three-storey building consisting of : (a) storage, offices, meeting rooms, research facility, catering and staff welfare facilities at ground floor level (1946.4sqm), (b) storage, offices, managers offices, meeting rooms, staff welfare facilities and conference room (1674.9sqm) and associated roof terraces (304.9sqm), at first floor level, (c) storage, offices meeting room, research room and toilets (1046.0sqm) and associated roof terraces (69.8sqm), at second floor level. (2)A 2-storey glazed entrance reception area accommodating an entrance lobby and incorporating a pedestrian link at first floor level, (3) Parking provision to accommodate 224 no. car park spaces, including a set-down area, 5 bus spaces and 73 bicycle spaces, (4) Provision of a sewage treatment system consisting of 2 no. above ground treatment tanks, 2 no. underground pumping stations and a percolation area of 2500 sq.m in size, (5) Upgrade an existing well, provision of a new water pipe, provision of a new water treatment plant housed in a building of 60sqm in addition to a bunded storage tank, (6) A surface water attenuation pond, (7) Construction of an internal access road and upgrading of existing road access onto the CR571, and the provision of a proposed new roundabout, including minor realignments to the CR571 and R157, to replace the existing CR571/R157 priority junction and (8) all associated hard and soft landscaping. Further Information/Revised Plans from that previously submitted under Planning Ref no DA/800091 have been submitted to the Planning Authority	Granted subject to 37 no. conditions (19/02/2009)
DA801926	10 year permission for the construction of a SMART (south Meath Area Research and Technology) Park to compromise educational and research/technology uses associated with the National University of Ireland, Maynooth (NUM) as well as employment and residential uses and ancillary neighbourhood centre. The development comprises as follows - 3 no. blocks (ranging in height from 3 to 4 storeys) associated with NUM as follows: 1 no. Innovation Centre (c. 2,615 sqm GFA) 1 no. Sports Science building (c. 3,309 sqm FGA) and 1 no. Research Centre (c. 3,278 sqm. GFA) The total GFA of the NUM element of the proposed scheme is c.9,202 sqm. 2 no. office buildings ranging in height from 2-4 storeys of c. 2,761 sq.m and c. 2,395 sqm. GFA 1 no. own door 3-storey office building, to comprise 24 no. office units fo c. 3,275 sqm. GFA. The total GFA of office floorspace is c. 8,431 sqm. The provision of 130 no. residential units including 1 no. block of 14 apartments (5 storeys) comprising 5 no. 1-bed ~Apartment units (c. 58 sqm. GFA) 9 no. 2-bed apartment units (c. 92 and c. 94 sqm GFA) and 116 no. house ranging in height form 2-3 storeys comprising 4 no. 2-bed houses (c. 104 sqm. GFA) 87 no. 3-bed houses (ranging in size from c. 139.5 sqm to c. 171.5 sqm GFA) 17 no. 4-bed houses (ranging in size from c. 175 to c. 180.5 sqm. GFA) and 8 no. 5-bed houses (c. 204.5sqm.	MCC: Granted subject to 57 no. conditions ABP: Refused (20/11/2009)

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Application Reference	Description	Decision
	GFA) 26 no. residential units above will form part of an academic village associated with NUM. the total GFA of the residential element of the proposed scheme is c. 19,282 sqm. The provision of a neighbourhood centre comprising 1 no. 2-storey commons building (c. 277 sqm. GFA) 1 no. 2-storey cafe/restaurant unit (c. 178 sqm. GFA) 1 no. retail unit (c. 295 sqm. GFA) 1 no. 2-stroey creche facility (c. 530 sqm. GFA) The total GFA of the Neighbourhood Centre is c. 1280 sqn. The provision of 1 no. single storey Security /Central Communications building of c. 77 sqm. GFA Permission is also sought for the realignment of a c. 470 metre portion fo the RA57 *(to be widened to c. 8 metres in width) and the provision of a new roundabout at the realigned junction of the R157, the CR571 and the revised entrance to Carton Demesne at the Moygaddy Gate (a Protected Structure). The application also seek permission for the associated demolition and subsequent reconstruction of c. 480 metre portion of the Carton Demesne Wall (a Protected Structure) on an alignment generally to the south of the existing wall. The works to the Dem	
DA40559	Development which will consist of a 120 bedroom hotel with conference centre, leisure centre/function rooms and night club facilities, in 5 levels over basement and, executive stay hotel suites, comprising of 24 units in 6 no. 2 storey blocks, consisting of 12 two bedroom suites and 12 one bedroom suites and holiday cottages, comprising of 24 no 3 bed units in 4 no. 2 storey blocks and the provision of 274 no. surface car parking spaces and associated site works and landscaping with site access from existing entrance to public road and foul sewer connection to new private treatment works	MCC: Refused ABP: Refused (27/07/2005)

2.2.2.3 Site C – SHD

Table 2-4: Planning History within 500m Radius of Site C

Application Reference	Description	Decision
Kildare County Council		
21836	proposed front porch extension to existing dwelling together with associated site works	KCC: Granted (10/09/2021)
13828	(a) The construction of two new two-storey post primary school buildings including general classrooms, specialist classrooms, social areas, administration areas, specialist accommodation for pupils with special educational needs, circulation areas, sensory gardens, service yards, external stores, covered storage areas for construction studies and other ancillary accommodation. (b) The construction of a part single-storey, part two-storey sports facility including a general purpose hall, a stage area, a fitness suite, social areas, changing rooms, circulation areas, administration	KCC: Granted ABP: Granted 16/10/2014

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Application Reference	Description	Decision
	areas, stores, service areas and other ancillary accommodation. (c) The provision of new site entrances and routes for vehicular pedestrian and bicycle use, bus, car and coach drop-off areas, car parking areas and bicycle shelters; alteration of existing road junction at Moyglare Road; provision of new roundabout, bus drop-off areas and alteration of boundary wall and fencing at the existing public road to the south of the site; provision of ballcourts, playing pitch, landscaped external areas and ancillary site works	

2.2.2.4 MOOR

Table 2-5: Planning History within the boundary and immediate vicinity of the MOOR

Application Reference	Description	Decision
Meath County Council		
DA140050	EXTENSION OF DURATION OF PLANNING PERMISSION REF. NO. DA/800091 - global studio 4667.3 sq. metres	Granted (20/03/2014)
DA800091	The construction of an office and research facility building ranging in height from single to three storeys with a total floor space of 4667.3sq.m. and all associated ancillary site works on a site of 8.054ha. The development will consist of : (1) A single to three-storey building consisting of : (a) storage, offices, meeting rooms, research facility, catering and staff welfare facilities at ground floor level (1946.4sqm), (b) storage, offices, managers offices, meeting rooms, staff welfare facilities and conference room (1674.9sqm) and associated roof terraces (304.9sqm), at first floor level, (c) storage, offices meeting room, research room and toilets (1046.0sqm) and associated roof terraces (69.8sqm), at second floor level. (2)A 2-storey glazed entrance reception area accommodating an entrance lobby and incorporating a pedestrian link at first floor level, (3) Parking provision to accommodate 224 no. car park spaces, including a set-down area, 5 bus spaces and 73 bicycle spaces, (4) Provision of a sewage treatment system consisting of 2 no. above ground treatment tanks, 2 no. underground pumping stations and a percolation area of 2500 sq.m in size, (5) Upgrade an existing well, provision of a new water pipe, provision of a new water treatment plant housed in a building of 60sqm in addition to a bunded storage tank, (6) A surface water attenuation pond, (7) Construction of an internal access road and upgrading of existing road access onto the CR571, and the provision of a proposed new roundabout, including minor realignments to the CR571 and R157, to replace the existing CR571/R157 priority junction and (8) all associated hard and soft landscaping. Further Information/Revised Plans from that previously submitted under Planning Ref no DA/800091 have been submitted to the Planning Authority	Granted subject to 37 no. conditions (19/02/2009)

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Application Reference	Description	Decision
DA40311	A development which will consist of construction of a new house, detached domestic garage, puraflo sewage treatment plant and percolation area plus new entrance. further information and revised plans in relation to current planning application ref. no. DA/40311 comprises of revised house plans on a new site adjacent to the original site. Clarification of further information submitted on Planning File DA/40311 comprising of revised site boundaries and details of sight distances etc.	Granted (Conditional) 17/03/2005
RA140891	Development will consist of a storey and half type dwelling, detached domestic garage, recessed domestic entrance with driveway, installation of new septic tank & percolation area together with all associated site works	Granted (Conditional) 04/12/2012
92/148	To retain bedroom, dormer room, bathroom, livingroom extension and revised site boundaries	Granted (Conditional) 07/08/1992
DA100297	Construction of a new detached storey and a half type dwelling, detached single storey domestic garage, new combined entrance from the public road and install a new proprietary waste water treatment system together with all associated site works and services	Granted (Conditional) 05/07/2010
DA70054	The construction of a new detached storey and a half type dwelling, detached single storey domestic garage, new entrance from the public road and install a new proprietary waste water treatment system together with all associated site works and services	Refused 15/05/2007
DA900534	The contruction of a new combined entrance and the closure of the existing entrance which has been granted permission under planning application reference da/60075 off the public road.	Granted (Conditional) 09/06/2009
92344	Erection of extension to house	Granted (Conditional) 22/05/1992
DA801481	The construction of a new domestic entrance and the closure of the existing entrance which has been granted permission under planning applicaiton reference da60075 off the public road	Refused 9/7/2008
DA50484	Development which will consist of the construction of a new house and detached domestic garage and two stables with manure-pit and run-off tank, o'reilly oakstown baf sewage treatment plant and percolation area plus new entrance	Refused 10/1/2006

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Application Reference	Description	Decision
DA60075	Development which will consist of the construction of a new house and detached domestic garage and two stables with manure-pit and run-off tank, o'reilly oakstown baf sewage treatment plant and percolation area plus new entrance	Granted (Conditional) 28/05/2006
211277	Conversion of existing detached garage and stables to a granny flat with a first floor storage area and direct access to existing detached dwelling	Granted (Conditional) 02/11/2021

2.2.2.5 Kildare Bridge Works

Table 2-6: Planning History within the boundary and immediate vicinity of the proposed Kildare Bridge

Application Reference	Description	Decision
Kildare County Council		
22/784	Development will consist of: Permanent Mechanical, Electrical, Instrumentation, Control and Automation (MEICA) upgrade works, upgrade of the existing chemical dosing system and ancillary works at the Maynooth Wastewater Pumping Station (WWPS) site in the townland of Mariavilla; and, (b) Provision of approximately 7.9km new pipeline (approximately 9.8km total development length within Kildare and Meath) and associated infrastructure (air valves, scour valves, flow meter, ventilation columns etc.) between the Maynooth WWPS and existing Irish Water infrastructure along the R149 in the townland of Confey.	Further Information requested: 22/08/2022
21/1498	Permission for (a) change of use of the existing building from use as a reception building for a catch and release fisheries facility to a new proposed use as a Gym, (b) to reconfigure the internal layout of the existing building, and to extend the building with a low profile lean-to type structure (maximum height 4.438 m) to the North-East (110.541 sq/mts), to provide male and female changing rooms with toilet and shower facilities, an entrance hall, fitness room and reception area, (c) move the existing previously permitted entrance (pl. ref. 15/1178) to a new proposed location West of the existing entrance, (d) re-configuration of existing fully permeable surface parking facilities to incl. 52 no, std. car parking bays, 2 no. mobility impaired parking bays and a covered bicycle shelter with a capacity for min. 6 no. bicycles, and (e) all associated site works and services to facilitate the proposed development	Decision due (28/09/2022)
ABP - 310865	Strategic Housing Development: 194 no. residential units (119 no. houses, 75 no. apartments). creche and associated site works	Granted subject to 31 no conditions (01/11/2021)

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Application Reference	Description	Decision
18/712	For development to outbuildings within the curtilage of the Protected Structure, Pebble Hill House. Development consists of works to the outbuildings comprising the reinstatement of blocked door and window openings to the north and south elevations; enlargement of existing window opening to south elevation; provision of new windows to all window openings; repairs to existing roof and provision of new rainwater goods; removal of 2 no. rooflights and provision of 6 no. new conservation rooflights; stabilising works to west wall; removal of any cementitious render and provision of new lime render	Granted subject to 5 no. conditions (22/10/2018)
ABP - 301230	Mariaville, Moyglare Road and Dunboyne Road SHD (known as Mariavilla): Mixed use development of 462 no. dwellings including the refurbishment of Gate Lodge (a Protected Structure), 483 no. student accommodation bedspaces, creche, cafe, gym and retail unit, provision of a new 800m link street with 1 no. pedestrian/vehicular bridge across the Lyreen River, new access junctions onto Moyglare Road and Dunboyne Road, internal road network, demolition of existing 2 storey building adjacent to 'Divine Word Missionaries' on the Moyglare Road and all associated site works and services	Granted subject to 29 no. conditions (03/07/2018)
17/1310	Construction of a new two storey townhouse to south elevation of existing semi-detached dwelling together with all associated landscaping, site works and services.	Granted subject to 9 no. conditions 26/01/2018
15/1178	The existing site opening onto the Dunboyne Road/Doctor's Lane and permission to construct a recessed entrance and all ancillary site works	Granted subject to 7 no. conditions (24/08/2016)
15/1083	The construction of a new detached dormer type dwelling along with a single storey domestic detached garage, new shared entrance from public road to serve the new proposed dwelling and adjacent dwelling of applicant's parents, Tony and Mary Bean, including connection to the public foul main water service that exists on site together with all associated landscaping site works and services	Granted subject to 23 no. conditions (15/09/2016)
14/1052	Two new detached dormer type dwellings along with two single storey domestic detached sheds/ garages on each plot, new entrances from public road and entrance to right of way on adjacent south west located site to serve the dwellings, including connection to the public foul main water service on site together with all associated landscaping, site works and services	Refused (19/08/2015)

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Application Reference	Description	Decision
14/637	For development at this site (a virtually complete development, Planning Ref. 06/1925) to the southwest. The proposed residential development which will consist of the erection of 112 two storey houses: - 40 No. two storey detached 4 bed houses Type A; 72 No. two storey semi-detached 3/4 bed houses Types B or C, and a proposed single storey crèche facility to size of 470 sq. Metres to also accommodate this development and the adjoining Castlepark existing development to the south west. Site development works include new site access from the Dunboyne Road, the removal of the dangerous road bend by the proposed road realignment including new public footpath along the site frontage with footpath extending from Castlepark to the existing roundabout. Installation of new pump station and outfall foul drain and a new surface water attenuated drain, site layout services, footpaths/verges, roads, landscaped open space areas, public lighting, two metre high screen walling between private and public areas with finishes to match the houses. Services facilities and access provision to service the existing house adjoining this development	Refused (16/07/2015)
13/724	The development will consist of revisions by the omission of the previously permitted houses at sites no 38 to 93 inc (61 two storey houses Plan Ref 06/1925) at road No's 5 & 6 (Castlepark Square Castlepark Drive & Castlepark View) and the replacement with 28 No two storey 4 bed detached houses type AB, at revised site numbers 45 to 63 & 72 to 80 inc & 20 no 3 / 4 bedroom semi-detached two storey houses (type G or H at site numbers 33 to 44 & 64 to 71 site development modification works including re-configured road No 5 & 5A. The omission of the previously permitted houses at sites No 94 to 95 two storey semi detached houses (Plan Ref No 13/229) at Castlepark View and replacement with 2 No. two storey 4 bed detached houses type AB. The permitted development roads and services remain substantially as previously permitted under 06/1925. The removal/omission of planning condition No 41 of Plan Ref No. 06/1925 is requested for this section of the development in the interest of the overall development completion as phase 1 works is now virtually completed.	Granted subject to 42 no. conditions (24/01/2014)
05/1952	Development consisting of laying of outfall surface water and foul drains from residentially zoned lands.	Granted (Conditional) 18/01/2006
Meath County Council		
DA801926	10 year permission for the construction of a SMART (south Meath Area Research and Technology) Park to compromise educational and research/technology uses associated with the National University of Ireland, Maynooth (NUM) as well as	Granted (Conditional) 9/3/2009

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Application Reference	Description	Decision
	employment and residential uses and ancillary neighbourhood centre.	

2.2.2.6 Moyglare Bridge

Table 2-7: Planning History within the boundary and immediate vicinity of the proposed Moyglare Bridge

Application Reference	Description	Decision
Kildare County Council		
21/836	Proposed front porch extension to existing dwelling together with associated site works.	Granted (Conditional) 04/08/2021
21/350	(1) Twenty six number 6m high lighting poles with LED lights to illuminate the new community walkway surface around the site, (2) Eight number 8m high lighting poles with LED lights to illuminate the new car park surface with new line-marking and drainage, (3) Erection of 2 rows of 1.2m high spectator fencing along the western side of the western senior pitch,(4) Erection of a 32sqm palisade fenced enclosure to house a generator to power the lighting and associated sundry other site works	Granted (Conditional) 14/07/2021
21/208	(1) Twelve number 18m high lighting poles with floodlights to illuminate 2no. senior playing pitches, (2) Erection of a 32sqm palisade fenced enclosure to house a generator to power the lighting and associated sundry other site works.	Granted (Conditional) 25/08/2021
19/238	The erection of a single storey,257.4sq.m. building consisting of 4 no. dressing rooms, kitchenette, 2 no. w/c's, 1 no. disabled access w/c with shower, plant room and cleaner's store, together with all necessary alterations to associated services, site development and landscaping works.	Granted (Conditional) 02/05/2019
18/648	(a) single storey domestic extension, (b) all associated site works to side	Granted (Conditional) 23/07/2018
17/175	The erection of a single storey, 390sqm building consisting of 4 No. dressing rooms, referee dressing room, first aid/physio room, equipment stores, kitchenette, and public toilets, together with all necessary alterations to associated services, site development and landscaping works (lands adjacent Moyglare Hall),	Granted (Conditional) 11/09/2017
15/1174	The construction of 4 no. 2-storey, 2-bedroom, terraced houses, and 1 no. building consisting of 1 no. local shop (66.66m sq) at ground floor level and 1 no. 1-bedroom apartment with terrace at first floor level, together with associated site works	Granted (Conditional) 16/09/2016

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Application Reference	Description	Decision
15/1153	Demolition of existing bungalow and the erection of 2 No. dormer type dwellings, each with a detached single storey boiler house, together with a new shared double entrance and all associated site works.	Granted (Conditional) 21/06/2016
13/828	(a) The construction of two new two-storey post primary school buildings including general classrooms, specialist classrooms, social areas, administration areas, specialist accommodation for pupils with special educational needs, circulation areas, sensory gardens, service yards, external stores, covered storage areas for construction studies and other ancillary accommodation. (b) The construction of a part single-storey, part two-storey sports facility including a general purpose hall, a stage area, a fitness suite, social areas, changing rooms, circulation areas, administration areas, stores, service areas and other ancillary accommodation. (c) The provision of new site entrances and routes for vehicular pedestrian and bicycle use, bus, car and coach drop-off areas, car parking areas and bicycle shelters; alteration of existing road junction at Moyglare Road; provision of new roundabout, bus drop-off areas and alteration of boundary wall and fencing at the existing public road to the south of the site; provision of ballcourts, playing pitch, landscaped external areas and ancillary site works	KCC: Granted subject to 56 no. conditions ABP: Granted subject to 55 no conditions (16/10/2014)
11/938	RETENTION: Existing ball stopping netting behind the existing senior and junior pitches, planning permission is also sought for the construction of a 5.0m high hurling wall and associated site works and floodlighting and the provision of temporary (pre-fabricated) changing rooms and referee's changing rooms.	Granted (Conditional) 06/02/2012
11/343	RETENTION: Development which consists of the retention of an existing senior GAA pitch with ball-stopping netting, the existing car-park entrance and the bulk excavation of the proposed pitches. Permission also for the completion of the five additional playing pitches with ball-stopping netting, new pedestrian access onto Moyglare Road, and the erection of temporary (pre-fabricated) changing rooms with associated site works including a road crossing on the Moyglare Road	Granted (Conditional) 02/06/2011
Meath County Council		
DA130879	Retention of existing single storey front extension and minor internal changes to existing detached dormer bungalow and all associated site works	Granted (Conditional) 21/1/2014
95/446	To retain the demolition of a dwelling and to erect a new dormer dwelling and biocycle system (revision to planning application p95/446	Granted (Conditional) 16/12/1995

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Application Reference	Description	Decision
DA100416	Construction of single story front extension, construction of single story domestic garage, upgrade existing recessed entrance and new front boundary wall treatment and all associated site works	Granted (Conditional) 17/06/2010
90/386	Erection of 2 no. farmhouses	Refused 1/1/1900
93/487	Extension to side of house	Granted (Conditional) 20/7/1993
DA40537	The construction of a single storey pitched roof extension to the rear of house, for new bedrooms and utility spaces	Granted (Conditional) 10/4/2005

2.3 Cumulative Projects

Table 2-8 below lists the projects within the vicinity, which are of a similar nature and scale, or may have a cumulative impact on the surrounding area, when considered cumulatively with the proposed development.

Table 2-8 Cumulative Projects Considered within Vicinity of the Proposed Development

Application Reference	Description	Decision
ABP – 310865 – 21	Dunboyne Road, Maynooth SHD: 194 no. residential units (119 no. houses, 75 no. apartments). creche and associated site works.	Grant 1st November 2021 Subject to 32 no. conditions
ABP – 314337	Mariaville, Moyglare Road – SHD (Known as Moyglare Road SHD): 7 year permission for 158 no. apartments, 260 no. student bedspace accommodation, creche and associated site works.	Awaiting Decision – due: 30/11/2022
ABP - 301230	Mariaville, Moyglare Road and Dunboyne Road SHD (known as Mariavilla): Mixed use development of 462 no. dwellings including the refurbishment of Gate Lodge (a Protected Structure), 483 no. student accommodation bedspaces, creche, cafe, gym and retail unit, provision of a new 800m link street with 1 no.	Grant 3rd July 2018 Subject to 29 no. conditions

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Application Reference	Description	Decision
	pedestrian/vehicular bridge across the Lyreen River, new access junctions onto Moyglare Road and Dunboyne Road, internal road network, demolition of existing 2 storey building adjacent to 'Divine Word Missionaries' on the Moyglare Road and all associated site works and services.	
P82019.08	Maynooth Eastern Ring Road (MERR) The construction of a 7.0m carriageway of 1.55km length; The construction of a bridge spanning the Royal Canal and Dublin to Sligo railway line; Provision of pedestrian and cyclist facilities along the length of the development, including a connection to the tow path of the Royal Canal; The construction of a new junction at the Dublin Road (R148) and Dunboyne Road (R157) junction; Earthworks; Drainage works; Public lighting and public utilities; Traffic signs and road markings; Temporary traffic management; Landscaping, site boundary treatments and all associated site development works.	Grant 11th April 2019 No decision notice had been issued by the LPA at the time of compiling this list
16/167 (Kildare County Council)	Mariaville, Dunboyne Road: Demolish dwelling and construct 34 dwellings internal roads, new entrance, ESB substation.	Granted at Appeal (Ref: PL09.247614) 27th March 2017 Subject to 13 no. conditions
16/585	National University of Ireland Maynooth: Extension of Duration of 10/906: the construction of the North Campus Student Housing Complex , total floor area 13,063.92M2, comprising 77 student apartments (65 x 5 Bed Units, 6 x6 Bedroom Units, 6 x3Bedroom Duplex Units). Resident's Office Student Social Room, Retail Unit, Bicycle Store (3no) all arranged in 4 Courtyard Buildings ranging in height form 9,5,4,& 3 Storeys. The development will include the realignment of existing playing fields , the provision of additional 18 m high flood lights to the playing fields & the construction of a new perimeter fencing (2.4m high) to the playing fields. The development will also include 2 Bring Centres, and energy centre (Containing, water storage tanks, plant , electricity substation & low-voltage witch room) & 29 car parking spaces as revised by Significant Further Information as follows; the construction of the North Campus student housing complex, total floor area 9,802sqm, comprising 59 student apartments (50 x 5 bed units, 5 x 6 bedroom units, 4 x 3 bedroom duplex units), residents office, student social room, retail unit, bicycle store (2 no.) all arranged in three courtyard buildings ranging in height from 9, 5, 4 and 3 storeys. The	Granted 26th July 2016 Extension of Duration Expired 16/10/2017.

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Application Reference	Description	Decision
	development will include the realignment of existing playing fields and the construction of new perimeter fencing (2.4metre high) to the playing fields. The development will also include a bring centre, an energy centre (containing water storage tanks, plant, electricity substation, and low voltage switch room) and 72 car parking spaces.	
21/208	Maynooth GAA Club: (1) Twelve number 18m high lighting poles with floodlights to illuminate 2no. senior playing pitches, (2) Erection of a 32sqm palisade fenced enclosure to house a generator to power the lighting and associated sundry other site works	Grant 25th August 2021 subject to 10 no. conditions
21/350	Maynooth GAA Club: (1) Twenty six number 6m high lighting poles with LED lights to illuminate the new community walkway surface around the site, (2) Eight number 8m high lighting poles with LED lights to illuminate the new car park surface with new line-marking and drainage, (3) Erection of 2 rows of 1.2m high spectator fencing along the western side of the western senior pitch, (4) Erection of a 32sqm palisade fenced enclosure to house a generator to power the lighting and associated sundry other site works	Grant 14th July 2021 subject to 4 no. conditions
21/1108	Parklands Grove, Railpark: The demolition of a habitable house and the construction of 40 No. houses and 36 No. apartments, 1 No. vehicular link with the approved Maynooth Eastern Ring Road and all associated and ancillary site development works. Details of the dwelling types are as follows: 24 No. "Type A", 3-Bed, 2.5 Storey Houses; 8 No. "Type B", 3-Bed 2 Storey Houses; 1 No. "Type B1", 3-Bed, 2 Storey House; 3 No. "Type C", 3-Bed, 2 Storey Houses; 2 No. "Type C1", 3-Bed, 2 Storey Houses; 2 No. "Type D", 3-Bed, 2 Storey Houses; 20 No. "Type E", 2-Bed Apartments; 10 No. “Type F”, 1-Bed Apartments; 1 No. “Type H”, 1-Bed Apartment; 2 No. “Type I”, 1-Bed Apartments; 3 No. “Type J”, 2-Bed Apartments.	Granted subject to 56 no. conditions (17/06/2022)

2.4 Planning Policy

This section of the report sets out the relevant national, regional and local planning policies which are of relevance to the planning application. The local planning policy section includes policy sections from

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both Meath County Council and Kildare County Council, as relevant. Relevant material considerations are also set out below, as appropriate.

2.4.1 National Planning Policy

2.4.1.1 National Planning Framework

The National Planning Framework (2018) ('NPF') is the Government's high-level strategic plan for shaping the future growth and development of Ireland to the year 2040.

The National Planning Framework includes ten National Strategic Outcomes implemented through the Strategic Investment Priorities, and includes:

- Compact Growth
- Enhanced Regional Accessibility
- Strengthened Rural Economics and Communities
- Sustainable Mobility
- A Strong Economy Supported by Enterprise, Innovation and Skills
- Sustainable Management of Water and Other Environmental Resources

The overview of the NPF set out in section 2.2 states that it supports the sustainable growth of rural communities, to include development in rural areas and promotes new economic opportunities arising from digital connectivity and indigenous innovation.

Section 3.2 of the NPF relates specifically to the Eastern and Midland Region and sets out

"*The Region's most significant place-making challenge will be to plan and deliver future development in a way that enhances and reinforces its urban and rural structure and moves more towards self-sustaining, rather than commuter driven activity, therefore allowing its various city, metropolitan, town, village and rural components to play to their strengths, while above all, moving away from a sprawl-led development model*".

And goes further to state:

"*In the wider Mid-East Region, the rapid growth experienced by many towns in recent decades was mainly driven by housing, rather than jobs-centred development. An integrated approach to the development of these and similar towns is a priority, but playing to local strengths and securing employment opportunities to drive self-sustaining, rather than mainly housing-led development.*"

Specifically in relation to the Mid-East and the Counties of Meath and Kildare, it is stated in this section of the NPF that "*managing the challenges of future growth is critical to this regional area. A more balanced and sustainable pattern of development, with a greater focus on addressing employment creation, local infrastructure needs and addressing the legacy of rapid growth, must be prioritised*" (our emphasis added).

In terms of Ireland's future population, circa one million additional people are expected to be living in Ireland by 2040, and National Objective 1b seeks to ensure this growth is felt across all the regions, with an estimated growth in the Eastern and Midland Region of 490,000 – 540,000 additional people (i.e. growth to a population of approximately 2.85 million people).

In relation to National Strategic Outcome 5, it is included that the NPF seeks to achieve sustainable full employment through supporting entrepreneurialism and building competitive clusters, sustaining talent and boosting human capital in all regions and through digital and data innovation.

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In relation to National Strategic Outcome 10, it is included that the development of new healthcare facilities must give consideration to the location, number, profile and needs of the population to ensure access to the most appropriate and quality care is provided.

The following pertinent objectives are noted:

National Policy Objective 1b
Eastern and Midlands Region: 490,000 – 540,000 additional people i.e. a population of just over 2.85 million

National Policy Objective 3a
Deliver at least 40% of all new homes nationally, within the built-up footprint of existing settlements

National Policy Objective 4
Ensure the creation of attractive, liveable, well designed, high quality urban places that are home to diverse and integrated communities that enjoy a high quality of life and well-being.

National Policy Objective 5
Develop cities and towns of sufficient scale and quality to compete internationally and to be drivers of national and regional growth, investment and prosperity.

National Policy Objective 6
Regenerate and rejuvenate cities, towns and villages of all types and scale as environmental assets, that can accommodate changing roles and functions, increased residential population and employment activity and enhanced levels of amenity and design quality, in order to sustainably influence and support their surrounding area.

National Policy Objective 7
Apply a tailored approach to urban development, that will be linked to the Rural and Urban Regeneration and Development Fund, with a particular focus on:- • Dublin; • the four Cities of Cork, Limerick, Galway and Waterford; • Strengthening Ireland's overall urban structure, particularly in the Northern and Western and Midland Regions, to include the regional centres of Sligo and Letterkenny in the North-West, Athlone in the Midlands and cross-border networks focused on the Letterkenny-Derry North-West Gateway Initiative and Drogheda-Dundalk-Newry on the Dublin-Belfast corridor;

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National Policy Objective 7

- Encouraging population growth in strong employment and service centres of all sizes, supported by employment growth;
- Reversing the stagnation or decline of many smaller urban centres, by identifying and establishing new roles and functions and enhancement of local infrastructure and amenities;
- Addressing the legacy of rapid unplanned growth, by facilitating amenities and services catch-up, jobs and/or improved sustainable transport links to the cities, together with a slower rate of population growth in recently expanded commuter settlements of all sizes;
- In more self-contained settlements of all sizes, supporting a continuation of balanced population and employment growth.

National Policy Objective 9

In each Regional Assembly area, settlements not identified in Policy 2a or 2b of this Framework, may be identified for significant (i.e. 30% or more above 2016 population levels) rates of population growth at regional and local planning stages, provided this is subject to:

- Agreement (regional assembly, metropolitan area and/or local authority as appropriate);
- Balance with strategies for other urban and rural areas (regional assembly, metropolitan area and/or local authority as appropriate), which means that the totality of planned population growth has to be in line with the overall growth target.; and
- A co-ordinated strategy that ensures alignment with investment in infrastructure and the provision of employment, together with supporting amenities and services.

National Policy Objective 10b

Regional and Local Authorities to identify and quantify locations for strategic employment development, where suitable, in urban and rural areas generally

National Policy Objective 11

In meeting urban development requirements, there will be a presumption in favour of development that can encourage more people and generate more jobs and activity within existing cities, towns and villages, subject to development meeting appropriate planning standards and achieving targeted growth.

National Policy Objective 13

In urban areas, planning and related standards, including in particular building height and car parking will be based on performance criteria that seek to achieve well-designed high quality outcomes in order to achieve targeted growth. These standards will be subject to a range of tolerance that enables alternative solutions to be proposed to achieve stated outcomes, provided public safety is not compromised and the environment is suitably protected.

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National Policy Objective 17
Enhance, integrate and protect the special physical, social, economic and cultural value of built heritage assets through appropriate and sensitive use now and for future generations.

National Policy Objective 27
Ensure the integration of safe and convenient alternatives to the car into the design of our communities, by prioritising walking and cycling accessibility to both existing and proposed developments, and integrating physical activity facilities for all ages.

National Policy Objective 28
Plan for a more diverse and socially inclusive society that targets equality of opportunity and a better quality of life for all citizens, through improved integration and greater accessibility in the delivery of sustainable communities and the provision of associated services.

National Policy Objective 30
Local planning, housing, transport/ accessibility and leisure policies will be developed with a focus on meeting the needs and opportunities of an ageing population along with the inclusion of specific projections, supported by clear proposals in respect of ageing communities as part of the core strategy of city and county development plans.

National Policy Objective 32
To target the delivery of 550,000 additional households to 2040

National Policy Objective 33
Prioritise the provision of new homes at locations that can support sustainable development and at an appropriate scale of provision relative to location.

National Policy Objective 35
Increase residential density in settlements, through a range of measures including reductions in vacancy, reuse of existing buildings, infill development schemes, area or site-based regeneration and increased building heights.

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2.4.1.2 Design Manual for Urban Roads and Streets (DMURS)

The *Design Manual for Urban Roads and Streets* (DMURS) was published by the Department of Transport, Tourism and Sport and the Department of Environment, Community and Local Government in June 2019. DMURS provides guidance relating to the design of urban roads and streets. DMURS encourages designers to give due consideration to creating a '*sense of place'* which is of core significance to the creation of safe and more integrated street designs.

This guidance document notes that there are four interlinked characteristics which influence the sense of place within a street. These are:

- **Connectivity**: The creation of vibrant and active places requires pedestrian activity. This in turn requires walkable street networks that can be easily navigated and are well connected.
- **Enclosure**: A sense of enclosure spatially defines streets and creates a more intimate and supervised environment. A sense of enclosure is achieved by orientating buildings toward the street and placing them along its edge. The use of street trees can also enhance the feeling of enclosure.
- **Active Edge**: An active frontage enlivens the edge of the street creating a more interesting and engaging environment. An active frontage is achieved with frequent entrances and openings that ensure the street is overlooked and generate pedestrian activity as people come and go from buildings.
- **Pedestrian Activity/Facilities**: The sense of intimacy, interest and overlooking that is created by a street that is enclosed and lined with active frontages enhances a pedestrian's feeling of security and well-being. Good pedestrian facilities (such as wide footpaths and well-designed crossings) also make walking a more convenient and pleasurable experience that will further encourage pedestrian activity.

The DMURS guidance emphasises that these four characteristics represent the basic measures that should be established in order to create people friendly streets that facilitate more sustainable neighbourhoods.

2.4.1.3 Planning Policy Statement 2015

The Government prepared the non-statutory Planning Policy Statement ('PPS') to set out the key principles of what it expects of planning authorities, public bodies and those engaged with the planning process and high-level priorities for the continued enhancement of the planning system.
Key principles of the PPS include:

- Planning must proactively drive and support sustainable development
- Planning is about creating communities and further development existing communities in a sustainable manner
- Planning will enhance a sense of place
- Planning will support the protection and enhancement of environmental quality

To ensure these and other Key Principles are met, Key Priorities are set out, including:

- Quality in Planning Outcomes
  - *"The success of our planning process will be judged by the quality of places that result variously from, the development of new places, the regeneration of existing places and the protection or enhancement of places that are particularly sensitive because of the natural and/or cultural heritage or environment they contain."*
  - *"Government wants to see planning authorities encourage high standards of development in their areas informed by an understanding of the qualities of their places and the underlying economics of development..."*
  - *"Quality of place is not just determined by buildings, but how the streets and spaces between buildings work..."*

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The proposed development creates a new commercial and health sector hub in Moygaddy, Co. Meath which incorporates a regional provision of healthcare and commercial office services and facilities. Distinct character areas create a sense of place, assisted by a detailed landscape approach which works with the existing landscape features of the site. Consideration has been given to how each area functions for future staff, visitors, pedestrians, cyclists and vehicular users and how strong connectivity and access across and through the site and its surrounds can be achieved. Enhancement of the landscape is provided for which in turn has benefits for the local biodiversity on and around the site, as appropriate.

2.4.2 Birds and Habitats Directive – Appropriate Assessment

Under Article 6 (3) of the EU Habitat Directive and Regulation 30 of SI no. 94/1997 European Communities (Natural Habitats) Regulations (1997) any plan or project which has the potential to significantly impact on the integrity of a Natura 2000 site (i.e. Special Area of Conservation or Special Protection Area) must be subject to an Appropriate Assessment. This requirement is also detailed in the Planning and Development Act 2000 (as amended).

2.5 Section 28 Ministerial Guidelines

There are various Ministerial Guidelines in respect of residential development, with those most relevant to the proposed development included below.

2.5.1 Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas (2009)

The *Sustainable Residential Development in Urban Areas* and the accompanying *Urban Design Manual: A Best Practice Guide* (2009) set out the criteria on planning for sustainable neighbourhoods in Chapter 4 under four main themes, namely,

- provision of community facilities,
- efficient use of resources,
- amenity or quality of life issues, and
- conservation of the built and natural environment.

The Guidelines advocate an urban design and quality-led approach to creating urban densities will be promoted, where the focus will be on creating sustainable urban villages and neighbourhoods. A varied typology of residential dwellings is promoted within neighbourhoods in order to encourage a diverse choice of housing options in terms of tenure, unit size, building design and to ensure demographic balance in residential communities.

Chapter 5 relating to cities and larger towns of these guidelines sets out density standards for 'Outer Suburban/Greenfield Sites (Section 5.11):

"*These may be defined as open lands on the periphery of cities or larger towns whose development will require the provision of new infrastructure, roads, sewers and ancillary social and commercial facilities, schools, shops, employment and community facilities. Studies have indicated that whilst the land take of the ancillary facilities remains relatively constant, the greatest efficiency in land usage on such lands will be achieved by providing net residential densities in the general range of 35-50 dwellings per hectare and such densities (involving a variety of housing types where possible) should be encouraged generally. Development at net densities less than 30 dwellings per hectare should generally be discouraged in the interests of land efficiency, particularly on sites in excess of 0.5 hectares.*".

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2.5.2 Urban Development and Building Heights Guidelines for Planning Authorities December 2018

These Guidelines, published by the Minister under Section 28 of the Planning and Development Act 2000 (as amended), set out national planning policy guidelines on building heights in relation to urban areas, building from the strategic policy framework set out in Project Ireland 2040 and the National Planning Framework.

In relation to Development Management Criteria, as set out in chapter 3 of these guidelines, at the scale of the relevant city/town, it is set out that "*On larger urban redevelopment sites, proposed developments should make a positive contribution to place-making, incorporating new streets and public spaces, using massing and height to achieve the required densities but with sufficient variety in scale and form to respond to the scale of adjoining developments and create visual interest in the streetscape*".

At the scale of the district/neighbourhood/street, the proposals should:

- *"responds to its overall natural and built environment and makes a positive contribution to the urban neighbourhood and streetscape";*
- *"not [be] monolithic and avoids long, uninterrupted walls of building in the form of slab blocks with materials / building fabric well considered";*
- *"enhances the urban design context for public spaces and key thoroughfares and inland waterway/ marine frontage, thereby enabling additional height in development form to be favourably considered in terms of enhancing a sense of scale and enclosure while being in line with the requirements of "The Planning System and Flood Risk Management – Guidelines for Planning Authorities" (2009)";*
- *"makes a positive contribution to the improvement of legibility through the site or wider urban area within which the development is situated and integrates in a cohesive manner";*
- *"positively contributes to the mix of uses and/ or building/ dwelling typologies available in the neighbourhood".*

At the scale of the site/building, "*The form, massing and height of proposed developments should be carefully modulated so as to maximise access to natural daylight, ventilation and views and minimise overshadowing and loss of light*".

The Guidelines detail that developments should include an effective mix of 2,3 and 4 storey developments which integrate well into the existing historical neighbourhoods. It notes that 4 storeys or more can be accommodated alongside existing larger buildings, trees, parkland, river/sea frontage or along wider streets. Specific Planning Policy Requirements ('SPPR') 2 details the following:

"In driving general increases in building heights, planning authorities shall also ensure appropriate mixtures of uses, such as housing and commercial or employment development, are provided for in statutory plan policy. Mechanisms such as block delivery sequencing in statutory plans[2] could be utilised to link the provision of new office and residential accommodation, thereby enabling urban redevelopment to proceed in a way that comprehensively meets contemporary economic and social needs, such as for housing, offices, social and community infrastructure, including leisure facilities."

Specific Planning Policy Requirement (SPPR) 3 sets out that

"*It is a specific planning policy requirement that where;*

(A) 1. an applicant for planning permission sets out how a development proposal complies with the criteria above; and

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2. the assessment of the planning authority concurs, taking account of the wider strategic and national policy parameters set out in the National Planning Framework and these guidelines;

then the planning authority may approve such development, even where specific objectives of the relevant development plan or local area plan may indicate otherwise."

In regard to building heights in suburban/edge locations the Guidelines note that

"*Development should include an effective mix of 2, 3 and 4-storey development which integrates well into existing and historical neighbourhoods and 4 storeys or more can be accommodated alongside existing larger buildings, trees and parkland, river/sea frontage or along wider streets*"

and that

"*Such development patterns are generally appropriate outside city centres and inner suburbs, i.e. the suburban edges of towns and cities, for both infill and greenfield development and should not be subject to specific height restrictions. Linked to the connective street pattern required under the Design Manual for Urban Roads and Streets (DMURS), planning policies and consideration of development proposals must move away from a 2-storey, cul-de-sac dominated approach, returning to traditional compact urban forms which created our finest town and city environments*".

2.5.3 Urban Design Manual: A Best Practice Guide (2009)

The Urban Design Manual: A Best Practice Guide (2009), which accompanies the above referenced *Sustainable Residential Development in Urban Areas* guidelines as a companion reference for best practice on the implementation of the Guidelines. This guide is based on 12 key Design Criteria that should inform planning policy at a regional and local level and new residential development in its design. These criteria are divided into three sections: Neighbourhood, Housing Site and Home. The 12 criteria are set out as follows:

- Context
- Connections
- Inclusivity
- Variety
- Efficiency
- Distinctiveness
- Layout
- Public Realm
- Adaptability
- Privacy & Amenity
- Parking
- Detailed Design

2.5.4 Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities (2020)

These Guidelines were most recently updated in December 2020. They provide for updated guidance on apartment developments in response to the *National Planning Framework* and *Rebuilding Ireland*. These guidelines supersede the 2018 *Sustainable Urban Housing: Design Standards for New Apartments; Guidelines for Planning Authorities*.

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The focus of this guidance is on the apartment building itself and on the individual units within it. These guidelines Specify Planning Policy Requirements (SPPRs) for:

- Internal space standards for different types of apartments
- Dual aspect ratios;
- Density Standards;
- Floor to ceiling height;
- Apartments to stair/lift core ratios;
- Storage spaces;
- Amenity spaces including balconies/patios;
- Car and Bicycle Parking;
- Children's Play Spaces;
- Room dimensions for certain rooms; and
- Build-to-Rent and Co-living schemes.

Section 2.4 of these guidelines sets out that sites such as this, which would be 'Peripheral and/or Less Accessible Urban Locations' are "*generally suitable for limited, very small-scale (will vary subject to location), higher density development that may wholly comprise apartments, or residential development of any scale that will include a minority of apartments at low-medium densities (will also vary, but broadly <45 dwellings per hectare net), including:*

- *Sites in suburban development areas that do not meet proximity or accessibility criteria;*
- *Sites in small towns or villages.*"

2.5.5 Childcare Facilities Guidelines for Planning Authorities

The Childcare Facilities Guidelines for Planning Authorities were published in 2001. These guidelines set out that in all new housing areas over 75 units, the provision of one childcare facility with a minimum of 20 childcare spaces is required, to create sustainable residential neighbourhoods.

These guidelines state in Section 2.4, in regard to larger housing developments, that planning authorities should require the provision of at least one childcare facility for new housing areas unless there are significant reasons to the contrary. Appendix I of the Guidelines sets out general standards and minimum floors areas for proposed childcare facilities.

2.5.6 Part V of the Planning and Development Act 2000 Guidelines (2017)

The Planning and Development Act 2000 (as amended) has recently been updated to include the provisions in relation to Part V, which came into effect on 3rd September 2021, in accordance with the Affordable Housing Act 2021.

The revised provisions set out that all new planning applications granted after 1st August 2021, where the land subject to the permission was purchased before 1st September 2015 or after 31st July 2021, 20% of the land or units proposed shall be provided for the Part V. This new provision also includes that permission granted before 1st August 2021, or permission granted between 1st August 2021 and 31st July 2026, where the land was purchased between 1st September 2015 and 31st July 2021, the 10% provision shall remain in place.

The lands associated with this scheme was purchased in September 2020 and so this scheme proposes to provide a transfer of 10% of the overall units to the Local Authority on completion, totalling 36 no. units.

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2.5.7 Guidelines for Planning Authorities on The Planning System and Flood Risk Management (November 2009)

The Planning System and Flood Risk Management Guidelines were published by the Minister for the Environment, Heritage & Local Government in November 2009 under Section 28 of the Planning & Development Act 2000 (as amended). The Guidelines require the planning system at all levels to avoid development in areas at risk of flooding, particularly floodplains, unless there are proven wider sustainability grounds that justify appropriate development and where the flood risk can be reduced or managed to an acceptable level without increasing flood risk elsewhere; adopt a sequential approach to flood risk management when assessing the location for new development based on avoidance, reduction and mitigation of flood risk; and incorporate flood risk assessment into the process of making decisions on planning applications and planning appeals.

The purpose of the Guidelines is to introduce "*comprehensive mechanisms for the incorporation of flood risk identification, assessment and management into the planning process.*" The document goes on to state that:

> *"Planning authorities will ensure that only developments consistent with the overall policy and technical approaches of these Guidelines will be approved and permission will be refused where flood issues have not been, or cannot be, addressed successfully and where the presence of unacceptable residual flood risks to the development, its occupants or users and adjoining property remains."*

The Guidelines introduce comprehensive mechanisms for the incorporation of flood risk identification, assessment and management into the planning process. The guidelines require the planning system to:

- Avoid development in areas at risk of flooding unless proven wider sustainable
- development grounds and risk can be mitigated without increasing risk elsewhere.
- Adopt a sequential approach to flood risk management for new development
- location based on avoidance, reduction and mitigation of flood risk.
- Incorporate flood risk assessment into decision making on planning applications.

2.6 Regional Planning Policy Context

2.6.1 Regional Spatial and Economic Strategy 2019-2031 (Eastern and Midland Region)

The Regional Spatial Economic Strategy for the Eastern and Midland Region (RSES) 2019-2031 is the strategic plan and investment framework for the region and sets out the overarching regional policy objectives to help shape future growth.

The closest major settlement to the subject site is Maynooth, located within the Dublin Metropolitan Area. It is identified in the RSES that Maynooth is a key town with the assets and capacity to grow in a sustainable manner while minimising impacts on the receiving environment.

The vision of the RSES is:

"*To create a sustainable and competitive Region that supports the health and wellbeing of our people and places, from urban to rural, with access to quality housing, travel and employment opportunities for all*".

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The regional policy objectives set down specifically for Maynooth in the RSES include the following:

'Support the continued development of Maynooth, co-ordinated with the delivery of strategic infrastructure including pedestrian and cycle linkages within the town and to the Royal Canal, DART expansion and road linkages forming part of the Maynooth Outer Orbital Route in a manner which supports future development and population growth and builds on synergies with Maynooth University promoting a knowledge-based economy' (**RPO 4.33**).

And

'Support Maynooth as a key town to act as an economic driver for north Kildare and provide for strategic employment at key locations to improve the economic base of the town and provide for an increased number of local jobs' (**RPO 4.34**).

It is specifically noted within the RSES, in relation to the Key Town of Maynooth, that "*lands at Moygaddy within the Maynooth Environs of County Meath have also been identified for Science and Technology based employment*".

2.7 Local Planning Policy

2.7.1 Meath County Development Plan 2021 – 2027

The current Meath County Development Plan (CDP) 2021-2027 was adopted on 22nd September 2021 and came into effect on 3rd November, 2021. It sets out a vision and an overall strategy for the proper planning and sustainable development of County Meath for a six-year period. It also sets out guiding policies and objectives for the development of County Meath in terms of physical growth and renewal, economic, social and cultural activity, and environmental protection and enhancement.

The Strategic vision of the development plan is

"*To improve the quality of life of all citizens in Meath by creating an environment that **supports a vibrant growing economy and a well-connected place to live, learn and do business***" (Our emphasis added).

It is set out in the introduction to the CDP that the Maynooth Environs (employment land), which this EIAR relates to in part, is a strategic employment site during this plan period.

The Core Strategy's Vision is:

"*To continue to support the creation of socio-economically progressive vibrant, dynamic, and healthy communities throughout the County and ensure that future growth is based on the principles of sustainable development that delivers a high-quality living and working environment that meets the needs of all residents, in accordance with National and Regional Guidance.*"

The site is located in the Maynooth Environs, and within the Dublin Metropolitan Area. Maynooth, which is located in Kildare, on the Meath boundary, is noted as a Key Town in the Meath County Development Plan, as illustrated on the Settlement Hierarchy Map (**Map 3.1**).

In relation to the influence of the RSES on shaping future growth in Meath, as set out in section 2.4.3 of the CDP, lands within the MASP for Metropolitan Growth include these lands adjacent to "*Maynooth (along the north-western corridor of the Metropolitan Area) that have the capacity to deliver significant residential and employment growth. The build out of these lands will increase the critical mass of population in the Metropolitan Area, creating more compact and sustainable patterns of growth*".

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According to the Settlement hierarchy in the CDP, lands in and around Maynooth are noted as being within the Dublin City and Metropolitan Area which is an "*International business core with a highly concentrated and diversified employment base and higher order retail, arts, culture and leisure offer. Acts as national transport hub with strong inter and intra-regional connections and an extensive commuter catchment*". Additionally, Maynooth is also noted as being a Key Town which is described as a "*Large economically active service and/or county towns that provide employment for their surrounding areas and with high-quality transport links and the capacity to act as growth drivers to complement the Regional Growth Centres*".

According to the Core Strategy, it is anticipated that the population of Meath will increase by 17.3% between 2016 and 2027.

It is noted that "*the RSES recognises the northern environs of Maynooth, which are located in Meath, as an important location for economic and residential development that will support the future development of the town and the delivery of the Maynooth Outer Relief Road, which is a key piece of infrastructure in the sustainable growth of the town*".

Table 2.12 in the CDP advises that the population of the Maynooth environs located in Meath, where this subject site lies, is anticipated to grow to 1,000 persons by 2027 from 0 persons in 2016, with a household allocation of 500 units for this plan period. This proposed development which includes new healthcare and commercial office uses goes hand in hand with this population growth, which will be met by lands adjacent to the subject SHD site.

Core Strategy policy **CS POL 1** states that it is the policy of the Council "*to promote and facilitate the development of sustainable communities in the County by managing the level of growth in each settlement to ensure future growth is in accordance with the Core Strategy and County Settlement Hierarchy in order to deliver compact urban areas and sustainable rural communities*" (our emphasis added).

Further, Core Strategy objectives include;

CS OBJ 1 – "*To secure the implementation of the Core Strategy and Settlement Strategy, in so far as practicable, by directing growth towards designated settlements, subject to the availability of infrastructure and services*".

CS OBJ 14 – "*To support the economic growth of Meath as set out in the Regional Spatial and Economic Strategy and the Economic Development Strategy for County Meath 2014-2022*".

CS OBJ 16 – "*To support the creation of 'live work' communities, in which employment and residential accommodation are located in close proximity to each other and strategic multi-modal transport corridors, and to reduce long distance commuter trends and congestion*".

Economy and Employment

The CDP sets out the Economy and Employment Strategy in Chapter 4 and states that "*Continued economic development and job creation will be supported by the work of the Planning and Economic Development Directorate and the Local Enterprise Office (LEO)*".

ED POL 1 of the Economic Strategy for Meath sets out that it is a policy of the Council "*To facilitate and support the continued growth of the economy in the County in a sustainable manner and in accordance with the National Planning Framework (NPF) and the Regional Spatial and Economic Strategy (RSES)*".

The Economic Development Strategy for County Meath 2014 – 2022 is noted to set out key components for the promotion of economic development in Meath, and include

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- *"Reserving sufficient employment zoned land in suitable locations for industry and enterprise uses";*
- *"Providing and facilitating the provision of requisite physical infrastructure"; and*
- *"Providing for appropriate zoned lands at strategic locations to accommodate synergies between third level institutions and business enterprises including start-up companies".*

Further to the above, despite this strategy being in effect from 2014-2022, policy **ED POL 2** specifically sets out that it will be a policy of the Council, for this plan period to 2027, "*To support and facilitate the economic development of the County in accordance with the Economic Strategy 2014-2022 or its replacement. There will be a general presumption against development that would prejudice the implementation of the Economic Strategy*".

Further relevant economic and employment policies and objectives set out in the CDP include:

ED POL 4 – "*To identify and promote a range of locations within the County for different types of enterprise activity including international business and technology parks, small and medium enterprises (SME) and micro enterprise centres.*"

ED POL 5 – "*To co-operate with local and national development agencies and engage with existing and future employers in order to maximise job opportunities in the County*".

ED POL 11 – "*To require that all new developments with over 100 employees shall have a mobility management Plan, (Refer to Chapter 11 Development Management Standards and Land Use Zoning Objectives)*".

ED OBJ 2 – "To continue to promote Meath as a strategically located economic and employment hub within the Greater Dublin Area".

ED OBJ 3 – "To continue to work with key state agencies and other stakeholders to develop opportunities for employment creation in the County".

Section 4.7.1.2 of the CDP specifically relates to the future development of the Maynooth Environs in County Meath, which this subject site forms part of. It sets out that these environs land comprise 139 hectares of lands which can accommodate significant employment and residential growth along with additional required infrastructural investment, as acknowledged in the RSES under **RPO 4.33**. It is the intention of Meath County Council to work alongside Kildare County Council during the plan period to prepare a joint Local Area Plan (LAP) which covers these lands and the wider Maynooth Environs area.

It is included in this section of the Plan that "*Lands at Moygaddy within the Maynooth Environs of County Meath have also been identified by the RSES for Science and Technology based employment. The County Development Plan sets out that the Environs will be a focal point for science and technology employment with potential for additional tourism related uses. Employment uses are based on the Economic Strategy objectives which focus on the development of Life Sciences, High Tech, Bio Tech, ICT, Research & Development and seeks to benefit from synergies with third level institutions which may include Maynooth University (MU) and major employers already established in the sub Region (Intel, Hewlett Packard)*".

In addition to this, the delivery of the Maynooth Outer Orbital Route, which will be located in the Meath Environs, will be developed in the future, and will bound the Proposed Development. It is envisaged that this Maynooth Outer Orbital Route will provide greater connectivity and links and will enhance the sustainability of developments in this Moygaddy area.

Policies and Objectives specifically relating to Maynooth include:

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ED OBJ 10 – "*In accordance with RPO 4.33 of the Regional Spatial and Economic Strategy, to support the continued development of Maynooth, co-ordinated with the delivery of strategic infrastructure including pedestrian and cycle linkages within the town and to the Royal Canal Greenway, DART expansion and road linkages forming part of the Maynooth Outer Orbital Route in a manner which supports future development and population growth and builds on synergies with Maynooth University promoting a knowledge-based economy*".

ED OBJ 14 – "*It is a priority for the Council to deliver on the significant potential of the lands in the Maynooth Environs, a designated strategic employment site to create a unique employment hub centred on a high tech/bio tech campus within the lands, supported by a 'live work' community with a mixture of employment, residential, community, medical and tourism uses to be progressed following the preparation of Master Plans. Said Master Plans shall be agreed in writing with the Executive of Meath County Council in advance of the lodgement any Planning application. This area can accommodate increased building height which shall be addressed as part of the Master Plans. (Please refer to Volume Maynooth Environs Written Statement for detailed requirements in respect of Master Plans)*". (Our emphasis added)

Further to the above, **ED POL 63** of the CDP sets out that it is a policy of the Council "*To encourage and support sensitive development which provides for the appreciation, interpretation, upgrade and provision of access to natural habitats, scenic vistas and heritage features for the benefit of rural tourism subject to normal Planning and nature conservation considerations*". This is relevant due to the location of the high amenity value lands within the southern area of the subject site and the proposals to provide upgraded links to Maynooth town.

In relation to the proposals to provide upgraded linkages to the town of Maynooth, the indicative location of the proposed Maynooth Outer Orbital Route (MOOR) through the subject site and the impact which traffic and transport stemming from the proposed development will have on the existing surrounding area, the supportive policies and objectives as set out in Chapter 5 of the CDP, relating to the Movement Strategy, are considered pertinent.

MOV POL 1 sets out that it is a policy of the Council "*To support and facilitate the integration of land use with transportation infrastructure, through the development of sustainable compact settlements which are well served by public transport, in line with the guiding principles outlined in RPO 8.1 of the EMRA RSES 2019-2031*".

MOV POL 3 – "*To promote sustainable land use planning measures which facilitate transportation efficiency, economic returns on transport investment, minimisation of environmental impacts and a general shift towards the greater use of public transportation throughout the County*".

MOV OBJ 20 – "*To encourage, where appropriate, the incorporation of safe and efficient cycleways, accessible footpaths and pedestrian routes into the design schemes for town centres/neighbourhood centres, residential, educational, employment, recreational developments and other uses*".

MOV OBJ 28 – "*To revise road junction layouts, where appropriate, to provide dedicated pedestrian and cycling crossings, reduce pedestrian crossing distances, provide more direct pedestrian routes, and reduce the speed of turning traffic*".

MOV OBJ 29 – "*To implement at appropriate locations pedestrian permeability schemes and enhancements*".

Infrastructure

The relevant policies and objectives as set out in the Meath CDP in relation to the Infrastructure Strategy in Chapter 6 are noted as follows:

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INF POL 10 – "*To liaise and work in conjunction with relevant stakeholders, to ensure a co-ordinated approach to the protection and improvement of the County's water resources*".

INF POL 12 – "*To require that in the case of all developments where the public foul sewer network is available or likely to be available and has sufficient capacity, that development shall be connected to it*".

INF OBJ 25 – "*To require the use of Sustainable Urban Drainage Systems (SuDS) to minimise and limit the extent of hard surfacing and paving and require the use of sustainable drainage techniques where appropriate, for new development or for extensions to existing developments, in order to reduce the potential impact of existing and predicted flooding risks*".

INF OBJ 27 – "*To encourage the use of Green Roof technology particularly on apartment, commercial, leisure and educational buildings*".

INF POL 35 – "*To seek a reduction in greenhouse gases through energy efficiency and the development of renewable energy sources utilising the natural resources of the County in an environmentally acceptable manner consistent with best practice and planning principle*".

INF POL 38 – "*To encourage that new development proposals maximise energy efficiency through siting, layout, design and incorporate best practice in energy technologies, conservation and smart technology*".

INF POL 43 – "*To require, where feasible and practicable, the provision of Photovoltaic solar panels in new residential developments, commercial developments, and public buildings for electricity generation/storage and/or water heating purposes so as to minimise carbon emissions and reduce dependence on imported fossil fuels and reduce energy costs*".

Health and Community

Chapter 7 of the Meath CDP sets out the Community Buildings Strategy for County Meath over the plan period. A significant proportion of development in relation to the overall proposed masterplan site, and specifically the planning application associated with 'Site B', relates to the development of a Primary Care Centre (PCC) and Nursing Home. Relevant policies and objectives within the Plan are listed below.

SOC POL 2 – "*To support the provision and distribution of a range of community infrastructure facilities in accordance with the Settlement and Core Strategies to meet the needs of the County's population in conjunction with other statutory, voluntary, private sector and community groups".*

SOC POL 3 – "*To ensure that, where practicable, community, recreational and open space facilities are clustered, with the community facilities being located in local centres or combined with school facilities, as appropriate. Community facilities should be located close to or within walking distance of housing, accessible to all sectors of the community and facilitate multi-use functions through their design and layout*".

SOC POL 4 – "*To ensure the delivery of community facilities commensurate with the needs of the resident population is done in tandem with new residential developments in the interests of the proper planning and sustainable development of the area, and to assist in the delivery of such facilities*".

SOC POL 7 – "*To promote and encourage social inclusion through universal access to services and facilities and to encourage the upgrade of community facilities*".

SOC POL 8 – "*To continue to provide care facilities for older people, such as own homes (designed to meet the needs of older people), sheltered housing, day-care facilities, nursing homes and specialised care units at appropriate locations throughout the County*".

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SOC POL 10 – "*To require that all residential care facilities for the elderly comply with all relevant standards set out in the 'National Quality Standards for Residential Care Settings for Older People in Ireland' published by the Health Information and Quality Authority (February 2009) or the relevant standards for any subsequent national guidelines*".

SOC POL 13 – "*To ensure that all buildings, public and open spaces, recreational and amenity areas are accessible for people with disabilities, having regard to the Building Regulations, the objectives of 'Building for Everyone' (National Disability Authority) and 'Access for the Disabled' (No. 1 to 3)(National Rehabilitation Board)*".

Section 7.7.4 of the CDP relating to Healthcare Facilities states specifically that "*The Council will continue to work closely with the HSE to ensure that there is adequate land zoned to accommodate health care facilities when the requirement arises in accordance with best planning practice*".

SOC POL 14 – "*To co-operate with the Health Service Executive and other statutory and voluntary agencies and the private sector in the provision of appropriate health care facilities covering the full spectrum of such care from hospitals to the provision of community based care facilities subject to proper planning considerations and the principles of sustainable development*".

SOC POL 30 – "*To support the provision of 'one stop' primary care medical centres and GP practices at locations easily accessible to members of the wider community*".

Maynooth Environs

Volume 2 of the Meath CDP contains the 'Maynooth Environs' Written Statement and maps which relates to the subject lands.

'MAY POL1' relates to the policy objective to prepare a joint Local Area Plan for Maynooth over the period of the plan, in conjunction with Kildare County Council. This policy is stated as follows:

> *'To prepare in conjunction with Kildare County Council a joint Local Area Plan for Maynooth, over the Plan period'.*

Objective '**MAY OBJ 1 (Masterplan 1)**' is also of particular relevance to the subject lands. The objective states:

> *'It is an objective of the Planning Authority to require the submission with any application for development of lands at Moygaddy of a Master Plan for the prior written agreement of the Executive of the Planning Authority which shall address the following:*
>
> *1. A Design Statement outlining the evolution of the design process for the proposed development. An emphasis on exemplar sustainable design and aesthetic quality shall be required*
>
> *2. Proposals for the accessing of lands which shall adhere to the permitted Part VIII realignment of the junction of the R157 Regional Road and Moygaddy Road.*
>
> *3. Proposals providing for the delivery of the Maynooth Outer Relief Road which shall be developer driven in tandem with the overall development;*
>
> *4. Proposals for piped water services to be agreed with Irish Water compliant with any existing consents in place;*
>
> *5. Mobility Management Plan for the development. This Plan shall be to the fore in establishing the agreed quantum of employees which can be accommodated within individual*

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locations predicated on maximising public transport opportunities and the use of innovation in reducing associated carbon footprint.

6. Urban design and landscape design statement.

Any development within the subject lands shall be subject to compliance with the requirements of the Habitats Directive and shall be phased with the delivery of the MOOR in Phase 1 of the development.'

Historic Environment

There is a National Monument (Moygaddy Castle and Tower) located on the subject site of the Proposed Development and a Protected Structure (Moygaddy House) located on an adjoining site which is in the ownership of the Applicant but which does not form part of the Proposed Development and which will be the subject of a separate planning application in the future. The Proposed Development for a residential development, a commercial office campus (Strategic Employment Zone) and healthcare facilities, the MOOR, the Moyglare Bridge and the Kildare Bridge works will all be developed giving due consideration to the heritage of these buildings and the surrounding area, in accordance with the policies and objectives of Chapter 8 of the CDP relating to the Cultural and Natural Heritage Strategy.

HER POL 1 sets out that it is a policy of the Council "*to protect sites, monuments, places, areas or objects of the following categories:*

- *Sites and monuments included in the Sites and Monuments Record as maintained by the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht;*
- *Monuments and places included in the Record of Monuments and Places as established under the National Monuments Acts;*
- *Historic monuments and archaeological areas included in the Register of Historic Monuments as established under the National Monuments Acts;*
- *National monuments subject to Preservation Orders under the National Monuments Acts and national monuments which are in the ownership or guardianship of the Minister for Culture, Heritage and the Gaeltacht or a local authority; ...*"

HER POL 2 – "*To protect all sites and features of archaeological interest discovered subsequent to the publication of the Record of Monument and Places, in situ (or at a minimum preservation by record) having regard to the advice and recommendations of the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht and The Framework and Principles for the Protection of the Archaeological Heritage (1999)".*

HER POL 3 – "*To require, as part of the development management process, archaeological impact assessments, geophysical survey, test excavations or monitoring as appropriate, for development in the vicinity of monuments or in areas of archaeological potential. Where there are upstanding remains, a visual impact assessment may be required*".

HER OBJ 2 – "*To ensure that development in the vicinity of a Recorded Monument or Zone of Archaeological Potential is sited and designed in a sensitive manner with a view to minimal detraction from the monument or its setting*".

HER POL 14 – "*To protect and conserve the architectural heritage of the County and seek to prevent the demolition or inappropriate alteration of Protected Structures*".

HER POL 16 – "*To protect the setting of Protected Structures and to refuse permission for development within the curtilage or adjacent to a protected structure which would adversely impact on the character and special interest of the structure, where appropriate*".

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HER POL 17 – "*To require that all planning applications relating to Protected Structures contain the appropriate accompanying documentation in accordance with the Architectural Heritage Protection Guidelines for Planning Authorities (2011) or any variation thereof, to enable the proper assessment of the proposed works*".

HER POL 21 – "*To encourage the retention, sympathetic maintenance and sustainable re-use of historic buildings, including vernacular dwellings or farm buildings and the retention of historic streetscape character, fabric, detail and features*".

HER POL 27 – "*To protect, conserve and enhance the County's biodiversity where appropriate*".

HER POL 28 – "*To integrate in the development management process the protection and enhancement of biodiversity and landscape features wherever possible, by minimising adverse impacts on existing habitats (whether designated or not) and by including mitigation and/or compensation measures, as appropriate*".

HER POL 31 – "*To ensure that the ecological impact of all development proposals on habitats and species are appropriately assessed by suitably qualified professional(s) in accordance with best practice guidelines – e.g. the preparation of an Ecological Impact Assessment (EcIA), Screening Statement for Appropriate Assessment, Environmental Impact Assessment, Natura Impact Statement (NIS), species surveys etc. (as appropriate)*".

HER POL 32 – "*To permit development on or adjacent to designated Special Areas of Conservation, Special Protection Areas, Natural Heritage Areas, Statutory Nature Reserves or those proposed to be designated over the period of the Plan, only where the development has been subject to the outcome of the Appropriate Assessment process and has been carried out to the satisfaction of the Planning Authority, in consultation with National Parks and Wildlife*".

HER POL 50 – "*To require landscape and visual impact assessments prepared by suitably qualified professionals be submitted with planning applications for development which may have significant impact on landscape character areas of medium or high sensitivity*".

Development Management Standards

Chapter 11 of the Meath CDP relates to the Development Management Standards for County Meath. The following Development Management Standards are considered relevant to this proposed development.

DM POL 1 – "*To support, be proactive and implement the objectives, actions and recommendations of the Public Realm Plans as completed*".

DM POL 2 – "*Appropriate energy conservation strategies should be employed in location, design, mass, orientation and the choice of materials of all new and renovated developments*".

DM OBJ 5 – "*Building design which minimises resource consumption, reduces waste, water and energy use shall be incorporated where possible, in all new and renovated developments*".

DM OBJ 6 – "*Building design shall maximise natural ventilation, solar gain and daylight, where possible, all new and renovated developments*".

DM OBJ 7 – "*Sustainable Urban Drainage Systems (SuDS) measures are required to form part of the design of all developments*".

DM POL 3 – "*All public lighting proposals shall be in accordance with the Councils Public Lighting Technical Specification & Requirements, June 2017, and the Council's Public Lighting Policy, December 2017, (or any updates thereof)*".

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DM OBJ 9 – "*A separation distance of 5 metres between the lighting column and the outside of the crown is required for the lighting to work as designed. Trees or vegetation shall not be planted within 7 metres of a public light column*".

DM OBJ 10 – "*The design of all new developments shall take into consideration the layout of the proposed public lighting column locations and the proposed landscape design. Both layouts should achieve the 7 metres separation between all trees and public lighting columns*".

DM OBJ 11 – "*Existing trees and hedgerows of biodiversity and/or amenity value shall be retained, where possible*".

DM OBJ 16 – "*Site coverage shall generally not exceed 80%. Higher site coverage may be permissible in certain limited circumstances such as adjacent to public transport corridors; to facilitate areas identified for regeneration purposes; and areas where an appropriate mix of both residential and commercial uses is proposed*".

DM OBJ 17 – "*To seek to provide building setbacks along Motorways, National Primary, National Secondary, Regional and Local Roads to allow for future road improvements*".

DM OBJ 25 – "*To require development with increased building height at the following locations; .... Maynooth Environs... In all cases all proposals for buildings in excess of 6 stories at these locations shall be accompanied by a statement demonstrating compliance with the Urban Development and Building Heights, Guidelines for Planning Authorities (2018), or any updates thereof".*

DM OBJ 61 – "*Any planning application for industrial, office, warehousing and Business Park Development shall address the following development assessment criteria:*

- *To require innovative contemporary designs for new industrial, office, warehousing and business park developments.*
- *External finishes shall be suitable for the local/natural landscape.*
- *That indicative site coverage for industrial/commercial development on greenfield sites is 50% coverage unless the design characteristics of the scheme, proposed uses and mobility management plan indicate support for higher site coverage.*
- *In town centre locations, in order to encourage and facilitate the development of a compact town centre, and to achieve desirable massing and heights of buildings, plot ratio and site coverage of 1.5 and 70% respectively will generally be the norm.*
- *To require that full details of the proposed use(s), including industrial processes involved are provided.*
- *To require that full details of the hours of operation be provided.*
- *To require that details of suitable access arrangements, internal roads layout including details of footpaths, turning areas, loading bays be provided.*
- *Boundaries which are visible from the public road should be of a high architectural quality. Palisade fencing to the front of any building line shall not be permitted.*
- *The use of retention ponds as an urban design feature within business parks will be encouraged to enhance the setting, subject to compliance with all relevant safety requirements.*
- *To require that proposals for and location of onsite areas for storage and disposal (if applicable) of waste be provided as part of any planning application. All external storage including bin storage, oil tanks, etc, shall be visually screened from public areas.*
- *To require that waste and recycling areas be covered, screened and enclosed from public view and wind, compliant with the Council's Waste Management Strategy.*
- *All overground oil, chemical storage tanks should be adequately bunded to protect against spillage.*
- *To require that a survey of any existing vegetation onsite and a suitable landscaping scheme prepared by an appropriately qualified professional, taking account of same, be submitted as part of any planning application to enhance the development. Open space shall be provided*

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in suitable locations as part of the development in order to enhance the development and provide amenity and passive recreation for future employees.

- *To require that all significant Industrial, Office, Warehousing and Business Park Development incorporate works of public art in the form of outdoor sculptures, special architectural and landscape features or other appropriate art work in the development.*
- *To require that all planning applications for Industrial, Office, Warehousing and Business Park Development on sites in excess of 0.5 hectares are accompanied by a Construction Environmental Management Plan (CEMP).*
- *To require that all new developments with over 100 employees shall have a Mobility Management Plan.*
- *To encourage the provision of supporting facilities for employees including childcare facilities, leisure uses and coffee shops in business parks.*
- *To encourage research and development activities as an ancillary part of all new and existing business parks in the County in conjunction with 3rd level Institutions.*"

DM POL 24 – "*To require that residential care homes, retirement homes, nursing homes, retirement villages and sheltered accommodation/step down housing be located in towns and villages for reasons of sustainability, accessibility, social inclusion, and proximity to the availability of services, except where a demonstrated need to locate in a rural environment because of the nature of the care required can be clearly established*".

DM OBJ 66 – "*Reduced open space standards may be acceptable for the following development types: residential care homes, retirement homes, nursing homes, retirement villages and sheltered accommodation only in cases where it is clearly demonstrated with a supporting evidence base that it is appropriate by having regard to the specific open space needs of residents and only where suitable accessible public open space is available as part of the development*".

DM OBJ 67 – "*Planning applications for the change of use of a residential dwelling or other building to nursing home, residential care home, or for the construction of new residential care homes, retirement homes, nursing homes, retirement villages or sheltered accommodation/step down housing, shall be assessed for compliance with the following criteria:*

- *The Health Act 2007 (Care and Welfare of Residents in Designated Centres for Older People) (Amendment) Regulations 2010 (or any such other relevant standards and legislation that may be enacted);*
- *The National Quality Standards for Residential Care Settings for Older People in Ireland, 2009;*
- *Sustainability is the location served by good public transport links, pedestrian and cycle facilities, close to local services and facilities;*
- *Suitability of the size and scale of the proposal having regard to the site constraints and the area in which it is located;*
- *The degree to which the residential amenity of surrounding properties is protected;*
- *The requirement for a high standard of design and external finishes;*
- *The adequacy of off-street car parking;*
- *High quality open space proposals with comprehensive landscaping plans prepared by a fully qualified landscape professional;*
- *Availability of services*".

DM OBJ 89 – "*Car Parking shall be provided in accordance with Table 11.2 and associated guidance notes*".

Table 11.2 includes the following parking requirements:

- *Offices - 1 per 300 sq.m. gross floor area*
- *Hospitals – 1 per bed*

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- *Surgeries – 2 per consulting room*
- *Nursing Homes – 1 per 3 beds and one space per employee*

Guidance Notes to this policy are set out as follows:

- *"Where parking is permitted in the view of the general public, adequate soft landscaping shall be provided to soften the appearance of hard surfaced areas;*
- *Parking areas shall be reserved solely for the parking of vehicles and should not be used for the storage of materials or goods associated with the development, nor for the parking of goods or other heavy vehicles;*
- *The standards set out in Table 11.2 shall apply to all new developments, be it new construction or a new extension or a material change of use of existing buildings;*
- *The Council will encourage and facilitate innovative design solutions for medium to high density residential schemes where substantial compliance with normal development management considerations can be demonstrated (Refer to DM OBJ 12);*
- *Accessible car parking spaces shall be provided at a minimum rate of 5% of the total number of spaces, for developments requiring more than 10 car parking spaces, with the minimum provision being one space (unless the nature of the development requires otherwise). Such spaces shall be proximate to the entry points of buildings and comply with the requirements of the Building Regulations;*
- *Age Friendly car parking spaces should generally be provided, where possible, in all developments;*
- *In the case of any specific uses not listed in the above table, the Council will specify its requirements in relation to parking;*
- *The above car parking standards shall be applied at the discretion of the Council in the County's rural towns and villages having regard to the availability and adequacy of on street parking, existing or proposed off street parking to serve the development and the status of the town/village within the settlement hierarchy of the County;*
- *Residential car parking can be reduced at the discretion of the Council, where development is proposed in areas with good access to services and strong public transport links;*
- *Non-residential car parking standards are set down as "maxima" standards;*
- *Adequate car parking bays should be provided within the confines of the public areas of residential areas to address public needs; and*
- *All parking areas shall be clearly demarcated and numbered with indelible paint which shall be permanently maintained to the satisfaction of the Planning Authority*".

DM OBJ 92 – "*Loading bays shall be located and designed to prevent any obstructions to traffic circulation and to accommodate vehicular manoeuvring on site*".

DM OBJ 94 – *"All car parks shall include the provision of necessary wiring and ducting to be capable of accommodating future Electric Vehicle charging points, at a rate of 20% of total space numbers*".

DM OBJ 95 – "*In any car park in excess of 20 spaces where public access is available, four fully functional charging points for Electric Vehicles shall be provided in accordance with IEC 61851 Standard for Electric Vehicle Conductive Charging Systems*".

DM OBJ 96 – "*To require the provision of cycle parking facilities in accordance with the Design Standards for New Apartments (March 2018) and Table 11.4 Cycle Parking Standards*".

DM OBJ 97 – "*Cycle parking facilities shall be conveniently located, secure, easy to use, adequately lit and well sign posted. All long-term (more than three hours) cycle racks shall be protected from the weather*".

Table 11.4 relating to Cycle Parking Standards includes the following standards:

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- *Offices – 10% of employee numbers subject to minimum of 10 bicycle places or one bike space for every car space, whichever is the greatest.*
- *Other developments – 1 bike space per car space, or 10% of employee numbers in general.*

Section 11.14 – Land Use Zoning Objectives sets out the zoning objectives for the development site. It is noted that the following relevant zoning objectives cover this proposed site, as illustrated in **Figure 2-14** below.

- E1 – Strategic Employment Zones (High Technology Uses).
- G1 – Community Infrastructure
- H1 – High Amenity

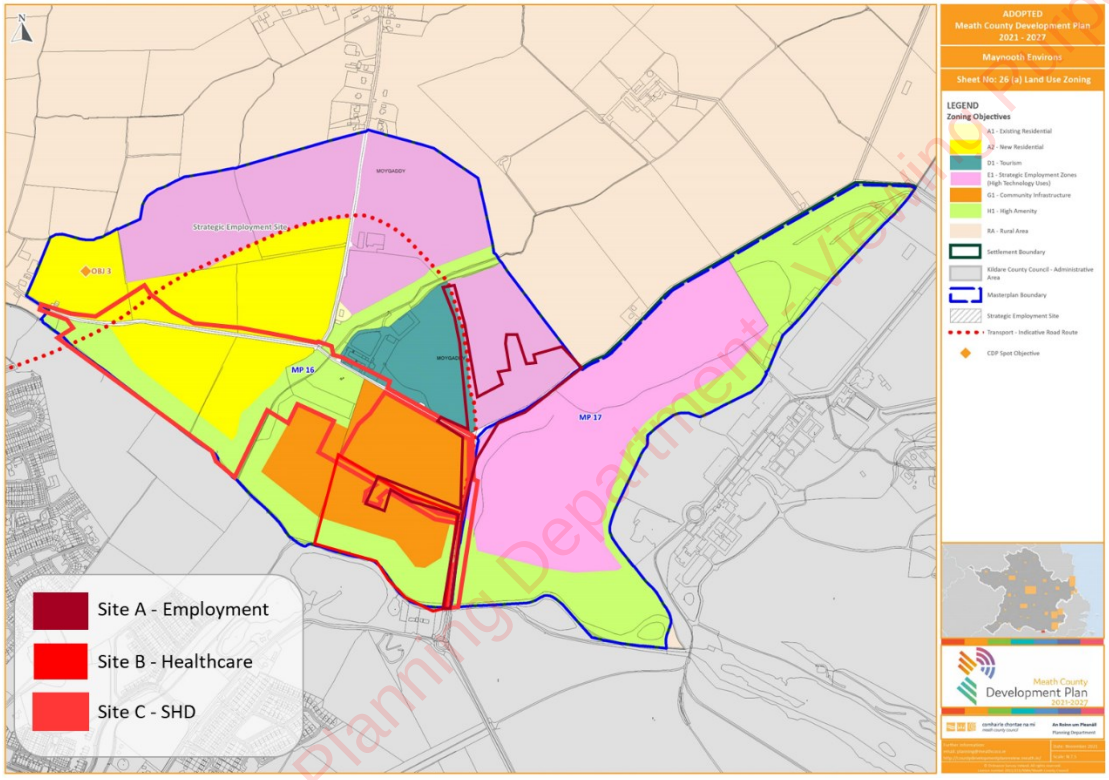

Figure 2-14: Land Use Zoning Objectives for Subject Sites A and B, and C (as denoted by red outlines). Source: Meath County Council County Development Plan 2021-2027

Zoning Category A2 – New Residential

"To provide for new residential communities with ancillary community facilities, neighbourhood facilities as considered appropriate."

Permitted uses for this zoning are:

Residential / Sheltered Housing, B & B / Guest House, Bring Banks, Community Facility / Centre, Childcare Facility, Convenience Outlet, Children Play / Adventure Centre, Education (Primary or Second Level), Halting Site / Group Housing, Home Based Economic Activities, Leisure / Recreation / Sports Facilities, Retirement Home / Residential Institution / Retirement Village, Utilities.

Open for Consideration Uses are:

Betting Office, Caravan Park, Cultural Facility, Education (Third Level), Enterprise Centre, Health Centre, Healthcare Practitioner, Hotel / Motel / Hostel, Offices.

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Zoning Category E1 – Strategic Employment Zones (High Technology Uses) has an objective

"*To facilitate opportunities for high end technology/manufacturing and major campus style office-based employment within high quality and accessible locations*".

It is noted in the guidance that "*E1 zones facilitate opportunities for high end, high value-added businesses and corporate headquarters. This adheres to the concept of 4th Generation Science & Technology Parks. It is envisaged that such locations are suitable for high density employment generating activity with associated commercial development located adjacent to or in close proximity to high frequency public transport corridors*". This will apply to suitable lands in ... Maynooth Environs ...".

Permitted uses for this zoning are:

"*Bio Technology Manufacturing, Call Centres, Childcare Facility, Convenience Outlet, Cafe, Leisure facilities, Data Centres, Green / Clean Light Industries, Education (third level), High Technology Manufacturing, Information Communication Technologies, International and National Traded Services, Knowledge Based Economic Development, Offices 100 to 1,000m², Offices >1,000m², Medical and Related Uses (includes hospital), Research & Development, Science & Technology Based Enterprise, Telecommunication Structures, Utilities, Public Park*".

Open for Consideration Uses are:

"*Conference/Event Centre, Education, Enterprise / Training Centre, Hotel / Aparthotel, Industry – Light, Transport Depot/Logistics, Warehousing. Uses which are 'open for consideration' or not identified as 'permitted' under the E1 zoning objective will only be considered where they do not compromise the objective of the overall zoning objective of E1 lands, as a strategic employment zone for high technology uses*".

Zoning Category G1 – Community Infrastructure has an objective

"*To provide for necessary community, social, and educational facilities*".

Permitted Uses are:

"*Allotments, Car Park (incl. Park and Ride), Cemetery/Crematorium, Children Play / Adventure Centre, Childcare Facility, Community Facility / Centre, Cultural Facility, Education, Health Centre, Hospital, Leisure / Recreation / Sports Facilities, Place of Public Worship, Playing Pitches, Playgrounds, Recycling Facility (Civic & Amenity), Utilities".*

Open for Consideration Uses are:

"Bring Banks, Funeral Home, Gymnasium, Halting Site / Group Housing, Healthcare Practitioner, Residential / Sheltered Housing, Restaurant / Café, Retirement Home / Residential Institution / Retirement Village, Telecommunication Structures".

Zoning Category H1 – High Amenity has an objective

"*To protect and improve areas of high amenity*".

Permitted Uses are:

"*Cycleways / Greenways / Trail Development, Land & Water Based Recreational Activities Open Space, Cultural Activities.*"

Open for Consideration Uses are:

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"*Kiosk, Restaurant, Tea Room, Sensitive re-use of existing structures*".

Section 11.15 relating to Masterplans includes the Moygaddy Lands (subject site) in the Maynooth Environs, under the reference MP16.

2.7.2 Kildare County Development Plan 2017 -2023

Part of the application site, relating to road, services and pedestrian infrastructure extends into the administrative boundary of County Kildare, south of the Maynooth Environs lands which form the proposed masterplan lands. The extant County Development Plan (CDP) for County Kildare covers the period 2017 – 2023. The relevant planning policies and objectives as they relate to the proposed infrastructure development are set out as follows.

Table 2.2 of the Kildare CDP sets out the Settlement Hierarchy and Typology for the County, noting that Maynooth is a Key Town and stating that this is a "*Large towns which are economically active that provide employment for their surrounding areas. High quality transport links and the capacity to act as regional drivers to complement the Regional Growth Centres*".

Section 3.6 of the Kildare CDP includes that "*A strategic land use and transportation study of northeast Kildare including the Metropolitan area towns of Leixlip, Maynooth, Celbridge and Kilcock involving all strategic stakeholders (including Meath, Fingal and South Dublin County Councils) will be prepared, which will inform the future planning and development of this area*".

Objective SO 1 sets out that it is an objective of the Council to "*Support the sustainable long-term growth of the Metropolitan Area towns of Leixlip, Maynooth, Celbridge and Kilcock and zone additional lands, where appropriate, to meet the requirements of the Core Strategy and Settlement Hierarchy of this Plan*".

Movement and Strategy

Chapter 6 of the Kildare CDP relating to Movement and Transport sets out the following relevant policies and objectives;

MT 1 – "*Promote the sustainable development of the county through the creation of an appropriately phased integrated transport network that services the needs of communities and businesses*".

MT 3 – "*Influence people's travel behaviour and choices towards more sustainable options by working closely with relevant organisations in improving and accessing public transport facilities*".

MT 4 – "*Develop sustainable transport solutions within and around the major towns in the county that encourage a transition towards more sustainable modes of transport, whilst also ensuring sufficient road capacity for trips which continue to be taken by private vehicles*".

MT 5 – "Prioritise the development of new urban distributor/link/arterial roads to provide access to new communities and employment development to support the economic development of the county".

MT 11 – "*Focus on improvements to the local road and street network that better utilise existing road space and encourage a transition toward more sustainable modes of transport, while ensuring sufficient road capacity exists for trips which will continue to be taken by private vehicle*".

WC 1 – "*Prioritise sustainable modes of travel by the development of high quality walking and cycling facilities within a safe street environment*".

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WC 3 – "*Ensure that connectivity for pedestrians and cyclists is maximised in new communities and improved within the existing areas in order to maximise access to town centres, local shops, schools, public transport services and other amenities*".

WC 4 – "*Ensure that all new roads and cycle routes implement the National Cycle Manual, with a focus on a high level of service for cyclists and encouraging a modal shift from car to cycling*".

RS 1 – "*Ensure ongoing competitiveness and the efficient movement of people and goods in the county through the improvement and expansion of the road and street network within the county to support economic development and provide access to existing communities, new communities, employment areas and development*".

RR 1 relating to Regional Roads states that it is the policy of the Council to "*Maintain and improve the capacity, safety and function of the regional road network (as finance becomes available) and to ensure that it is planned for and managed to enable the sustainable economic development of the county and wider area while encouraging a shift towards more sustainable travel and transport in accordance the Core Strategy, the Spatial Planning and National Roads Guidelines (2012) and the Transport Strategy for the Greater Dublin Area 2016-2035*".

LR 1 relating to Local Roads states that it is the policy of the Council to "*Ensure that the safety and capacity of the local road network is maintained and improved where funding allows and to ensure that local streets and roads within the county are designed to a suitable standard to accommodate the future needs of the county. The design of these roads and streets should balance the needs of place and movement with providing a safe street environment for all road users*".

LR 2 – "*Seek to improve the quality of the pavement of local roads*".

LR 7 – "*Ensure that all developments allow for and ensure full connectivity (pedestrian, cycle and vehicular) to the adjacent lands which are zoned for development and lands which may be zoned for development in the future*".

2.7.2.2 Maynooth Local Area Plan 2013 - 2019

The Maynooth Local Area Plan (LAP) 2013 – 2019 was amended and formally adopted in October 2018. This plan will remain extant prior to the adoption of the emerging Kildare County Development Plan 2023-2029, which is currently in draft. The LAP includes the proposed upgrades to the local and regional road network surrounding the subject site of the Proposed Development, as indicated on **Figure 2-15** below.

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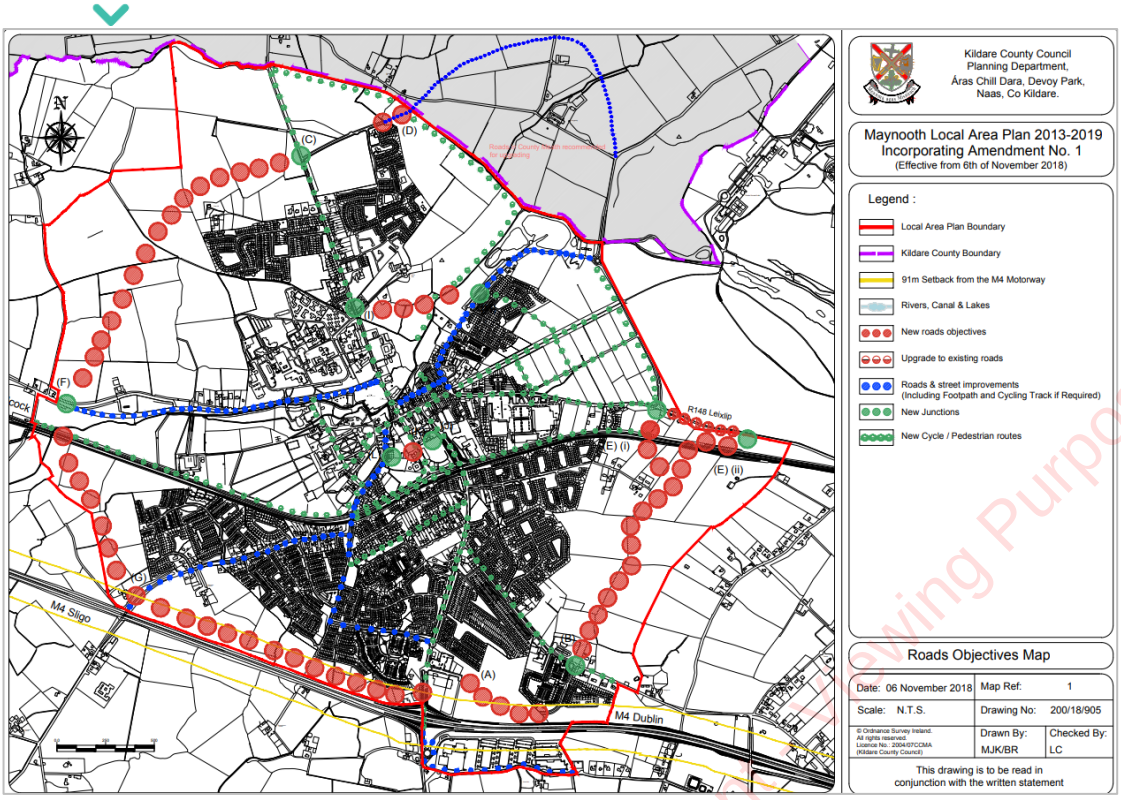

Figure 2-15: Roads Objective Map covering roads surrounding subject site. Source: Kildare County Council Maynooth Local Area Plan 2013-2019

Policy TR 1 of the LAP sets out that it is a policy of the Council "*To develop, maintain and improve as required, the local road network to ensure a high standard of road quality and safety in accordance with the requirements of this Plan and relevant legislation*".

Objective TRO 1 of the LAP sets out that it is an objective of the Council "*To facilitate the future construction of the following roads and in the interim protect these routes from development; …*

(b) Between the Moyglare Road (C) and the County Boundary (D) (only a small section of this road to the County Boundary has to be completed)

(d) Between the Kilcock Road (F) and the Moyglare Road (C)

(g) Between the Dunboyne Road (H) and the Moyglare Road (I)".

Section 7.5.4 of the LAP sets out that "*The Council will seek the provision of pedestrian access and linkages where opportunities arise as part of new developments*".

2.7.3 Draft Kildare County Development Plan 2023 – 2029

The emerging Kildare County Development Plan 2023-2029 is currently being prepared by the local planning authority and has recently completed its Draft stage, for which public consultation ended on 24th May 2022 and the Chief Executive's Report was subsequently published.

Relevant policies within this draft plan are not yet adopted and are potentially subject to change prior to the adoption of the emerging Development Plan 2023-2029 but are listed as follows for consideration.

TM P2 – "*Prioritise and promote the development of high-quality, suitable, safe and sustainable walking and cycling pathways and facilities, both inter-county, intra-county (in consultation with all relevant stakeholders including neighbouring local authorities) and within the towns and settlements of County*

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Kildare within a safe road/street environment that will encourage a shift to active travel that is accessible for all, regardless of age, physical mobility, or social disadvantage".

TM O17 – "*Ensure new development areas are fully permeable for walking and cycling at a minimum, public transport (where appropriate) and provide for filtered permeability for private vehicle access in accordance with the NTA Permeability Best Practice Guide in order to give a competitive advantage to active travel modes for local trip making*".

TM O25 – "*Ensure the provision of improved cycle and walking infrastructure linking Maynooth Town Centre, the Royal Canal Greenway, the train station, the proposed Maynooth Orbital Route and to Kilcock and Leixlip*".

TM O59 – "*Support and facilitate in conjunction with Meath County Council, private developers and landowners, the construction of the Maynooth Relief Road*".

Table 5.4 relating to Priority Road and Bridge Projects lists the deliver of the Outer Relief Road, Maynooth between the Moyglare and Dunboyne Roads as a priority project to be delivered.

TM O93 – "*Ensure that all developments allow for full connectivity (pedestrian, cycle and vehicular) to adjacent road networks and to adjacent lands which may be developed in the future*".

TM P8 – "*Ensure that streets and roads within the county are designed to balance placemaking and movement to, prioritise sustainable modes of transport and to provide a safe traffic calmed street environment in accordance with the principles set out in the Design Manual for Urban Roads and Streets (2019) while meeting the needs of road users of all ages and abilities.*"

TM 097 – "*Ensure that all streets and street networks are designed considering the hierarchy of users in Figure 5.8 above and includes the provision of high-quality walking and cycling infrastructure and traffic calming measures which may include speed ramps".*

TM P9 – "*Effectively manage and minimise the impacts of traffic in urban areas and prioritise the movement of pedestrians, cyclists and public transport particularly at key junctions, while maximising the efficient use of existing resources.*"

RE O16 – "*Co-ordinate the delivery of strategic infrastructure including pedestrian and cycle linkages within Maynooth and the Royal Canal Greenway, DART expansion and road linkages forming part of the Maynooth Outer Orbital Route in a manner which supports future development and pop-ulation growth*".

IN O14 – "*Maximise the use of existing capacity in wastewater services in the planning of new development and to ensure that full consideration is given to the level of investment required in the provision of wastewater services, particularly in environmentally sensitive areas, when zoning for new development*".

IN O15 – "*Ensure all new developments connect to public wastewater infrastructure where available*".

Further to the above, the Chief Executive's Report acknowledges under submission no. 488 (pages 139-140 of the report) that it is recommended by the Chief Executive a new objective, CSO 1.9, "*Prepare a Joint Local Area Plan for Mayooth and Environs in conjunction with Meath County Council*", is included in the emerging plan.

The Chief Executive's Report also recommends updates to relevant policies TM 025, TM O59, and Table 5.4 of the draft plan

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2.8 Summary of Compliance

The Proposed Development of sites 'A', 'B', 'C', the MOOR, Kildare Bridge works and Moyglare Bridge will comprise a new 3 storey Primary Care Centre, a 2 storey Nursing Home, approximately 20,633sqm commercial office space in 3 no. commercial office blocks extending between 3 and 5 storey's in height, 360 no. residential homes, a creche facility, a scout den and all associated and ancillary development, the construction of new accesses onto the R157 Dunboyne Road, the delivery of the Maynooth Outer Orbital Road (MOOR), car and cycle parking, three new pedestrian & cycle bridges and two new vehicular bridges and road improvements at the Kildare Bridge and the Moyglare Bridge, in both administrative boundaries of County Meath and County Kildare, provision of foul and surface water drainage, connection to potable water supply at Moyglare Bridge and Kildare Bridge and all other ancillary development works.

The relevant National, Regional and Local planning policies and objectives for both County Meath and County Kildare, are outlined above. These policies mainly relate to Economy, Employment, Social/Healthcare, Residential and Infrastructural development and it is considered that the proposed development is compliant with these referenced relevant policies.

2.9 Scoping and Consultation

2.9.1 Scoping Document

An informal EIAR scoping exercise was undertaken as part of the EIAR preparation process. Scoping is the process of determining the content, depth and extent of topics to be covered in the environmental information to be submitted to a competent authority for projects that are subject to an Environmental Impact Assessment (EIA). This process is conducted by contacting the relevant authorities and Non-Governmental Organisations (NGOs) with interest in the specific aspects of the environment likely to be affected by the proposal. These organisations are invited to submit comments on the scope of the EIAR and the specific standards of information they require. Comprehensive and timely scoping helps ensure that the EIAR refers to all relevant aspects of the proposed development and its potential effects on the environment. In this way, scoping not only informs the content and scope of the EIAR, it also provides a feedback mechanism for the proposed design itself.

A scoping document providing details of the application site and the Proposed Development, was prepared by MKO and circulated on 9th of August 2021 to the agencies, NGOs and other relevant parties listed in **Table 2-9** below.

MKO requested the comments of the relevant personnel/bodies in their respective capacities as consultees with regards to the EIAR process.

2.9.2 Scoping Responses

The scoping responses received to date are presented in Appendix 2-1.

Table 2-9 Scoping Consultees

No.	Consultee	Response
1.	An Taisce	No Response
2	Department of Agriculture, Food and the Marine	Response received 27/10/2021

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No.	Consultee	Response
		The department of agriculture responded to state that they had no comments or recommendations for the Proposed Development at this time.
3	Department of Environment, Climate and Communications	Refer to IFI and GSI responses below, both of which are branches of the Department of Environment. No further response received.
4	Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media	No Response
5	Department of Transport	Response received 01/09/2021 The department of transport had the following comment; *'Given the proximity of the Moygaddy sites to the Royal Canal Greenway and NTA plans for additional cycling and pedestrian facilities within Maynooth, it will be vital that the masterplan being developed includes significant provision for cycling and pedestrian access from the sites to Maynooth train station, the University and the Royal Canal Greenway and also significant provision for cycle parking within the sites'.*
6	Department of Housing, Local Government and Heritage	No Response
7	ESB Telecoms	No Response
8	EirGrid	No Response
9	Failte Ireland	Response Received on the 19th of August 2021. Fáilte Ireland issued 'EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects' which provides guidance for those conducting EIA and compiling an (EIAR, or those assessing EIARs, where the project involves tourism or may have an impact upon tourism.
10	Geological Survey of Ireland	Detailed Response received 27/08/2021 GSI make a number of recommendations which can be viewed in full under Appendix 2-1 of this report.
11	Health Service Executive	Detailed Response received 09/09/2021 HSE make a number of recommendations which can be viewed in full under Appendix 2-1 of this report.

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No.	Consultee	Response
12	Inland Fisheries Ireland	Detailed Response received 21/08/2021 IFI make a number of recommendations which can be viewed in full under Appendix 2-1 of this report.
13	Irish Water	No Response
14	Meath County Council– Planning Department	No Response
15	Meath County Council– Roads Department	No Response
16	Meath County Council – Environmental Department	No Response
17	Meath County Council – Heritage Officer	No Response
18	Kildare County Council– Planning Department	No Response
19	Kildare County Council– Roads Department	No Response
20.	Kildare County Council – Environmental Department	No Response
21	Kildare County Council – Heritage Officer	No Response
22	Office of Public Works	No Response
23	The Heritage Council	No Response
24	Transport Infrastructure Ireland (TII)	Detailed Response received 23/09/2021 TII make a number of recommendations which can be viewed in full under Appendix 2-1 of this report.

2.9.3 Pre-Planning Meetings with Meath County Council

2.9.3.1 Pre-Planning Meeting: Site A – Strategic Employment Zone

A pre-planning meeting was held with Meath County Council on 4th November 2021 to discuss the proposed development of Site A, which comprises the Strategic Employment Zone lands within Moygaddy, for which an office development is proposed.

This meeting tabled the following points for discussion:

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- **Overview and Planning Context**
- **Architectural Design**
- **Engineering and Roads**
- **Landscape Architecture**

2.9.3.2 Pre-Planning Meeting: Site B – Healthcare Facilities

A pre-planning meeting was held with Meath County Council on 16th September 2021 to discuss the proposed development of Site B, which comprises Community Infrastructure zoned lands within Moygaddy, for which a healthcare facility is proposed.

A brief presentation was given by the design team to the attendees of this meeting and the following items in relation to the proposed development were discussed:

- **Development Plan** – the (now adopted) Development Plan 2021-2027 was expected to be adopted in the coming weeks. The proposed development is reliant on the zoning change to G1.
- **Principle of Development** – Meath County Council agreed with the design team that the proposed development was, in principle, in accordance with the G1 zoning objective and any impeding application should include details as to the wider G1 zoning and proposed masterplan for the Moygaddy area.
- **Proposed Masterplan** – Any application for the proposed development should be cognisant with the proposed masterplan, the MOOR, Irish Water infrastructure and the phasing of all elements.
- **Contacts/Engagement** – The various subconsultants and inputs required for the application were discussed.
- **Uses** – Meath County Council requested that all complementary and ancillary uses proposed within the application are clearly set out in the application documentation and justified.
- **Public** – Meath County Council advised that the traffic generation and landscaping for the proposed development were likely to be points of submissions from the public.
- **MOOR** – the Maynooth Outer Orbital Road (MOOR) was discussed. A section of the MOOR will be constructed as part of the development, up to the new point of access.

2.9.3.3 Site C – SHD

2.9.3.3.1 *S.247 Pre-Planning Meeting: Site C – SHD*

A Stage 1 SHD s.247 pre-planning meeting was held with Meath County Council on Tuesday 2nd September 2021.

2.9.3.3.2 *Tripartite Meeting: Site C – SHD Application*

A Section 5 Pre-Application Consultation Tripartite Meeting was held with Meath County Council, Kildare County Council, An Bord Pleanála, and the applicant on 5th May 2022.

The following key items were discussed at the tripartite meeting:

1. Proposed Masterplan (MP 16) and Core Strategy
2. Design and Layout
3. Traffic and Transport
4. Drainage and Irish Water Submission

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5. Any Other Business

2.9.4 Pre-Planning Meetings with Kildare County Council

A pre-planning meeting was held with Kildare County Council on 23rd February 2022 for the purposes of discussing the proposed infrastructure developments.

This meeting discussed the proposed development elements which include a new pedestrian and cycle route, the utilities, services and waste water connection infrastructure and the proposed road and bridge connection infrastructure and all associated works.

2.10 Cumulative Impact Assessment

This EIAR, which includes a description of likely significant impacts of the project, includes an assessment of cumulative impacts that may arise. The factors considered in relation to cumulative effects include human beings, flora and fauna, soil, water, climatic factors, landscape, cultural heritage, and material assets.

The potential for cumulative impacts arising from the proposed development in combination with other projects has therefore been fully considered throughout this EIAR. This section of the EIAR provides an overview of other projects located within the wider area that have been considered within the cumulative impact assessments.

2.10.1 Methodology for the Cumulative Assessment of Projects

The potential for cumulative effects to arise from the proposed development was considered in the subject areas of human beings, flora and fauna, soil, water, climatic factors, landscape, cultural heritage, and material assets. To comprehensively consider potential cumulative impacts, the final section of each relevant section within this Environmental Report includes a cumulative impact assessment where appropriate.

The potential cumulative impact of the proposed development and other relevant developments has been carried out with the purpose of identifying what influence the proposed development will have on the surrounding environment when considered cumulatively and in combination with relevant permitted, proposed, and constructed projects in the vicinity of the proposed site.

The Cumulative Impact Assessments (CIA) of projects has four principle aims:

1. *To establish the range and nature of existing projects within the cumulative impact study area of the proposed cable connection.*
2. *To summarise the relevant projects which have a potential to create cumulative impacts.*
3. *To establish anticipated cumulative impact findings from expert opinions within each relevant field. Detailed cumulative impact assessments are included in each relevant section of the Environmental Report.*
4. *To identify the projects that hold the potential for cumulative interaction within the context of the proposed development and discard projects that will neither directly or indirectly contribute to cumulative impacts.*

Assessment material for this cumulative impact assessment was compiled on the relevant developments within the vicinity of the proposed development. The material was gathered through a search of the Meath County Council online Planning Register and the Kildare County Council online Planning Register, reviews of relevant Environmental Reports, or Environmental Impact Assessment Report

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(EIAR) documents, planning application details and planning drawings, and serves to identify past and future projects, their activities and their environmental impacts. These projects are summarised in **Section 2.10.2** below.

2.10.2 Projects Considered in Cumulative Assessment

The projects considered in relation to the potential for cumulative impacts and for which all relevant data was reviewed (e.g. individual EIS/EIAR's, layouts, drawings etc) include those listed previously above at **Section 2.3** are summarised below:

- **ABP – 314337** (Mariaville SHD) – 158 no. apartments, 260 no. student bedspace accommodation, creche and associated site works. Decision due: 30/11/2022.
- **ABP – 310865** (Dunboyne Road SHD) – 194 no. residential units (119 no. houses, 75 no. apartments). creche and associated site works. Granted Permission.
- **ABP – 301230** (Moyglare Road SHD) – Mixed use development of 462 no. dwellings, 483 no. student accommodation bedspaces, creche, cafe, gym and retail unit and link street with 1 no. pedestrian/vehicular bridge across the Lyreen River, new access junctions onto Moyglare Road and Dunboyne Road. Granted Permission.
- **P82019.08** (MERR) – Construction of 1.55km of carriageway, a bridge spanning the Royal Canal and Dublin to Sligo railway line, pedestrian and cycle facilities and a new junction on the Dublin Road (R148) and Dunboyne Road (R157). Granted Permission.
- **16/167** (Kildare CoCo) (Mariaville, Dunboyne Road) – Demolish dwelling and construct 34 no. dwellings, internal roads, new entrance and ESB Substation. Granted Permission.
- **16/585** (Kildare County Council) (NUI Maynooth) – Extension of Duration of 10/906: the construction of the North Campus Student Housing Complex, total floor area 13,063.92M2, comprising 77 student apartments (65 x 5 Bed Units, 6 x6 Bedroom Units, 6 x3Bedroom Duplex Units). Resident's Office Student Social Room, Retail Unit, Bicycle Store (3no) all arranged in 4 Courtyard Buildings ranging in height form 9,5,4,& 3 Storeys. Extension of Duration Granted Permission.
- **21/208** (Kildare County Council) (Maynooth GAA Club) – 12 no. 18m high lighting poles with floodlights and 32m2 pallisade fencing. Granted Permission.
- **21/350** (Kildare County Council) (Maynooth GAA Club) – 26 no. 6m high lighting poles with LED lights, 8 no. 8m high lighting poles, 2 no. rows of 1.2m high spectator fencing along western side of pitch, and 32m2 pallisade fencing. Granted Permission.
- **21/1108** (Kildare County Council) (Parklands Grove, Railpark) – The demolition of a habitable house and the construction of 40 No. houses and 36 No. apartments, 1 No. vehicular link with the approved Maynooth Eastern Ring Road and all associated and ancillary site development works. Granted Permission.

In addition to the above listed developments, this EIAR also considers the cumulative impact of the wider Maynooth Environs, which is zoned for a variety of developments, including further healthcare facilities, strategic employment zones and tourism, as outlined in **Figure 2-14** above. This wider area has been considered in the relevant chapters of this EIAR, where appropriate.

The potential for cumulative impacts arising from the proposed development and these projects have been set out in full in the relevant chapters of this EIAR, where appropriate. Detailed consideration of all potential cumulative impacts can therefore be found in the relevant sections of this EIAR.

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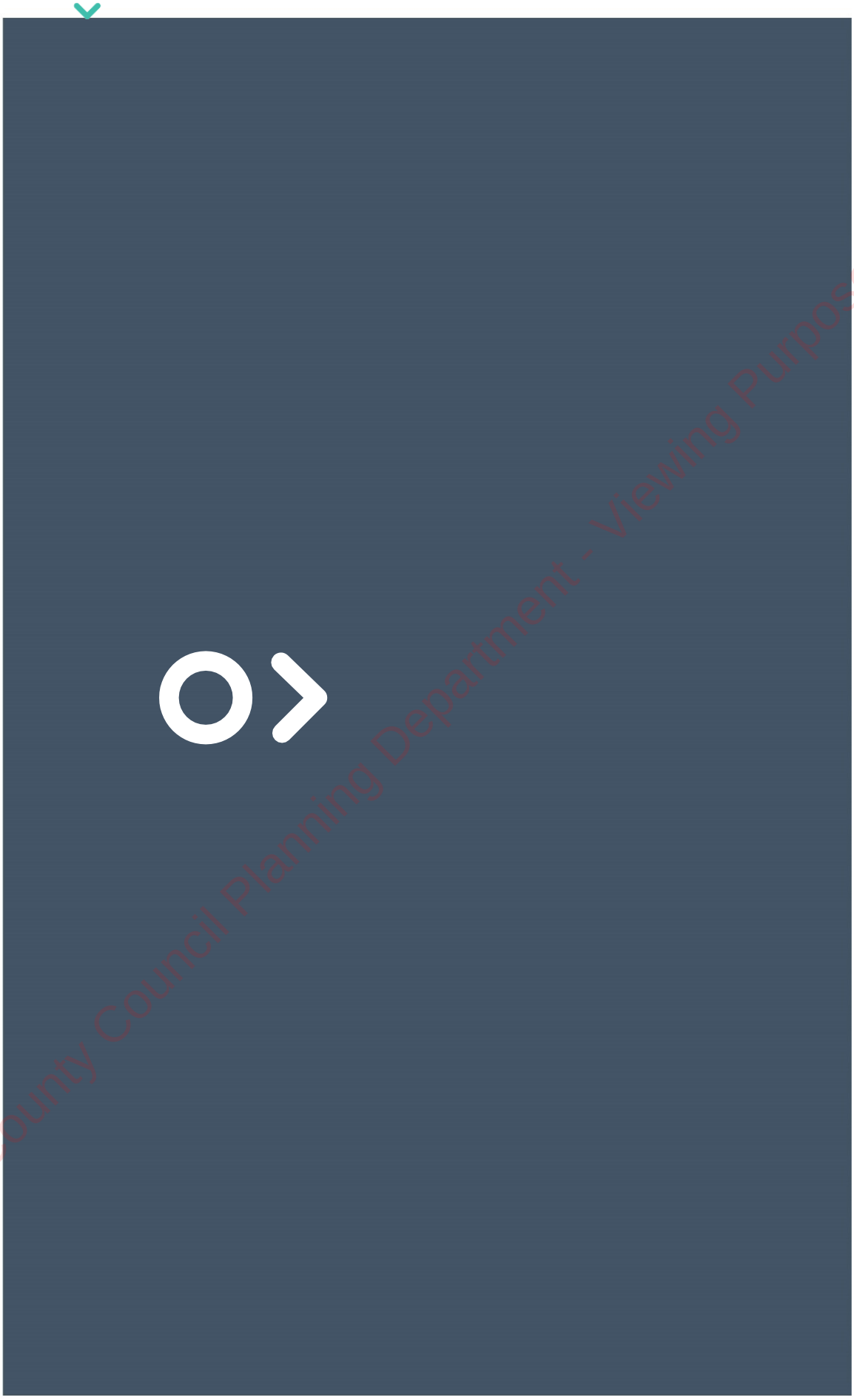

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3. CONSIDERATION OF REASONABLE ALTERNATIVES

3.1 Introduction

Article 5(1)(d) of Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (codification) as amended by Directive 2014/52/EU (the EIA Directive) requires that the Environmental Impact Assessment Report (EIAR) prepared by the developer contains *"a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment."*

Article 5(1)(f) of the EIA Directive requires that the EIAR contains *"any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected."*

Annex IV of the EIA Directive states that the information provided in an EIAR should include a *"description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects."*

This section of the EIAR contains a description of the site selection criteria and the reasonable alternatives that were considered for the Proposed Development, in terms of site layout and transport route options to the site. This section also outlines the design considerations in relation to the Proposed Development and indicates the main reasons for selecting the chosen option with regards to its environmental impacts.

The consideration of alternatives is an effective means of avoiding environmental impacts. As set out in the '*Guidelines on The Information to be Contained in Environmental Impact Assessment Reports'* (Environmental Protection Agency, 2022), the presentation and consideration of reasonable alternatives investigated is an important part of the overall EIA process.

It is important to acknowledge that although the consideration of alternatives is an effective means of avoiding environmental impacts, there are difficulties and limitations when considering alternatives. Indeed, as is clear from the provisions of the EIA Directive itself, the requirement is to consider "reasonable alternatives" which are relevant to the project and its characteristics. In general terms, issues such as hierarchy, non-environmental factors and certain site-specific issues may also be relevant to the consideration of reasonable alternatives by the developer.

Hierarchy

EIA is concerned with projects. The Environmental Protection Agency's guidelines (EPA, 2022) state that in some instances neither the applicant nor the competent authority can be realistically expected to examine options that have already been previously determined by a higher authority, such as a national plan or regional programme for infrastructure.

Non-environmental Factors

EIA is confined to the potential significant environmental effects that influence consideration of alternatives. However, other non-environmental factors may have equal or overriding importance to the

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developer of a project, for example project economics, land availability, engineering feasibility or planning considerations.

Site-specific Issues

The EPA guidelines state that the consideration of alternatives also needs to be set within the parameters of the availability of the land, i.e., the site may be the only suitable land available to the developer, or the need for the project to accommodate demands or opportunities that are site-specific. Such considerations should be on the basis of alternatives within a site, for example design and layout.

3.2 Determination of Proposed Development

A comprehensive proposed masterplan for the entire site has been developed, setting out proposals for buildings, spaces and a movement and land-use strategy. The **'Proposed Moygaddy Masterplan'** comprises four main parcels of land, currently intended to be developed as follows:

- **Site A: Strategic Employment Zone**, as per Meath County Development Plan (CDP, 2021-2027) and Maynooth Environs Local Area Plan (LAP, see Section 3 of Scoping Document for further details). Proposed to be developed as a Biotechnology & Life Sciences Campus. The initial planning application in this area will be for 3 No. standalone office buildings, to be submitted to Meath County Council.
- **Site B: Community Infrastructure Use**, as per Meath CDP (2021-2027) and Maynooth Environs LAP. It is envisaged that the initial planning application within this area will comprise a Nursing Home and Primary Care Centre, to be submitted to Meath County Council. A separate, future planning application is also envisaged for a new public hospital on an adjoining site in collaboration with the HSE / Sláintecare.
- **Site C: Residential Use**, as per Meath CDP (2021-2027) and Maynooth Environs LAP. It is intended that a Strategic Housing Development planning application will be submitted to An Bord Pleanála for the first phase of residential development within this area. A creche/childcare facility and public park will also be included as part of the SHD application.
- **Site D: Tourism / Community /Amenity Use**, as per as per Meath CDP (2021-2027) and Maynooth Environs LAP. It is intended that a hotel, sport and leisure facilities, local retail and a cultural heritage centre will be delivered on this site, to be submitted to Meath County Council as part of a separate, future planning application.

Sky Castle Ltd. intends to submit to a total of six planning applications as part of the Moygaddy Mixed Use Development (henceforth referred to as the Proposed Development). A total of three planning applications will be submitted to Meath County Council as the competent authority. The First planning application seeks to provide a Strategic Employment Zone, the second planning application for Healthcare Facilities which includes a Nursing Home and Primary Care Centre, and the third planning application for the delivery of the proposed Maynooth Outer Orbital Road (MOOR).

A planning application for a Strategic Housing Development (SHD) will be submitted to An Bord Pleanála under the Strategic Housing Provisions of the Planning and Development (Housing) and Residential Tenancies Act, 2016.

There will also be two separate planning applications submitted to Kildare County Council for shared infrastructure and proposed road services and utilities connection to Maynooth town in County Kildare. One planning application to Kildare includes a proposed pedestrian / cycle bridge adjacent to the existing Kildare Bridge, as well as a proposed wastewater connection to the Maynooth Municipal Wastewater Pumping Station to the southeast of the Proposed Development. The other planning application to be submitted to Kildare County Council is located to the southwest of the Proposed Development for the provision of an integral single span bridge over the River Rye Water with

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associated flood plain works and embankments, as well as services and utilities connections in county Kildare.

MKO have also prepared an Appropriate Assessment Screening Report and a Natura Impact Statement (NIS) for the Proposed Development.

The current statutory planning policy document for the subject lands is the Maynooth Environs Local Area Plan 2013-2019 (MLAP), which is incorporated into the Meath County Development Plan 2021-2027. The plan sets out the zoning and other specific objectives for all lands within the Maynooth Environs area of Co. Meath. The land use zonings for the MLAP are also reflected in the Kildare County Development Plan. The subject lands have a mix of land use zonings as Figure 3-1 indicates below.

The Proposed Development lands are located within the MLAP lands which are zoned for Strategic Employment, Community Infrastructure, Tourism, New Residential and High Amenity. The current land zoning and Proposed Distributor Road under the MLAP have been key facilitators in the design process for the Proposed Development at Moygaddy.

The route alignment of the proposed MOOR has been heavily informed by the Part 8 Planning Application that was advanced previously by Meath County Council for the Maynooth Outer Orbital Route (P8/16003). Meath County Council decided to proceed with the proposed road scheme in 2016. However, the Part 8 scheme was subsequently withdrawn by Meath County Council.

The proposed mixed-use development at Moygaddy has been designed in compliance with the policies and objectives of the Meath County Development Plan. The Maynooth Environs Local Area Plan, which is set out in the Meath County Development Plan 2021-2027, includes the following policy objectives relevant to the Proposed Development at Moygaddy;

Table 3-1 Meath County Development Plan 2021-2027 Relevant Policies and Objectives

Policy Objective	Guidance/Policy Requirement
MAY POL 1	To prepare in conjunction with Kildare County Council a joint Local Area Plan for Maynooth, over the period of the Plan.
MAY POL 2	To ensure that the development of the Maynooth Environs is accommodated in an environmentally sensitive manner that will: 1. Create a centre of excellence for innovation and employment; 2. Protect the existing natural environment and built heritage and utilise it to frame new development, and; 3. Build a distinctive and attractive mixed-use place to work and live.
MAY POL 3	To provide for high technology / biotechnology industries/medical uses inclusive of associated advanced manufacturing, office, research and development uses in a high-quality campus style environment on the strategic employment lands.
MAY OBJ 1 (Master Plan 1):	It is an objective of the Planning Authority to require the submission with any application for development of lands at Moygaddy for a Master Plan for the prior written agreement of the Executive of the Planning Authority which shall address the following:

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Policy Objective	Guidance/Policy Requirement
	1) A Design Statement outlining the evolution of the design process for the proposed development. An emphasis on exemplar sustainable design and aesthetic quality shall be required 2) Proposals for the accessing of lands which shall adhere to the permitted Part VIII realignment of the junction of the R157 Regional Road and Moygaddy Road. 3) Proposals providing for the delivery of the Maynooth Outer Relief Road which shall be developer driven in tandem with the overall development; 4) Proposals for piped water services to be agreed with Irish Water compliant with any existing consents in place; 5) Mobility Management Plan for the development. This Plan shall be to the fore in establishing the agreed quantum of employees which can be accommodated within individual locations predicated on maximising public transport opportunities and the use of innovation in reducing associated carbon footprint. 6) Urban design and landscape design statement. Any development within the subject lands shall be subject to compliance with the requirements of the Habitats Directive and shall be phased with the delivery of the MOOR in Phase 1 of the development.
MAY OBJ 4	To support and facilitate in conjunction with Kildare County Council and private developers and landowners, the construction of the Maynooth Outer Orbital Route.
MAY OBJ 5	To require that the Maynooth Outer Orbital Route connects with the MOOR being delivered in the administrative area of Kildare County Council. Said route shall incorporate the construction of a sewer and ring main linking the sewer and trunk main in the Dublin Road to the residential development in the Mariavilla area.
MAY OBJ 6	To ensure the provision of improved cycle and walking connections to Maynooth Town Centre.
MAY OBJ 7	To upgrade the R157 between Kildare Bridge and Offaly Bridge.
MAY OBJ 8	To require the implementation of cycle lanes and associated cycle infrastructure upgrades as identified within the Greater Dublin Area Cycle Network Plan, in the area in partnership with the National Transport Authority and other relevant stakeholders.
MAY OBJ 10	To require that any development in the Maynooth Environs respects the built and natural heritage of the area, its landscape quality, protected structures, historic demesne, archaeological heritage, natural heritage and general landscape character.
MAY OBJ 11	To ensure all development in the area has no negative impact on the Rye Water Valley/Carton SAC site or on the environmental characteristics of the area including woodland, rivers and tributaries.
MAY OBJ 13	To facilitate the provision of community facilities including a hospital and/or associated educational/research and residential facilities.
MAY OBJ 14	To promote a high standard of architectural design, and quality of materials utilised throughout the Development Framework area, that is appropriate in scale, and form to its location.

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The Proposed Development has been designed in consideration of the Maynooth Environs Local Area Plan and Meath and Kildare County Development Plan policies and objectives, including zoned lands for Moygaddy as indicated in Figure 3-1 below. The site boundaries for the 6 no. planning applications included as part of the Proposed Development are shown in Figure 3-2 below.

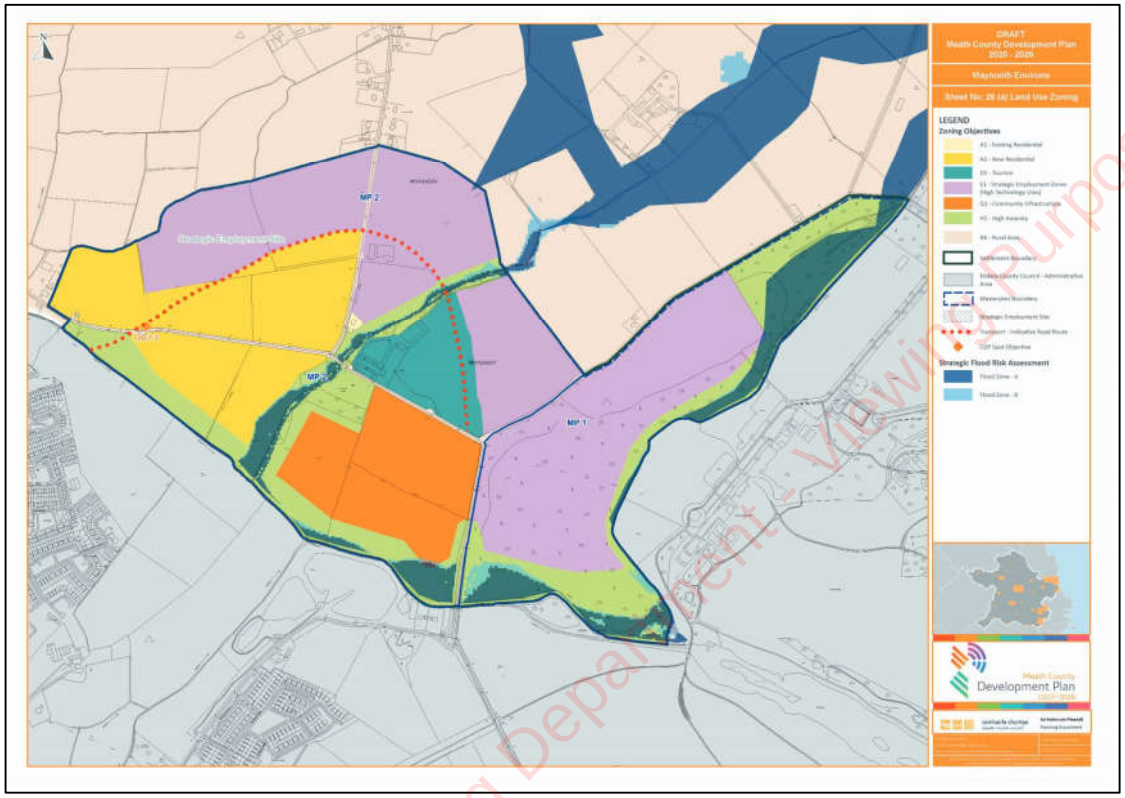

Figure 3-1 Land Use Zoning Map for Maynooth Environs (Meath County Development Plan 2021-2027)

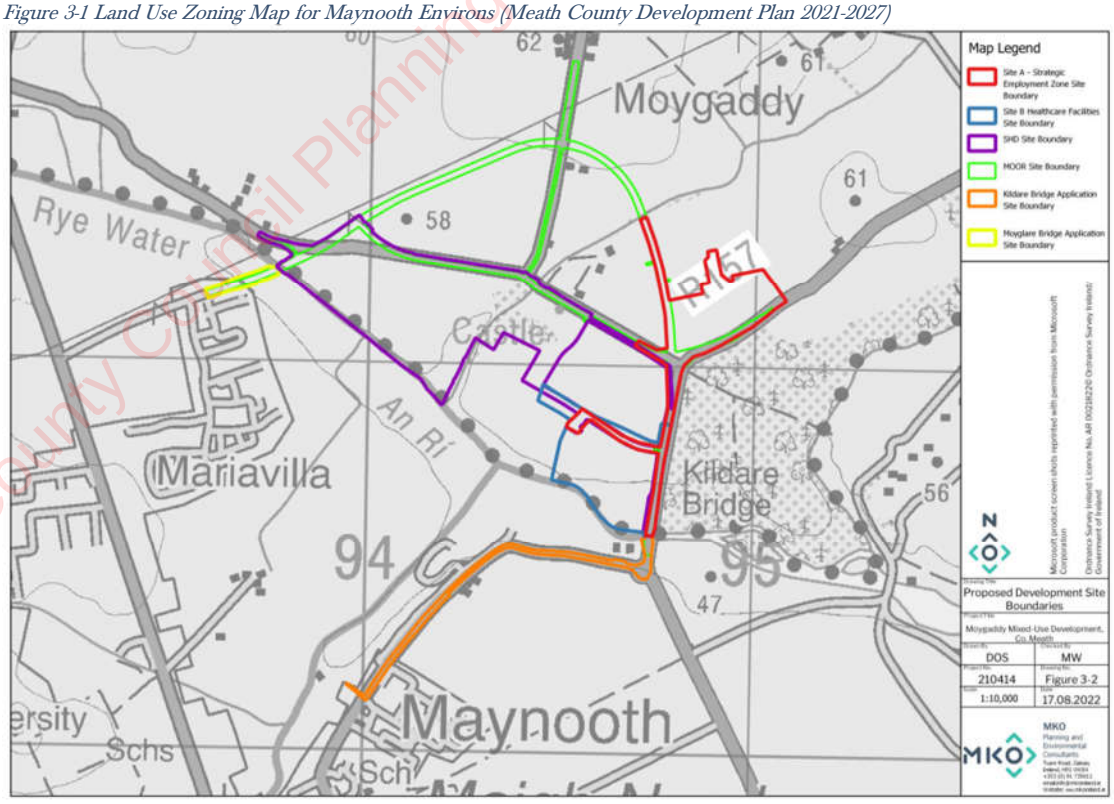

Figure 3-2 Proposed Development Site Boundaries

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The site selection and design for the Proposed Development was an iterative process which took account of all site constraints and the distances to be maintained between infrastructure from ecological constraints, houses, roads, watercourses, etc. As information regarding the site of the Proposed Development was compiled and assessed, the proposed layout has been revised and amended to take account of the physical constraints of the site and the requirement for buffer zones and other areas in which infrastructure could not be located. The final site selection provides the optimum location for site infrastructure, with ecological and environmental constraints at the forefront in the selection process.

3.3 Consideration of Alternatives

3.3.1 Methodology

The EU Guidance Document (EU, 2017) on the preparation of EIAR outlines the requirements of the EIA Directive and states that, in order to address the assessment of reasonable alternatives, the Developer needs to provide the following:

- A description of the reasonable alternatives studied; and
- An indication of the main reasons for selecting the chosen option with regards to their environmental impacts.

There is limited European and National guidance on what constitutes a 'reasonable alternative' however the EU Guidance Document (EU, 2017) states that reasonable alternatives "*must be relevant to the proposed project and its specific characteristics, and resources should only be spent assessing these alternatives".*

The guidance also acknowledges that "*the selection of alternatives is limited in terms of feasibility. On the one hand, an alternative should not be ruled out simply because it would cause inconvenience or cost to the Developer. At the same time, if an alternative is very expensive or technically or legally difficult, it would be unreasonable to consider it to be a feasible alternative".*

The current EPA Guidelines (EPA, 2022) state that "*It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account is deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required."*

Consequently, taking consideration of the legislative and guidance requirements into account, this chapter addresses alternatives under the following headings:

- 'Do Nothing' Alternative;
- Alternative Locations;
- Alternative Layouts;
- Alternative Designs; and
- Alternative Mitigation Measures.

Each of these is addressed in the following sections.

In considering a mixed-use development on already zoned lands, given the intrinsic link between layout and design, the two will be considered together in this chapter.

3.3.2 'Do-Nothing' Option

If the Proposed Development were not to proceed, no changes would be made to the current land-use practice. The site would continue to be managed under the existing farming and agricultural practices and the environmental impact of this is considered negative in the context of the EIAR. The potential

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for additional investment in infrastructure, housing and employment in the area in relation to the construction and operation of the Proposed Development would be lost. It is considered that the 'Do-Nothing' impact would be permanent, negative and slight as the Proposed Development lands are already zoned for Strategic Employment, Community Infrastructure, Tourism, New Residential and High Amenity.

3.3.3 Alternative Sites/Strategic Site Selection

It is critical that the most suitable layout for the Proposed Development was chosen. Sites selected for development must be suitable for consideration under a number of criteria, such as:

- Planning Policy Context;
- Low population density preferred;
- Potential for impact on Designated sites;

Planning policy, population density, designated sites and ecological and environmental constraints were all crucial considerations as part of the selection of optimum site. If the developer was unable to utilise the lands at Moygaddy, they would envisage the need to develop another (potentially greenfield and unzoned lands) site for the Proposed Development. The Proposed Development has been designed in consideration with local planning policy objectives and the low population density of Moygaddy, proximity to Maynooth town and delivery of the Maynooth Orbital Outer Relief (MOOR) Road and construction of zoned lands as key facilitators. Alternative sites or locations on unzoned lands were not considered as a result.

The below sections have assessed all alternatives considered in respect to the Proposed Development.

3.3.4 Alternative Infrastructure Layout and Design

The design of the Proposed Development has been an informed and collaborative process from the outset, involving the designers, developers, engineers, landowners, environmental, hydrological and geotechnical, archaeological specialists and traffic consultants. The aim being to reduce potential for environmental effects while designing a project capable of being constructed and viable.

Throughout the preparation of the EIAR, the layout of the Proposed Development has been revised and refined to take account of the findings of all site investigations, which have brought the design from its first initial layout to the current proposed layout. The design process has also taken account of the recommendations and comments of the relevant statutory and non-statutory organisations, the local community and local authorities as detailed in Section 2.9 of Chapter 2 in this EIAR.

3.3.4.1 Constraints Mapping

The constraints mapping process involves the placing of buffers around different types of constraints so as to identify clearly the areas within which no development works will take place. The size of the buffer zone for each constraint has been selected on a highly precautionary and conservative basis and incorporated into the design. As outlined above, the recommendations and comments of the relevant statutory and non-statutory organisations, the local community and local authorities as detailed in Section 2.9 of Chapter 2 in this EIAR, have been considered in selecting the constraints buffer to be applied. Specifically Inland Fisheries Ireland recommended a 10m buffer between the Proposed Development and adjacent watercourses.

The constraints map for the site, as shown in Figure 3-3, was produced following a desk study of all site constraints.

- Residential dwellings plus 30-metre buffer achieved from infrastructure;
- Natura 2000 sites plus 200-metre buffer;

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- Natural Heritage Areas (NHAs);
- Watercourses plus 25-metre buffer from infrastructure (excluding, watercourse crossings, road upgrades and drainage infrastructure);
- Archaeological Sites or Monuments (RMP and/or NIAH) plus 20-metre buffer.

Facilitators at the site build on the existing advantages and include the following:

- Available lands for development;
- Separation distance from third-party dwellings;
- Local Planning Policy;
- Existing access points and onsite road infrastructure;
- Limited extent of constraints as detailed above.

The inclusion of the constraints on a map of the study area allows for identification of suitable areas for the Proposed Development. An initial layout is then developed to take account of all the constraints mentioned above and their associated buffers.

Following the mapping of all known constraints, detailed site investigations were carried out by the project team. The ecological assessment of the site encompassed habitat identification and mapping and surveying of the site for flora and fauna, as described in Chapter 6 of this EIAR.

The hydrological and geotechnical investigations of the site examined the proposed locations for excavation works, road upgrades and other components of the Proposed Development. A walkover of the Proposed Development infrastructure was also undertaken by a project archaeologist to identify any additional constraints from the desk study. Where specific areas were deemed as being unsuitable for the siting of the Proposed Development infrastructure, alternative locations were proposed and assessed, taking into account the areas that were already ruled out of consideration.

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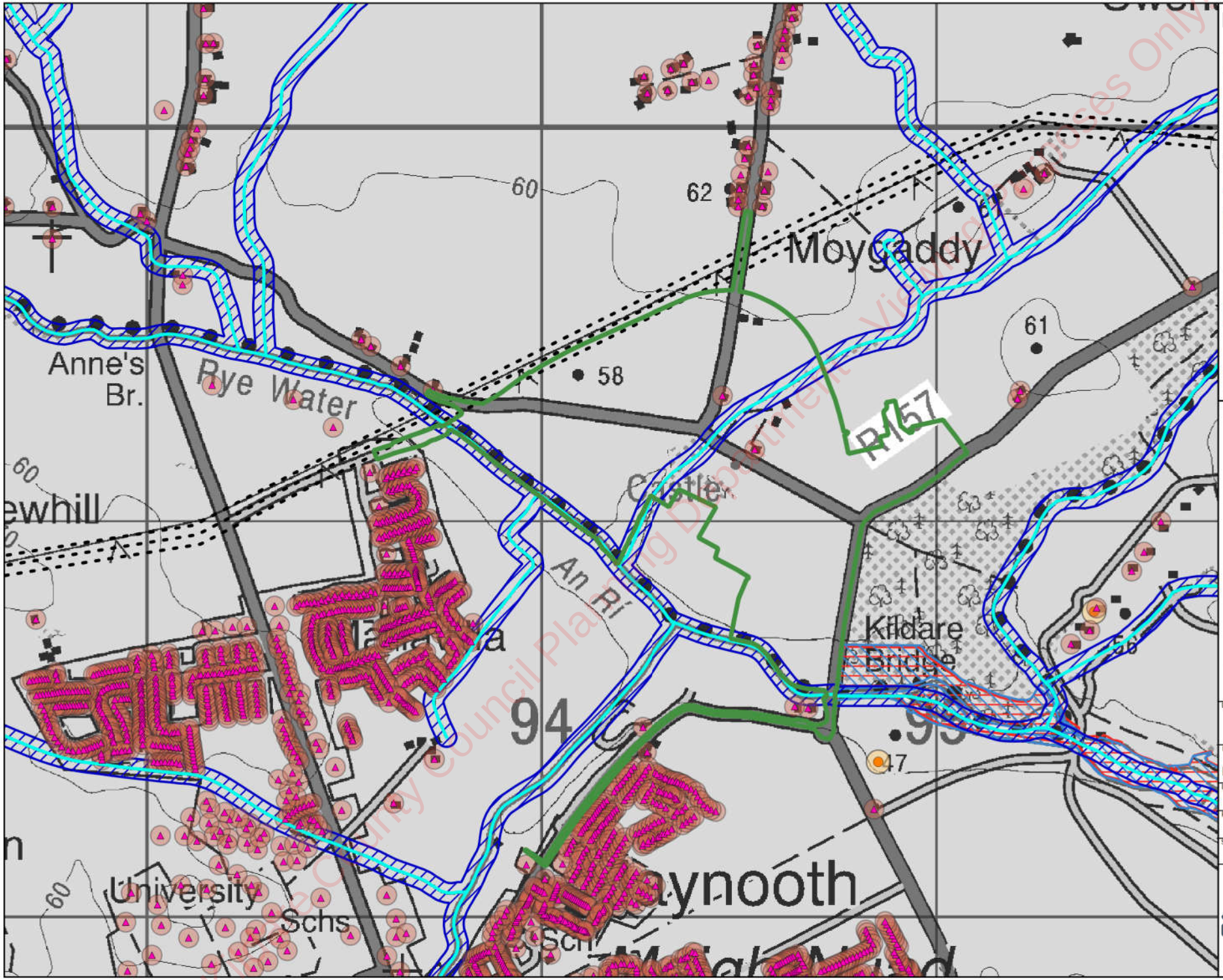

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Map Legend

- EIAR Site Boundary
- Dwelling
- 30m Dwelling Buffer
- Powerlines (25m Buffer)
- Watercourses
- Watercourses 25m Buffer

Protection Areas

- pNHA
- SAC
- National Monument
- 30m National Monument

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N

Drawing Title

Constraints Map

Project Title	Moygaddy Mixed Development
Drawn By: DOS	Checked By: MW
Project No.: 210414	Figure 3-3
Scale: 1:12,500	Date: 01.09.2022

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

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3.3.4.2 Proposed Development Iterations

The final Proposed Development layout takes account of all site constraints and the distances to be maintained between infrastructure and houses, roads, watercourses etc. The layout is based on the results of all site investigations that have been carried out during the EIAR process. As information regarding the site of the Proposed Development was compiled and assessed, the proposed layout has been revised and amended to take account of the physical constraints of the site and the requirement for buffer zones and other areas in which infrastructure could not be located. The EIAR and project design was an iterative process, where findings at each stage of the assessment were used to further refine the design, always with the intention of minimising the potential for environmental impacts.

The development of the final layout of the Proposed Development has resulted following feedback from the various studies and assessments carried out.

3.3.4.2.1 *Proposed Moygaddy Masterplan Area and Land Use Zoning*

As outlined in Section 3.2 above, the lands at the Proposed Development are incorporated into the proposed Moygaddy Masterplan area which reflects the existing land use zoning set out in the Maynooth Environs Local Area Plan 2013-2019 (MLAP), which is incorporated into the Meath County Development Plan 2021-2027. The initial proposed Moygaddy Masterplan area was envisaged by the applicant as shown in Figure 3-4 below and considered the previous Part 8 proposal on the MOOR as those designs have informed the current design of the MOOR. The proposed non-statutory Moygaddy Masterplan was developed prior to finalising the Proposed Development but is a continuously evolving plan for the Moygaddy lands.

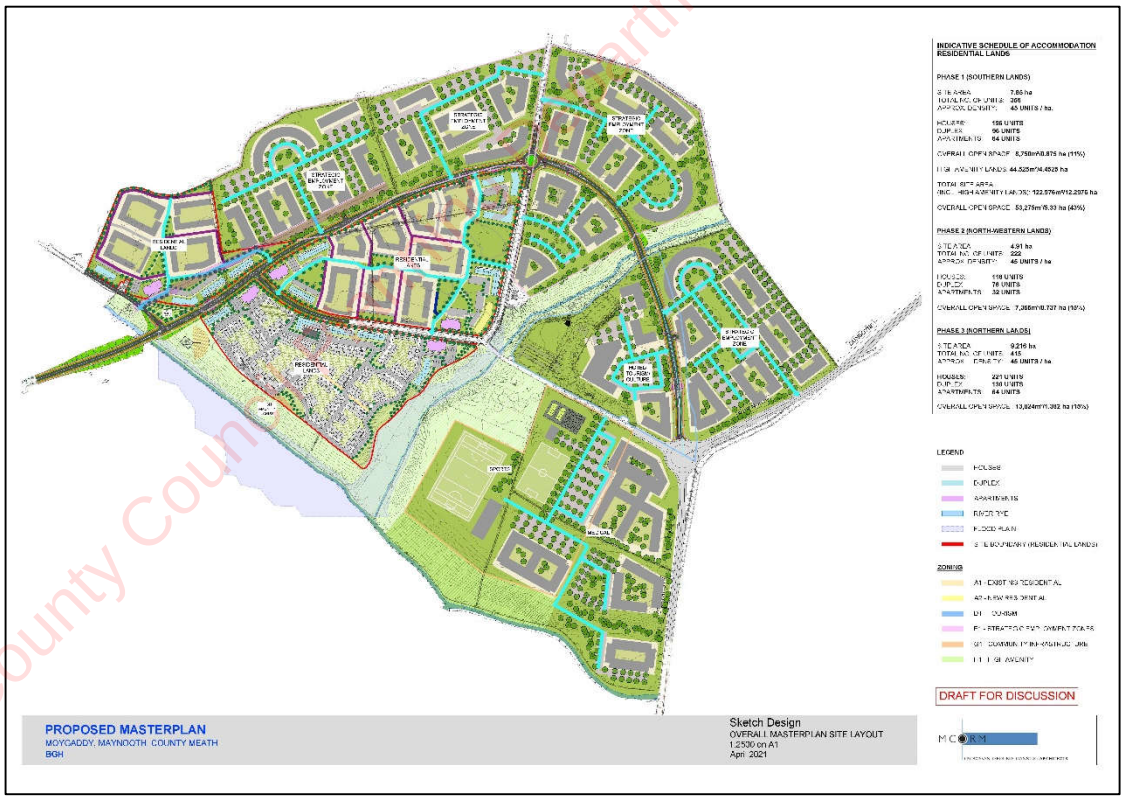

Figure 3-4 Initial proposed Moygaddy Masterplan

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3.3.4.2.2 Initial Site Layouts

Site A

During the optimisation of the site layout, there were a number of iterations and reviews to the Site A study area. The proposed Site A study area, originally included for a much larger area, which initially followed the existing field boundary. The initial layout for Site A included for 11 no. office building blocks, internal access roads and car parking areas, see Figure 3-5 below.

As previously discussed, iterations to the proposed section of MOOR and road upgrades works for the existing R157 regional road and L2214-3 local road were also considered and progressed throughout the design process for Site A. As can be seen in Figure 3-5 below the original road design included for a new roundabout at the existing junction between the R157 and L2214-3, which was subsequently replaced by a proposed crossroad junction as a safer more viable alternative.

Figure 3-5 Initial Site A Layout

Site B

The proposed Site B study area initially followed the existing field boundary. The initial layout for Site B included the proposed nursing home and primary care centre buildings, as well as access roads and car parking areas, but did not include the proposed onsite pumping station, see Figure 3-6 below.

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Figure 3-6 Initial Site B Layout

Site C

During the optimisation of the site layout, there were a number of iterations and reviews to the Site C study area. The proposed Site C study area originally occupied a similar area, with the exception being the location of the proposed creche and childcare facilities which were originally located to the north of the L22143 Local Road, directly adjacent to and northeast of Moygaddy House. The initial layout for Site C included for 381 no. residential units, a creche, public park, internal access roads and car parking areas, see Figure 3-7 below.

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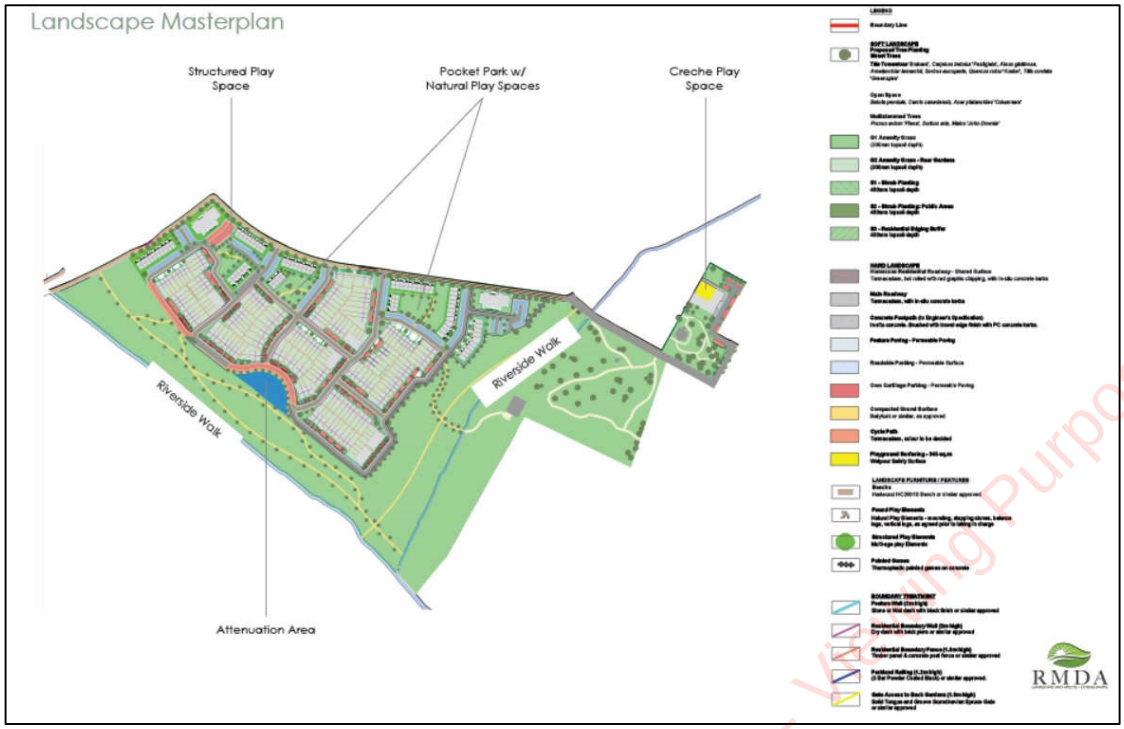

Figure 3-7 Initial Site C Layout

MOOR

During the optimisation of the MOOR site layout, there were a number of iterations and reviews to the MOOR study area. The design of the proposed MOOR has been heavily informed by the Part 8 Planning Application by Meath County Council for the Maynooth Outer Orbital Route (P8/16003). The proposed MOOR study area originally occupied a similar area, with the exception being the upgrade works north of the Kildare Bridge along the R157 Regional Road and the upgrade of the L22143 Local Road, directly adjacent to the Moygaddy House. The original road design included for a new roundabout at the existing junction between the R157 and L2214-3, which was subsequently replaced by a proposed crossroad junction as a safer more viable alternative. See Figure 3-8 below.

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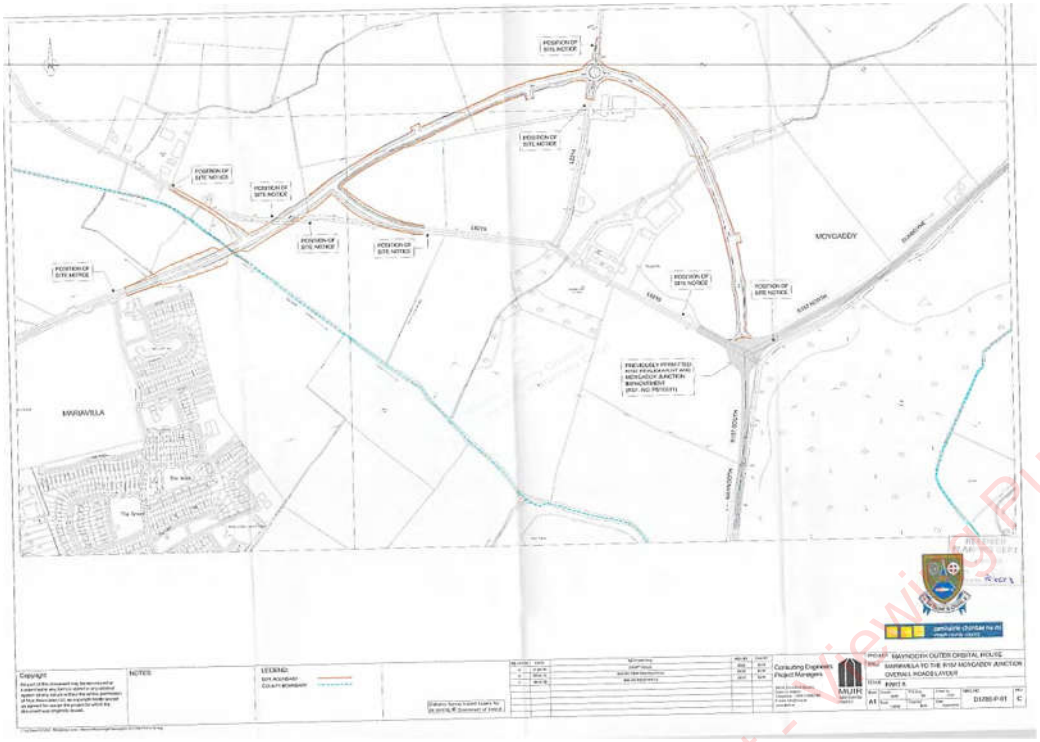

Figure 3-8 Initial MOOR Layout

Kildare Bridge Planning Application

During the optimisation of the Kildare Bridge site layout the part 8 Maynooth Outer Orbital Road proposal was considered and impacted the final Kildare Bridge design. As the Kildare Bridge application includes a section of the MOOR and any changes to the design of the MOOR were transferred across to the Kildare Bridge application.

Moyglare Bridge Planning Application

During the optimisation of the Moyglare Bridge site layout the part 8 Maynooth Outer Orbital Road proposal was considered and impacted the final Moylgare Bridge design. As the Moyglare Bridge application includes a section of the MOOR and any changes to the design of the MOOR were transferred across to the Moyglare Bridge application.

3.3.4.3 Progression of Site Layout Design

In the course of the progression of the site layout design, consideration was given to a number of factors, which all fed into various iterations of the design process. Consideration was given primarily to the creation of a 'live, work, play' area which set the tone for the wider proposed Masterplan. Emphasis was placed on selecting appropriate locations for the creche, so that it could serve both the new Residential community, and also the new strategic employment zone, and the healthcare facilities zone. Similar to this, emphasis was placed on selecting the appropriate location in which to place the Leisure and Cultural Tourism development, which forms part of the proposed Masterplan.

Consideration also was given to how best to accommodate Irish Water's strategic infrastructure investment into the new High Pressure sewer line upgrade from Maynooth to Leixlip.

Integration of all of the High Amenity areas into the Residential, Employment and Medical uses envisaged by the proposed Masterplan so that a fully integrated networks of blueways and greenways

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could be created throughout the site. Similarly, consideration was given to the enhancement of pedestrian and cycle connectivity throughout the wider proposed Masterplan site to assist with permeability and to promote a modal shift away from vehicular transport. Riparian zones and high amenity areas throughout the site were also used to create an attractive network of interconnected walkways that traverse the proposed masterplan site.

3.3.4.3.1 Site A – Strategic Employment Zone

Once the initial proposed Masterplan area and Proposed Development design was confirmed, site investigations and surveys were undertaken by the project team to finalise the layout. This involved environmental, ecological, geological, hydrological and archaeological surveys. Assisted noise monitoring was also undertaken as well as traffic counts and future modelling.

- Ecological Constraints (Badger Setts and Otter Holts) plus 30-metre buffer;
- Hydrological Constraints (Watercourses) plus 25-metre buffer;
- Existing Infrastructure (Powerlines) plus 25-metre buffer;
- National Monuments plus 30-metre buffer
- Existing Dwellings plus 25-metre buffer
- Proposed Irish Water High Pressure Sewer Line

Taking into account constraints in the area and based on feedback from the design team, it was determined that the proposed final site layout would be the most suitable layout when constraints and facilitating factors were considered.

3.3.4.3.2 Site B – Healthcare Facilities

Once the initial proposed Masterplan area and Proposed Development design was confirmed, site investigations and surveys were undertaken by the project team to finalise the layout. This involved environmental, ecological, geological, hydrological and archaeological surveys. Assisted noise monitoring was also undertaken as well as traffic counts and future modelling.

- Ecological Constraints (Badger Setts and Otter Holts) plus 30-metre buffer;
- Proposed Irish Water High Pressure Sewer Line
- Hydrological Constraints (Watercourses) plus 25-metre buffer;
- Historic Flood Zone mapping – development excluded from Flood Zone A & B
- Hedgerow protection

Taking into account constraints in the area and based on feedback from the design team, it was determined that the proposed final site layout would be the most suitable when constraints and facilitating factors were considered.

3.3.4.3.3 Site C – Strategic Housing Development

Once the initial proposed Masterplan area and Proposed Development design was confirmed, site investigations and surveys were undertaken by the project team to finalise the layout. This involved environmental, ecological, geological, hydrological and archaeological surveys. Assisted noise monitoring was also undertaken as well as traffic counts and future modelling.

- Ecological Constraints (Badger Setts and Otter Holts) plus 30-metre buffer;
- Hydrological Constraints (Watercourses) plus 25-metre buffer;
- National Monuments plus 30-metre buffer
- Proposed Irish Water High Pressure Sewer Line
- Historic Flood Zone Mapping – development excluded from Flood Zone A & B

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Taking into account constraints in the area and based on feedback from the design team, it was determined that the proposed final site layout would be the most suitable when constraints and facilitating factors were considered.

3.3.4.3.4 MOOR – Maynooth Outer Orbital Road

Once the initial proposed Masterplan area and Proposed Development design was confirmed, site investigations and surveys were undertaken by the project team to finalise the layout. This involved environmental, ecological, geological, hydrological and archaeological surveys. Assisted noise monitoring was also undertaken as well as traffic counts and future modelling.

- Ecological Constraints (Badger Setts and Otter Holts) plus 30-metre buffer;
- Hydrological Constraints (Watercourses) plus 25-metre buffer;
- Existing Infrastructure (Powerlines) plus 25-metre buffer;
- National Monuments plus 30-metre buffer
- Existing Dwellings plus 25-metre buffer
- Proposed Irish Water High Pressure Sewer Line

Taking into account the constraints in the area and based on the previous part 8 MOOR application, the most suitable route for the MOOR was considered. The preferred option contains 2 no. road bridges crossing the Rye Water River and the Blackhall Little Stream.

3.3.4.3.5 Kildare Bridge Application

Once the initial proposed Masterplan area and Proposed Development design was confirmed, site investigations and surveys were undertaken by the project team to finalise the layout. This involved environmental, ecological, geological, hydrological and archaeological surveys. Assisted noise monitoring was also undertaken as well as traffic counts and future modelling.

- Ecological Constraints (Badger Setts and Otter Holts) plus 30-metre buffer;
- Hydrological Constraints (Watercourses) plus 25 metre buffer
- Existing Infrastructure (Powerlines) plus 25-metre buffer;
- National Monuments plus 30-metre buffer
- Existing dwellings plus 25 metre buffer
- Proposed Irish Water High Pressure Sewer Line

Taking into account constraints in the area and based on feedback from the design team, it was determined that the proposed final site layout would be the most suitable when constraints and facilitating factors were considered.

The Rye Water River located at the bridge is categorized as Eroding upland River. The design of the development was realigned to facilitate this. Appropriate mitigation has been detailed in Chapter 6 of this EIAR.

3.3.4.3.6 Moyglare Bridge Application

Once the initial proposed Masterplan area and Proposed Development design was confirmed, site investigations and surveys were undertaken by the project team to finalise the layout. This involved environmental, ecological, geological, hydrological and archaeological surveys. Assisted noise monitoring was also undertaken as well as traffic counts and future modelling.

- Ecological Constraints (Badger Setts and Otter Holts) plus 30-metre buffer;
- Hydrological constraints (Watercourses) plus 25m buffer
- Existing Infrastructure (Powerlines) plus 25-metre buffer;
- National Monuments plus 30-metre buffer
- Existing dwellings plus 25 metre buffer

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- Proposed Irish Water High Pressure Sewer Line

Taking into account constraints in the area and based on feedback from the design team, it was determined that the proposed final site layout would be the most suitable when constraints and facilitating factors were considered.

The Rye Water River located at the bridge is categorized as Eroding upland River. The design of the development was realigned to facilitate this. Appropriate mitigation has been detailed in Chapter 6 of this EIAR.

3.3.4.3.7 *Final Proposed Development Layout*

The proposed development layout builds on Alternative Layouts and seeks to address issues is relation to a more appropriate spread of density throughout the development. In this layout the overall number of residential homes is 360 dwellings within Site C. Site A provides for 3 no office building while Site B includes a Primary Care Centre and Nursing Home. The MOOR is designed to facilitate the proposed Moygaddy Masterplan lands and provide connectivity to Maynooth town. The 2 no. Kildare applications facilitate the proposed development.

The proposed development layout is the culmination of an extensive design process. Overall, the proposed development as a whole is a better design from an environmental perspective than the alternatives previously considered. The proposed development provides for an appropriate number of residential units at a density that is consistent with the provisions of the *Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas (2009).* The standards provided within the Meath County Development Plan 2021 – 2027 have been adhered to across Sites A, B & C.

A network of footpaths and pedestrian/cycle bridges throughout the proposed development will provide a high rate of accessibility to the landscaped amenity areas including parks, playgrounds and open play areas. The inclusion of these attractive, well-designed routes will encourage pedestrians to access the local facilities on foot as opposed to taking their personal vehicles.

The use of permeable paving, natural infiltration, landscape collection features and carefully designed landscaping including native and adapted plants and trees throughout the proposed development are a key design focus in the final proposed development.

Connectivity to Maynooth has been improved through the provision of a footpath along the R157, L22143 and L2214 roads which will benefit not only the proposed development but also the existing residents of the area. For these main reasons, the proposed development is considered the most appropriate alternative from an environmental impact assessment perspective.

3.3.5 Alternative Processes

The management of processes that affect the volumes and characteristics of emissions, residues, traffic and the use of natural resources has formed part of the consideration of reasonable alternatives through the project's development.

The construction works on the site will require the use of raw materials in the form of energy to supply plant and machinery, standard building materials including stone, metals, pipework, concrete, electrical, plumbing etc and raw materials are consumed to manufacture building materials. The use of these resources will be controlled by the employment of best practice construction techniques including waste management practices.

The processes to be employed during the construction of the Proposed Development, and described in Chapter 4 of this EIAR, are standard best practice for the construction industry in Ireland. There will be no novel processes or methods employed. Since the proposed processes represent industry standard

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best practice, alternative processes were not considered to be reasonable and were therefore not considered further in the EIAR.

3.3.6 Alternative Mitigation Measures

Mitigation by avoidance has been a key aspect of the Proposed Development's evolution through the selection and design process. Avoidance of the most ecological, archaeological and hydrogeological sensitive areas of the site, limits the potential for environmental effects. As noted above, the site layout aims to make use of existing infrastructure which assists in avoiding any environmentally sensitive areas. The alternative to this approach is to encroach on the environmentally sensitive areas of the site and accept the potential environmental effects and risk associated with this.

The best practice design and mitigation measures set out in this EIAR will contribute to reducing any risks and have been designed to avoid any potential impacts on identified environmental receptors. The alternative is to either not propose these measures or propose measures which are not best practice and effective, neither of which are sustainable option.

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4. DESCRIPTION OF THE PROPOSED DEVELOPMENT

4.1 Introduction

This section of the Environmental Impact Assessment Report (EIAR) describes the development and its component parts (the 'Proposed Development') including a description of the site, proposed construction activities & methodologies as well as general construction and operational phase characteristics of the project.

Sky Castle Ltd. intends to submit to a total of six planning applications as part of the Moygaddy Mixed Use Development (henceforth referred to as the Proposed Development).

A total of three planning applications will be submitted to Meath County Council (MCC) as the relevant competent authority. Of these three applications, one planning application seeks to provide for the first phase of a Strategic Employment Zone (referred to as Site A) one planning application is for Healthcare Facilities which includes a Nursing Home and Primary Care Centre (referred to as Site B), and one planning application is for the delivery of the proposed Maynooth Outer Orbital Road (MOOR).

A planning application for the Moygaddy Castle SHD henceforth referred to as Site C - Strategic Housing Development (SHD) will be submitted to An Bord Pleanála under the Strategic Housing Provisions of the Planning and Development (Housing) and Residential Tenancies Act, 2016.

There will also be two separate planning applications submitted to Kildare County Council (KCC) for shared infrastructure, proposed services and utilities connections to Maynooth town in County Kildare. One planning application to KCC includes a proposed pedestrian / cycle bridge adjacent to the existing Kildare Bridge, as well as a proposed wastewater connection to the Maynooth Municipal Wastewater Pumping Station to the southeast of the Proposed Development. The second planning application to be submitted to KCC is located to the southwest of Site C (SHD) for the provision of an integral single span bridge over the River Rye Water with associated flood plain works and embankments.

As outlined in Chapter 1: Introduction, this EIAR assesses all six planning applications under the one 'Proposed Development' due to the proximity, timeline and links between the applications. Three planning applications will be submitted to MCC (**Site A, Site B** and **MOOR**). One planning application will be submitted to An Bord Pleanála (**Site C: SHD**) as the competent authority, while two planning applications will be submitted to KCC for infrastructure works required to connect the Proposed Development to the road network and services and utility infrastructure within Co. Kildare.

The Strategic Employment Zone (**Site A**) will consist of:

1) *The proposed development comprises 3 no. office blocks and all associated site development works (GFA: 20,633.26 sq.m) as follows:*
2) *Block A: 5 storey office building providing offices, stair and lift cores and plant rooms (GFA: 10,260.42 sq.m)*
3) *Block B: 3 storey office building providing offices, stair and lift cores and plant rooms (GFA: 5,186.54 sq.m)*
4) *Block C: 3 storey office building providing offices, stair and lift cores and plant rooms (GFA: 5,186.30 sq.m)*

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5) *The development includes a surface car park which includes 323 no. car parking spaces and 320 no. bicycle car parking spaces (including 16 no. accessible car parking spaces and 12 no. EV charging spaces)*
6) *Undertaking of road upgrade works including the provision of a signalised junction on the R157 Dunboyne Road and the construction of a section of the Maynooth Outer Orbital Route and provision of associated pedestrian and cycle infrastructure, as well as a realignment of a section of the R157. The works to the R157 adjoin the Carton Demense Wall which is a Protected Structure (RPS Ref 91556).*
7) *Vehicular access to the site will be provided via the R157 Dunboyne Road and provision is made for a secondary vehicular access via the proposed section of the Maynooth Outer Orbital Route.*
8) *Provision of water, foul and surface water drainage infrastructure including pumping station.*
9) *Provision of a new pedestrian & cycle bridge structure at the River Rye Water adjacent to the existing Kildare Bridge.*
10) *Provision of roof mounted solar PV panels on Office Blocks A, B & C.*
11) *Provision of 3 no. ESB Kiosks.*
12) *Provision of bin stores, bike stands, landscaping, boundary treatments and public lighting and all other site development works and services ancillary to the proposed development.*

The Healthcare Facilities (**Site B**) will consist of:

1) *Construction of a new two-storey Nursing Home of 156 no. bedrooms with a Gross Floor Area (GFA) of 8,576m^2, including vehicular pick up/drop-off area and service road;*
2) *Construction of a new three-storey Primary Care Centre (PCC) with a Gross Floor Area (GFA) of 3,049m^2;*
3) *The development includes a shared surface car park providing 161 no. car parking spaces (comprising of 151 no. standard car parking spaces and 10 no. accessible car parking spaces) and 160 no. bicycle parking spaces.*
4) *Provision of foul and surface water drainage including wastewater pumping station.*
5) *Connection to potable water supply at Kildare Bridge.*
6) *Provision of communal (semi-private) and public open space*
7) *Provision of hard and soft landscaping including amenity equipment, fencing and gates.*
8) *Provision of substation and public lighting.*
9) *Proposed road improvement and realignment works including:*
    i. *Construction of a new 2-way, 6m-wide access road from the R157 Dunboune Road to include a priority T-junction on the R157,*
    ii. *Upgrade works to a section of the R157 from the new site entrance south to Kildare Bridge on the R157 (representing delivery of a 15m-wide portion of the Maynooth Outer Relief Road (MOOR)), including creation of a new 2m-wide footpath, 3m-wide cycle lane and pedestrian and cycle link adacent to the Kildare Bridge,*
    iii. *Provision of pedestrian and cycle improvement measures along the R157 which abuts the Carton Demense Wall which is a Protected Structure (RPS Ref 91556)*
10) *All other site development works and services ancillary to the proposed development.*
11) *A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) will be submitted to the planning authority with the planning application.*

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The Strategic Housing Development (**SHD: Site C**) will consist of:

1) *Construction of 360 no. residential homes comprising:*
   196 no houses (including 19 no. 2 beds, 156 no. 3 beds and 21 no. 4 beds).
   102 no. duplexes (including 51 no. 1 beds and 51 no. 2 beds) set out in 6 no. blocks.
   62 no. apartments (including 26 no. 1 beds and 36 no. 2 beds) set out in 2 no. blocks.
2) *Provision of a public park and playground with associated 42 no. car parking spaces adjacent to Moygaddy Castle Towerhouse and pedestrian and cyclist links along the Rye Water River. The overall public open space (including the High Amenity Lands) equates to 7.98 hectares.*
3) *Provision of private open spaces in the form of balconies and terraces is provided to all individual apartments and duplexes to all elevations.*
4) *Development of a two-storey creche facility (514 sqm), outdoor play area and associated parking of 29 no. spaces.*
5) *Provision of a single storey Scout Den facility, including a hall, kitchen, meeting room and ancillary facilities (220sqm) and associated parking of 6 no. spaces.*
6) *Provision of 4 no. bridge structures comprising:*
   i. *an integral single span bridge at Moyglare Hall over the Rye Water River to connect with existing road infrastructure in County Kildare and associated floodplain works and embankments.*
   ii. *a new pedestrian and cyclist bridge at Kildare Bridge which will link the proposed site with the existing road network in County Kildare.*
   iii. *a new pedestrian and cycle bridge across the Blackhall Little Stream on the L6219 adjacent to the existing unnamed bridge.*
   iv. *a new pedestrian and cycle bridge over the Blackhall Little Stream linking the proposed residential site with the proposed Childcare Facility, Scout Den and Moygaddy Castle Public Park.*
7) *Provision of 500m of distributor road comprising of 7.0m carriageway with turning lane where required, footpaths, cycle tracks and grass verges. All associated utilities and public lighting including storm water drainage with SuDS treatment and attenuation.*
8) *Proposed road improvement and realignment works including:*
   realignment of a section of the existing L6219 local road, which will entail the demolition of an existing section of the road which extends to circa 2,500 sqm.
   Provision of pedestrian and cycle improvement measures along the L6219 which abuts the boundary of Moygaddy House which is a Protected Structure (RPS ref 91558).
   Provision of pedestrian and cycle improvement measures along the R157 which abuts the Carton Demense Wall which is a Protected Structure (RPS Ref 91556).
9) *Provision of 3 no. vehicular and pedestrian accesses from the L6219 local road and an additional vehicular and pedestrian access from the R157 to the Childcare and Scout Den facilities.*
10) *The proposed development will provide 283 no. of bicycle parking spaces, of which 200 no. are long term spaces in secure bicycle stores and 83 no. are short term visitor bicycle parking spaces. 12 no. bicycle spaces are provided for the creche and 12 no. bicycle spaces are provided for the Scout Den.*
11) *A total of 667 no. car parking spaces are provided on site located at surface level. The car parking provision includes 10 no. Electric Vehicle charging and Universally Accessible spaces allocated for the Apartment & Duplex units. All Houses will be constructed with provision for EV Charging.*
12) *Provision of site landscaping, public lighting, bin stores, 3 no. ESB unit substations, site services and all associated site development works.*
13) *A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) has been included with this application.*

The planning application for the Maynooth Outer Orbital Road (**MOOR**) will consist of:

1) *Provision of approximately 1,700m of new distributor road (MOOR Arc) comprising of 7.0m carriageway with turning lane where required, footpaths, cycle tracks and grass verges. All*

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associated utilities and public lighting including storm water drainage with SuDS treatment and attenuation.

2) *Proposed road improvement and realignment works including:*

   i. *realignment of a section of the existing L6219 local road, which will entail the demolition of an existing section of the road which extends to circa 2,500 sqm.*
   ii. *Provision of pedestrian and cycle improvement measures along the L6219 and L22143 which abuts the boundary of Moygaddy House which is a Protected Structure (RPS ref 91558).*
   iii. *Provision of pedestrian and cycle improvement measures along the R157 which abuts the Carton Demense Wall which is a Protected Structure (RPS Ref 91556).*
   iv. *Realignment of a section of the existing L22143 local road and R157, which will entail the demolition of an existing section of the road which extends to circa 3,200 sqm.*
   v. *Provision of a new signalised junction at the realigned junction between the L22143 and R157.*
   vi. *Provision of a new signalised junction between the L2214 local road and the MOOR with right-turn lanes on approaches.*
   vii. *Reconfiguration of the L2214 section within the MOOR arc to a one-way from north to south with right-turn lanes, where applicable.*
   viii. *Reconfiguration of the northbound lane of the L2214 within the arc to a shared facility for use by pedestrians and cyclists.*
   ix. *Addition of chicanes on the L6219 and L22143 local road to reduce traffic flow and encourage utilisation of the MOOR.*

3) *Provision of 4 no. bridge structures comprising:*

   i. *an integral single span bridge at Moyglare Hall over the River Rye Water to connect with existing road infrastructure in County Kildare and associated floodplain works and embankments.*
   ii. *a new pedestrian and cyclist bridge at Kildare Bridge which will link the proposed site with the existing road network in County Kildare.*
   iii. *a new pedestrian and cycle bridge across Moyglare Stream on the L22143 adjacent to the existing unnamed bridge.*
   iv. *an integral single span bridge on the north-eastern section of the MOOR arc, over the Blackhall Little Stream, and associated floodplain works and embankments.*

4) *Provision of site landscaping, public lighting, site services and all associated site development works.*
5) *A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) has been included with this application.*

The planning application for the **Kildare Bridge** will consist of:

The proposed development will consist of the following:

1. *Provision of a new bridge structure comprising the following:*

   i. *a pedestrian and cycle bridge structure to be erected adjacent to the upstream/western side of the existing Kildare Bridge, with a 2m clearance, with the infrastructure tying into new infrastructure in Co. Meath.*
   ii. *This bridge will be a standalone, independent structure that will also support new water main assets*

2. *New wastewater rising mains to be installed underground adjacent the bridge structure, to the west.*

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3. *New walkways and cycle track will tie-in with new infrastructure to be constructed by Cairn Homes and their Agents.*
4. *Provision of site landscaping, public lighting, site services and all associated site development works.*
5. *A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) has been included with this application.*

The planning application for the **Moyglare Bridge** will consist of:

The proposed development will consist of the following:

1) *Provision of approximately 200m of new portion of distributor road comprising of 7.0m carriageway with footpaths, cycle tracks and grass verges. All associated utilities and public lighting including storm water drainage with SuDS treatment and attenuation. This new road section with pedestrian and cycle infrastructure will tie in with existing infrastructure just east of the roundabout which provides access to the Maynooth Community College and Moyglare Hall Estate.*
2) *Provision of a new bridge structure comprising the following:*

    i. *an integral 50m single span bridge at Moyglare Hall over the River Rye Water to connect with existing road infrastructure in County Kildare and associated floodplain works and embankments.*
    ii. *The bridge will include pedestrian and cycle facilities*
    iii. *Extension of the water main assets to serve new developments in Maynooth Environs*

3) *Provision of site landscaping, public lighting, site services and all associated site development works.*
4) *A Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR) has been included with this application.*

The 6 no. planning applications that form the Proposed Development are accompanied by a Natura Impact Statement (NIS) and an Environmental Impact Assessment Report (EIAR). All elements of the Proposed Development have been assessed as part of this EIAR.

4.2 Existing Site Description

4.2.1 Site Layout

4.2.1.1 Strategic Employment Zone (Site A)

The site measures approximately 6.8 hectares and is located in County Meath on the northern edge of Maynooth town. The site consists of a green field currently in agricultural use.

The site is directly adjacent and to the northeast of Carton House woodlands and grounds, which is separated by the R157 Regional Road. Approximately 400m to the southwest of the development site is an existing housing development in Maynooth. The site is surrounded by agricultural lands to the north, west and south. There are no existing buildings or structures on the development site. A figure on the existing land use at the site is shown on Figure 2-2 in Chapter 2 of this EIAR.

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4.2.1.2 Healthcare Facilities (Site B)

Site B measures approximately 6.6 hectares and is located in County Meath on the northern edge of Maynooth town. The site consists of a green field currently in agricultural use.

The site is directly adjacent and to the east of Carton House woodlands and grounds, which is separated by the R157 Regional Road. Approximately 350m to the south of the development site is an existing housing development in Maynooth. The site is surrounded by agricultural lands to the north and west. There are no existing buildings or structures on the development site. A figure on the existing land use at the site is shown on Figure 2-3 in Chapter 2 of this EIAR.

4.2.1.3 Strategic Housing Development (Site C)

Site C measures approximately 19.5 hectares and is located in County Meath on the northern edge of Maynooth town. The site consists of a green field currently in agricultural use.

The site is directly adjacent and to the north of the River Rye Water, which is the county boundary between Meath and Kildare. The site is also bounded by the L22143 Local Road which rounds to the north of the site boundary in an east-west direction. Approximately 120m to the south of Site C is Moyglare Close, an existing housing development in Mariavilla on the outskirts of Maynooth town in County Kildare. The site is surrounded by agricultural lands to the north, west and east. The existing Moygaddy Castle (ME053-001—) is a Recorded Monument (RMP), which is located within the eastern part of the Site C boundary, consisting of a 17th century three-storey tower house. Moygaddy House is located to the north of Moygaddy Castle, directly adjacent to the Site C boundary, which is a protected structure consisting of a two storey over basement 19th century Georgian house and associated stable block. A figure on the existing land use at the site is shown on Figure 2-4 in Chapter 2 of this EIAR.

4.2.1.4 Maynooth Outer Orbital Road (MOOR)

The Maynooth Outer Orbital Road (MOOR) consists of approximately 1.7km of proposed new distributor road linking the R157 Regional Road, located to the east of Site B, to the Moyglare Hall road in Mariavilla, located southwest of the Site C (SHD). The distributor road will comprise of 7.0m carriageway with turning lanes where required, public lighting, footpaths, cycle tracks and grass verges.

The total area of the MOOR site boundary measures approximately 6.6 hectares and is located in County Meath on the northern edge of Maynooth town. The site consists predominately of green fields currently in agricultural use. Some road upgrade works along the existing R157 Regional Road, L6219, L2214 and L22143 Local Roads are required and these works are included as part of the overall site boundary in order to facilitate the delivery of the MOOR.

There are two new watercourse crossings required as part of the MOOR, which will be delivered in the form of clearspan bridges. One bridge crossing is located on the Blackhall Little Stream, approximately 250m northeast of Moygaddy House. The other bridge crossing is located on the Rye Water River, at the southwest corner of Site C (SHD) in order to connect the MOOR to the existing Moyglare Hall Road in County Kildare. The existing Moyglare Close housing estate in County Kildare is located less than 40m from the MOOR site boundary at its closest point. The MOOR site is surrounded by agricultural lands. There are no existing buildings or structures within the MOOR site boundary, with the exception of existing access roads which will require upgrade works as part of the Proposed Development. A figure on the existing land use at the site is shown on Figure 2-5 in Chapter 2 of this EIAR.

4.2.1.5 Kildare Bridge

The Kildare Bridge planning application includes road upgrade works to the existing R157 Regional Road, a proposed pedestrian / cycle bridge adjacent to the existing Kildare Bridge, as well as a

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proposed wastewater connection to the Maynooth Municipal Wastewater Pumping Station which is located to the southeast of the Proposed Development. The Kildare Bridge planning application site boundary measures approximately 1.2 hectares and is located in County Kildare on the northern edge of Maynooth town. The site consists of made ground in the form of the R157 Regional Road (Dunboyne Road), the Dunboyne Road Roundabout and the L1013 Local Access Road.

There are no existing buildings or structures within the Kildare Bridge site boundary, with the exception of existing access roads which will require upgrade works as part of the Proposed Development. A figure on the existing land use at the site is shown on Figure 2-6 in Chapter 2 of this EIAR.

4.2.1.6 Moyglare Bridge

The Moyglare Bridge planning application includes for the provision of an integral single span bridge over the River Rye Water with associated flood plain works and embankments, as well as construction of approximately 160m section of new access road linking the existing Moyglare Hall Road to the south of the site to the proposed single span bridge crossing the Rye Water River.

with associated services and utilities. The Moyglare Bridge planning application site boundary measures approximately 0.5 hectares and is located in Mariavilla, County Kildare on the outskirts of Maynooth town. The site consists of a green field site currently in agricultural use.

The site is directly adjacent and to the south of the River Rye Water, while the existing Moyglare Close housing estate is located approximately 5m from the site boundary at its closest point. There are no existing buildings or structures within the site boundary A figure on the existing land use at the site is shown on Figure 2-7 in Chapter 2 of this EIAR.

4.2.2 Site Access

4.2.2.1 Strategic Employment Zone (Site A)

The road network within Site A can be broken-up into three distinct elements, mainly:

1. *Approximately 750m section of proposed road upgrade works along the existing R157 Regional Road, to facilitate the planned future Maynooth Outer Orbital Route (MOOR) distributor road linking the overall Moygaddy Masterplan area to Maynooth town.*
2. *Approximately 110m section of proposed road upgrade works along the existing L22143 Local Road, to facilitate the proposed new junction/crossroads as part of the Maynooth Outer Orbital Route (MOOR) distributor road.*
3. *Delivery of approximately 365m of the Proposed MOOR. The complete delivery of the MOOR will be subject to permission of a separate planning application.*

The aforementioned MOOR distributor road is outlined is a key Policy Objective outlined in the Meath County Development Plan 2021 – 2027. The Meath CDP policy objectives relating to the MOOR are outlined in the draft Maynooth Local Area Plan and listed below:

- **MAY OBJ 4 –** To support and facilitate in conjunction with Kildare County Council and private developers and landowners, the construction of the Maynooth Outer Orbital Route.
- **MAY OBJ 5 –** To require that the Maynooth Outer Orbital Route connects with the MOOR being delivered in the administrative area of Kildare County Council. Said route shall incorporate the construction of a sewer and ring main linking the sewer and trunk main in the Dublin Road to the residential development in the Mariavilla area.

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The planning application for the Strategic Employment Zone includes approximately 750m of proposed road upgrade works along the existing R157 Regional Road, and approximately 110m of proposed road upgrade works along the existing L22143 Local Road, to the south of the Strategic Employment Buildings. These road upgrade works will be necessary to facilitate the planned future Maynooth Outer Orbital Route (MOOR) distributor road. The complete delivery of the MOOR will be subject to a separate planning application.

Also included as part of the Strategic Employment Zone planning application is a new proposed junction/crossroads between the existing L22143 Local Road and the existing R157 Regional Road, at the southeast corner of the Strategic Employment Zone. This new junction/crossroads will facilitate the delivery of the c.365m section of the proposed MOOR, which runs in a north-northeast direction from the existing junction, between the R157 Regional Road and the existing L22143 Local Access Road, and the Blackhall Little Stream to the northeast.

A high-level study of a much wider area has been carried out to ensure the technical viability to the full extension of the MOOR. The findings of this study were discussed in detail with the Roads Department of MCC on two separate meetings as referred in Chapter 2 of this report and separate meetings with the Roads Department in Kildare County Council. The full delivery of the MOOR is subject to the success of its own separate planning application, as described in Section 4.2.2.4 below.

The main access to the proposed Site A will be via a new entrance from the existing R157 Regional Road, on the eastern boundary of the site, creating a new T-junction. The local roads network has been assessed and is confirmed to be capable of supporting the entire development without the delivery of the MOOR which is addressed in Chapter 13 of this report.

The proposed scheme has been designed in accordance with the principles of the Design Manual for Urban Roads and Streets (DMURS), namely:

- Design Principle 1: To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users, and in particular more sustainable forms of transport.
- Design Principle 2: The promotion of multifunctional streets that balance the needs of all users within a self-regulating environment.
- Design Principle 3: The quality of the street is measured by the quality of the pedestrian environment.
- Design Principle 4: Greater communication and cooperation between design professionals through the promotion of a plan led, multidisciplinary approach to design.

Site A provides for a high level of accessibility and permeability ensuring ease of circulation throughout the scheme and easy access to the proposed facilities. Pedestrian and cycle routes will be provided throughout the scheme with a main arterial pedestrian and cycle route running through the scheme from north to south, linking Site A to Maynooth town. The location of existing pedestrian and cycle routes, and other transport infrastructure in the vicinity of Site A and Maynooth town are shown in the Mobility Management Plan included as Volume 3a Appendix 4-1 of this EIAR. Site A will provide new pedestrian and cycle infrastructure adjacent to the Kildare Bridge, the Dunboyne Road (R157), and throughout Site A.

4.2.2.2 Healthcare Facilities (Site B)

The road network within Site B can be broken-up in two distinct elements, mainly:

1) *The proposed internal road network servicing the proposed nursing home and primary care centre.*
2) *290m section of proposed road upgrade works along the existing R157 Regional Road, to facilitate the planned future Maynooth Outer Orbital Route (MOOR) distributor road linking*

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the overall Moygaddy Masterplan area to Maynooth town. The delivery of the entire MOOR will be subject to permission of a separate planning application.

The aforementioned MOOR distributor road is outlined is a key Policy Objective as described in Section 4.2.2.1 above.

The planning application for Site B includes a 290m section of proposed road upgrade works along the existing R157 Regional Road that runs along the eastern boundary of the planning application site. These road upgrade works will be necessary to facilitate the planned Maynooth Outer Orbital Route (MOOR) distributor road. The complete delivery of the MOOR will be subject to permission of a separate planning application as described in Section 4.2.2.4 below.

The main access to Site B will be via a new entrance to the west of the existing R157 Regional Road, opposite Carton House Woods creating a new T-junction. The local roads network has been assessed and is confirmed to be capable of supporting the entire development without the delivery of the MOOR which is addressed in Chapter 13 of this report.

The proposed scheme has been designed in accordance with the principles of the Design Manual for Urban Roads and Streets (DMURS), namely:

- Design Principle 1: To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users, and in particular more sustainable forms of transport.
- Design Principle 2: The promotion of multifunctional streets that balance the needs of all users within a self-regulating environment.
- Design Principle 3: The quality of the street is measured by the quality of the pedestrian environment.
- Design Principle 4: Greater communication and cooperation between design professionals through the promotion of a plan led, multidisciplinary approach to design.

Site B provides for a high level of accessibility and permeability ensuring ease of circulation throughout the scheme and easy access to the proposed facilities. Pedestrian and cycle routes will be provided throughout the scheme with a main arterial pedestrian and cycle route running through the scheme from north to south, linking Site B to Maynooth town. The location of existing pedestrian and cycle routes, and other transport infrastructure in the vicinity of the Proposed Development and Maynooth town are shown in the Mobility Management Plan included as Volume 3b Appendix 4-1 of this EIAR. Site B will provide new pedestrian and cycle infrastructure adjacent to the Kildare Bridge and the Dunboyne Road (R157).

4.2.2.3 Strategic Housing Development (Site C: SHD)

The road network within Site C can be broken-up in three distinct elements, mainly:

1) *The proposed internal road network servicing the proposed Strategic Housing Development (SHD).*
2) *Approximately 850m of road, pedestrian and cycle improvements measures along the L6219 and L22143 Local Roads, including two dedicated pedestrian and cycle bridges over the Blackhall Little Stream; and*
3) *Delivery of Approximately 500m of the Proposed MOOR which will facilitate access to the proposed Strategic Housing Development. The complete delivery of the MOOR will be subject to a separate planning permission for the overall route.*

The aforementioned MOOR distributor road is outlined is a key Policy Objective as described in Section 4.2.2.1 above.

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The planning application for Site C includes a c.650m section of proposed road upgrade works along the existing L6219 and L22143 Local Roads that runs along the north-eastern boundary of the planning application site and c.200m of upgrade works along the L22143 Local Road which runs along the northern section of the planning application site. These road upgrade works also include for pedestrian and cycle infrastructure and 2 no. dedicated pedestrian and cycle bridges over the Blackhall Little stream and one pedestrian and cycle bridge adjacent to the existing Kildare Bridge. The planning application for Site C also includes for the delivery of approximately 500m of the Proposed MOOR which will facilitate access to the proposed Strategic Housing Development. The complete delivery of the MOOR will be subject to permission of a separate planning application as described in Section 4.2.2.4 below.

The main access to the proposed SHD (Site C) will be via a new entrance to the north of the site from the existing L6219 Local Road, creating a new T-junction. The local roads network has been assessed and is confirmed to be capable of supporting the entire development without the delivery of the MOOR which is addressed in Chapter 13 of this report.

The proposed scheme has been designed in accordance with the principles of the Design Manual for Urban Roads and Streets (DMURS), namely:

- Design Principle 1: To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users, and in particular more sustainable forms of transport.
- Design Principle 2: The promotion of multifunctional streets that balance the needs of all users within a self-regulating environment.
- Design Principle 3: The quality of the street is measured by the quality of the pedestrian environment.
- Design Principle 4: Greater communication and cooperation between design professionals through the promotion of a plan led, multidisciplinary approach to design.

Site C provides for a high level of accessibility and permeability ensuring ease of circulation throughout the scheme and easy access to the proposed facilities. Pedestrian and cycle routes will be provided throughout the scheme with a main arterial pedestrian and cycle route running through the scheme from east to west, along the L6219 & L22143 Local Road on the northern boundary of Site C. The location of existing pedestrian and cycle routes, and other transport infrastructure in the vicinity of the Proposed Development and Maynooth town are shown in the Mobility Management Plan included in Volume 3c(i) Appendix 4-1 of this EIAR.

4.2.2.4 Maynooth Outer Orbital Road (MOOR)

The road network associated with the MOOR can be broken-up in three distinct elements, mainly:

1) *Construction of c.1.7km of distributor road linking the existing R157 Regional Road, located to the east of Site B, to the Moyglare Hall road in Mariavilla, located southwest of the SHD (Site C) site. The distributor road will comprise of 7.0m carriageway with turning lanes where required, footpaths, cycle tracks and grass verges; and*
2) *Approximately 750m section of proposed road upgrade works along the existing R157 Regional Road from the existing Kildare Bridge up to the new proposed signalised junction with the MOOR.*
3) *Installation of new 2 no standalone pedestrian and cycle links adjacent to the Kildare Bridge and along the L22143 crossing the Blackhall Little Stream.*

The aforementioned MOOR distributor road is outlined is a key Policy Objective outlined in the Meath County Development Plan 2021 – 2027. The Meath CDP policy objectives relating to the MOOR are outlined in the draft Maynooth Local Area Plan and listed below:

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- **MAY OBJ 4** – To support and facilitate in conjunction with Kildare County Council and private developers and landowners, the construction of the Maynooth Outer Orbital Route.
- **MAY OBJ 5** – To require that the Maynooth Outer Orbital Route connects with the MOOR being delivered in the administrative area of Kildare County Council. Said route shall incorporate the construction of a sewer and ring main linking the sewer and trunk main in the Dublin Road to the residential development in the Mariavilla area.

The planning application for the MOOR includes for the construction of c1.7km of new distributor road linking the existing R157 Regional Road, located to the east of Site B, to the Moyglare Hall road in Mariavilla, located southwest of the SHD (Site C) site. The distributor road will comprise of 7.0m carriageway with turning lanes where required, footpaths, cycle tracks and grass verges. Road upgrade works will also be required to facilitate the delivery of the MOOR, including approximately 750m section of proposed road upgrade works along the existing R157 Regional Road from the existing Kildare Bridge up to the new proposed signalised junction with the MOOR.

Access to the proposed MOOR will be via the R157 Regional Road to the south and east, with access also being provided from the L2214 and L6219 Local Roads to the north and west of the site. Access will also be provided to the MOOR via the proposed Moyglare Bridge to the south.

The proposed scheme has been designed in accordance with the principles of the Design Manual for Urban Roads and Streets (DMURS), namely:

- Design Principle 1: To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users, and in particular more sustainable forms of transport.
- Design Principle 2: The promotion of multifunctional streets that balance the needs of all users within a self-regulating environment.
- Design Principle 3: The quality of the street is measured by the quality of the pedestrian environment.
- Design Principle 4: Greater communication and cooperation between design professionals through the promotion of a plan led, multidisciplinary approach to design.

The MOOR provides for a high level of accessibility and permeability ensuring ease of circulation throughout the scheme and easy access to the proposed facilities. Pedestrian and cycle routes will be provided throughout the scheme with arterial pedestrian and cycle routes running through the entire scheme.

4.2.2.5 Kildare Bridge

The road network associated with the Kildare Bridge planning application can be broken-up in two distinct elements, mainly:

1. *Approximately 115m section of proposed road upgrade works along the existing R157 Regional Road between the existing Kildare Bridge and the Dunboyne Roundabout in County Kildare; and*
2. *Installation of new standalone pedestrian and cycle link adjacent to the Kildare Bridge.*

The main access to the Kildare Bridge site will be via the R157 Regional Road (Dunboyne Road).

The proposed scheme has been designed in accordance with the principles of the Design Manual for Urban Roads and Streets (DMURS), namely:

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- Design Principle 1: To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users, and in particular more sustainable forms of transport.
- Design Principle 2: The promotion of multifunctional streets that balance the needs of all users within a self-regulating environment.
- Design Principle 3: The quality of the street is measured by the quality of the pedestrian environment.
- Design Principle 4: Greater communication and cooperation between design professionals through the promotion of a plan led, multidisciplinary approach to design.

The Kildare Bridge works provides for a high level of accessibility and permeability ensuring ease of circulation throughout the scheme and easy access to the proposed facilities. Pedestrian and cycle routes will be provided with a main arterial pedestrian and cycle route running through the scheme in a north-south direction, along the R157 Regional Road.

4.2.2.6 Moyglare Bridge

The road network associated with the Moyglare Bridge planning application can be broken-up in two distinct elements, mainly:

1) *Installation of 2 no. new single span bridge over the River Rye and Blackhall Little Stream to facilitate the delivery of the MOOR; and*
2) *Construction of approximately 160m section of new access road linking the existing Moyglare Hall Road to the south of the site to the proposed single span bridge crossing the River Rye.*

The main access to the Moyglare Bridge Planning Application site will be via the existing Moyglare Hall Road to the south of the site.

The proposed scheme has been designed in accordance with the principles of the Design Manual for Urban Roads and Streets (DMURS), namely:

- Design Principle 1: To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users, and in particular more sustainable forms of transport.
- Design Principle 2: The promotion of multifunctional streets that balance the needs of all users within a self-regulating environment.
- Design Principle 3: The quality of the street is measured by the quality of the pedestrian environment.
- Design Principle 4: Greater communication and cooperation between design professionals through the promotion of a plan led, multidisciplinary approach to design.

The Moyglare Bridge provides for a high level of accessibility and permeability ensuring ease of circulation throughout the scheme and easy access to the proposed facilities. Pedestrian and cycle routes will be provided with a main arterial pedestrian and cycle route running through the scheme in a north-south direction.

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4.3 Proposed Development Construction Operations

The detailed layout drawings for the Proposed Development are included in the planning drawings pack of this EIAR. A Construction and Environmental Management Plan (CEMP) for each component of the Proposed Development is included in Volume 3 of this EIAR. The CEMP's are located in the following:

- Site A – Volume 3a Appendix 4-3
- Site B – Volume 3b Appendix 4-3
- Site C – Volume 3c(i) Appendix 4-3
- MOOR – Volume 3d Appendix 4-2
- Kildare Bridge – Volume 3e Appendix 4-2
- Moyglare Bridge – Volume 3f Appendix 4-2

4.3.1 Phasing

4.3.1.1 Strategic Employment Zone Application (Site A)

It is anticipated that the proposed Strategic Employment Zone (Site A) will be completed over 2 separate phases (See Figure 4-1), and the access and egress routes will change for the various phases. Two of the three office buildings will be constructed as part of Phase 1, while the most north-eastern of the three buildings will be constructed as part of Phase 2 along with a c.365m section of the proposed MOOR. The construction phase of the proposed Site A is expected to commence in March 2023 and last approximately 22 months in total, with a 2 month overlap between the construction of the two phases

- Phase 1: Office Block A & B = Month 0 – Month 12;
- Phase 2: Office Block C = Month 10 – Month 12).

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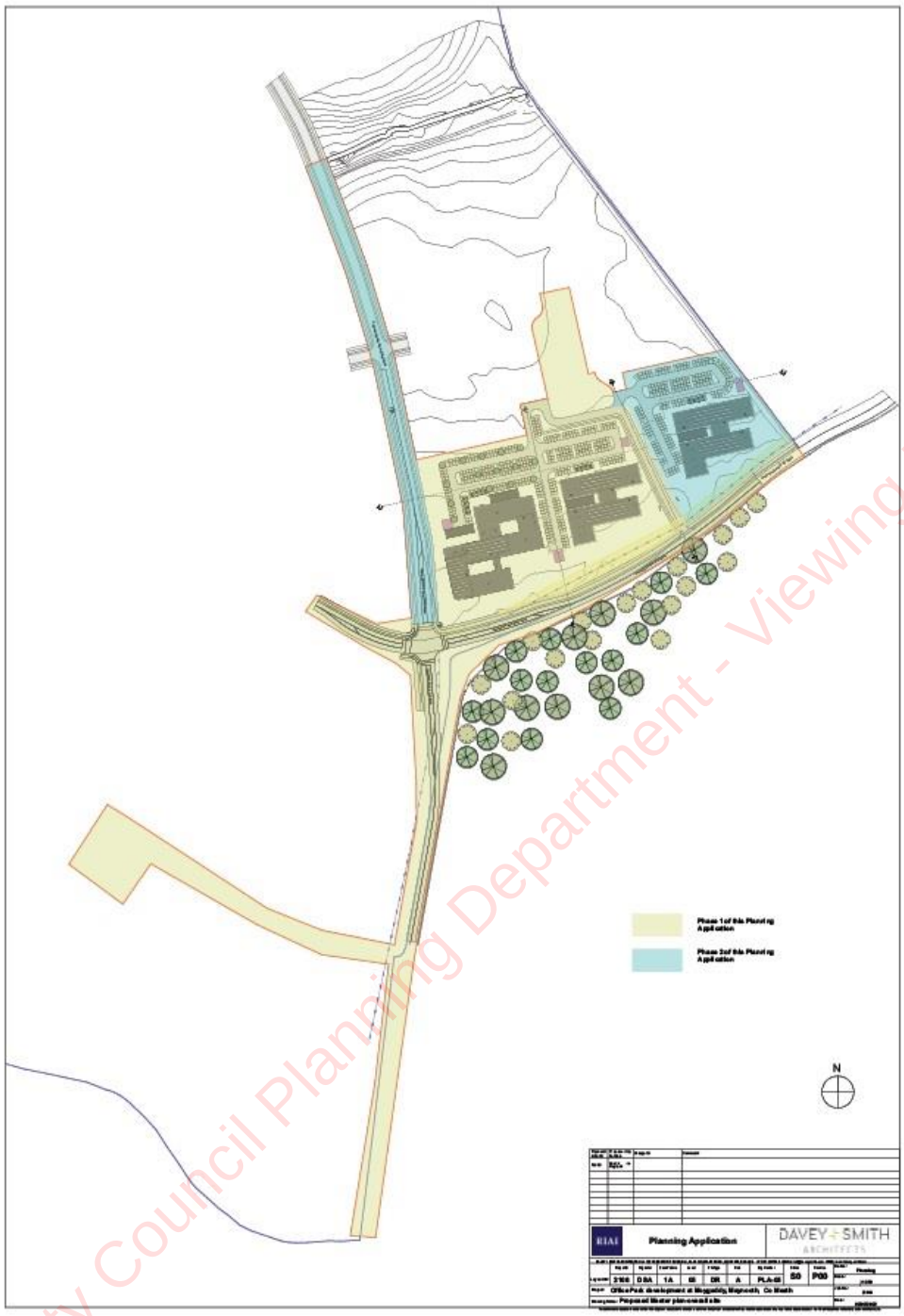

Figure 4-1 Site A Construction Phasing (Source Davey-Smith Architects)

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4.3.1.2 Healthcare Facilities (Site B)

It is anticipated that the development will be completed over two individual, but sequential phases. Phase 1 will consist of the Primary Care Centre, while Phase 2 will consist of the Nursing Home and proposed onsite pumping station (See Figure 4-2). The construction phase of the proposed Site B is expected to commence in September 2023 and last approximately 27 months in total, with a 2 month overlap between the construction of the two phases.

- Phase 1: Primary Care Centre = Month 0 – Month 14;
- Phase 2: Nursing Home = Month 12 – Month 27.

Figure 4-2 Site B Construction Phasing

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4.3.1.3 Strategic Housing Development (SHD: Site C)

It is anticipated that the development will be completed over four individual phases. (See Figure 4-3). The construction phase of the proposed Site C is expected to commence in September 2023 and last approximately 27 months in total. The development will be constructed in four phases, however it is anticipated that all of the phases will overlap within the construction period mentioned above.

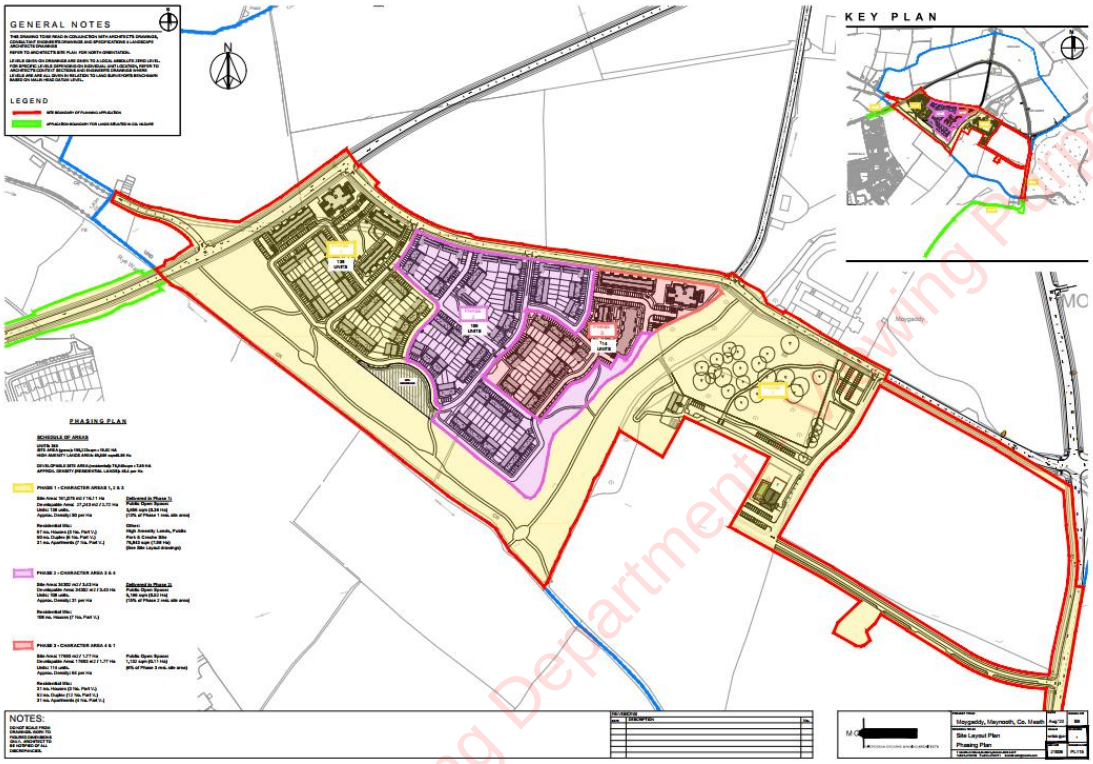

Figure 4-3 - Site C Construction Phasing

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4.3.1.4 Maynooth Outer Orbital Road (MOOR)

It is anticipated that the MOOR will be completed in one phase (See Figure 4-4). Detailed design is expected to be completed by Q2 2023 with construction commencing by Q3 2023. Construction is expected to be completed by Q3 2025 and it's anticipated that the construction duration will be approximately 21 months.

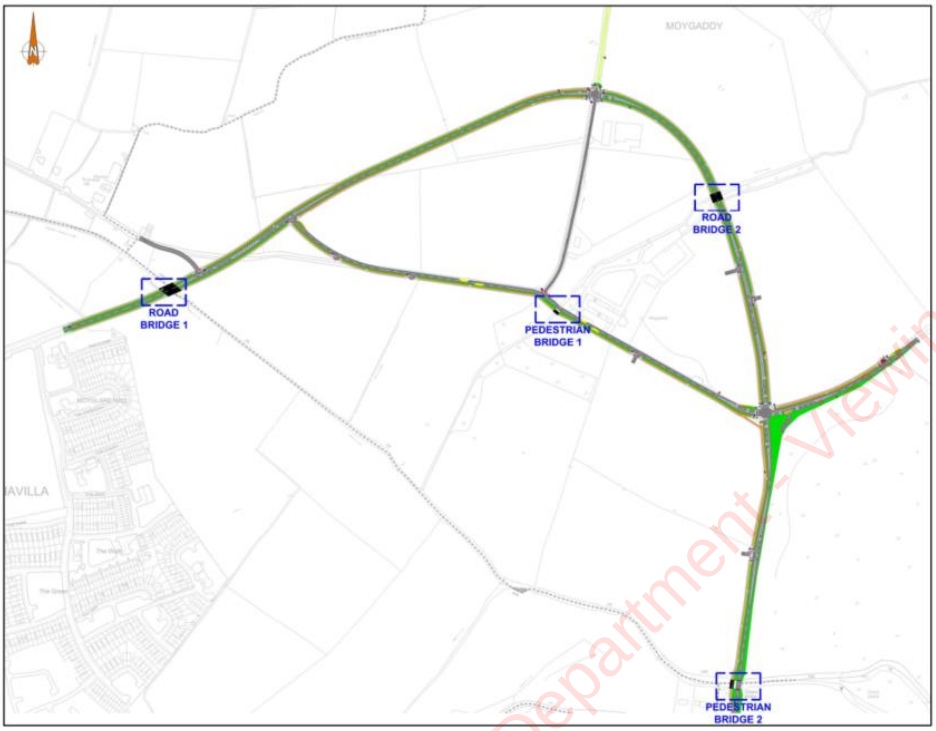

Figure 4-4 - MOOR Construction Phasing (Source OCSC)

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4.3.1.5 Kildare Bridge

It is anticipated that the Kildare Bridge application will be completed in one phase (See Figure 4-5). Detailed design is expected to be completed by Q2 2023 with construction commencing by Q3 2023. Construction is expected to be completed by Q3 2024 and it's anticipated that the construction duration will be approximately 12 months.

Figure 4-5 - Kildare Bridge Construction Phasing

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4.3.1.6 Moyglare Bridge

It is anticipated that the Moyglare Bridge will be completed in one phase (See Figure 4-6). Detailed design is expected to be completed by Q2 2023 with construction commencing by Q3 2023. Construction is expected to be completed by Q3 2024 and it's anticipated that the construction duration will be approximately 21 months.

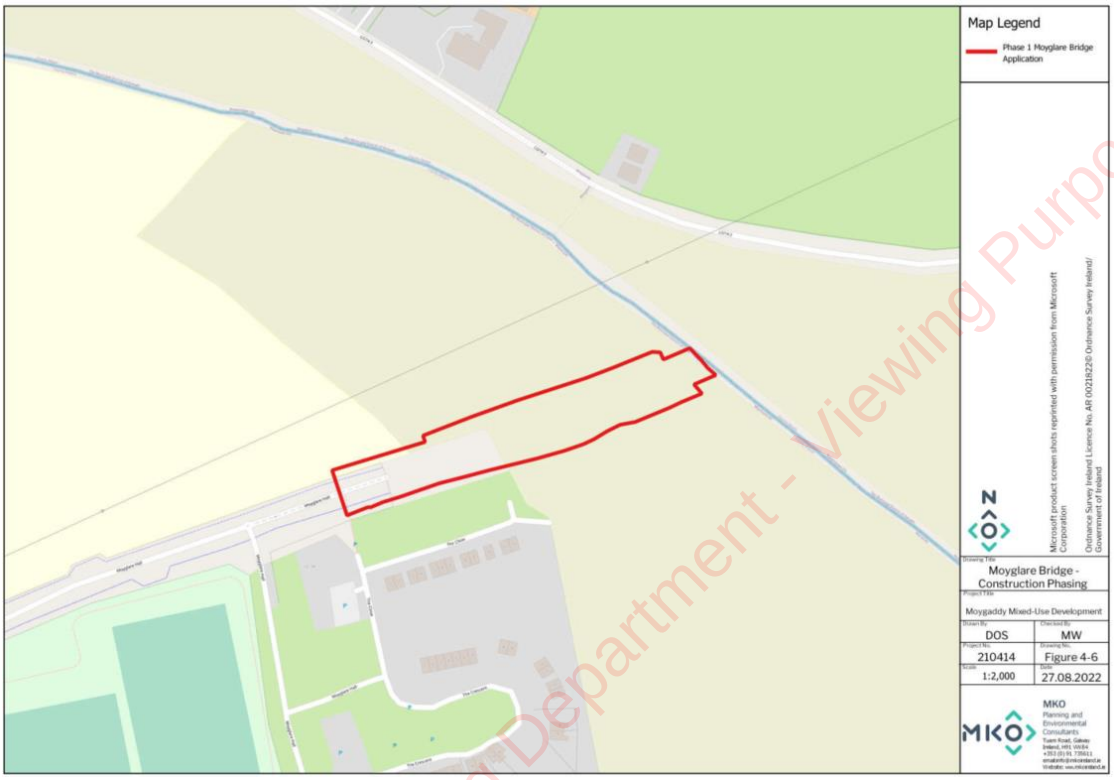

Figure 4-6 Moyglare Bridge Construction Phasing

4.3.2 Hoarding

The site areas **(Site A** (Phase 1 & Phase 2), **Site B** (Phase 1 & Phase 2) **Site C** (Phases 1-4), **MOOR** (Phase 1) & **Kildare Planning Applications** (Phase 1)) will be enclosed with perimeter site hoarding as required, the exact details of which will be agreed with Meath and Kildare County Councils prior to commencement of construction. Controlled access/egress points will also be provided. Hoarding will be maintained to a high standard and painted or covered as appropriate. Temporary hoarding will be provided as necessary within the site as safety restrictions to prevent public access. The locations and arrangement of this temporary hoarding will vary as work progresses across the site.

4.3.3 Site Security

The Contractor will be responsible for the security of each site. The Contractor will be required to undertake the following:

- Operate a Site Induction Process for all site staff,
- Ensure all site staff will have current 'Safe Pass' cards,
- Install adequate site hoarding to the site boundary,
- Maintain Site Security at all times,
- Install access security in the form of turn-styles and gates for staff,
- Separate public pedestrian access from construction vehicular access,
- Ensure restricted access is maintained to the works.

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4.3.4 Access Arrangements for Vehicles

The access arrangements will be as specified in the statutory publications with reference to the publications "Traffic Management Guidelines" manual and the "Traffic Signs Manual" and as agreed with Meath and Kildare County Councils.

Traffic Management procedures will be implemented to ensure the safety of the users of the access routes, for each component of the Proposed Development and the construction access.

All deliveries and vehicles into site will access the site from the new site entrances that will be constructed as part of each planning application as described in Section 4.2.2 above.

Access details for pedestrians and cyclists are discussed in Section 4.3.7 below.

Further information on traffic management is outlined in the Construction & Environmental Management Plans in Volume 3 of the EIAR within the following appendices.

- Site A – Volume 3a Appendix 4-3
- Site B – Volume 3b Appendix 4-3
- Site C – Volume 3c(i) Appendix 4-3
- MOOR – Volume 3d Appendix 4-2
- Kildare Bridge – Volume 3e Appendix 4-2
- Moyglare Bridge – Volume 3f Appendix 4-2

4.3.5 Type of Vehicles

It is anticipated that there will be numerous types of delivery vehicles used to bring material to and from the site. These include:

- Tipper lorries required for removal/movement of spoil following excavation.
- Ready mix concrete lorries.
- Flatbed delivery vehicles for the delivery of various material.
- Skip lorries. These will include roll on/roll off skips for major demolition works and standard yard skips for waste.

4.3.6 Parking and Loading Arrangements

A "Just in Time" approach will be implemented for the delivery of particular building materials such as concrete formwork and large structural steels in order to ensure no long-term stockpiling of material within the site. The location of these materials' storage facilities will be within the site boundaries and as highlighted within the Construction and Environmental Management Plan for each individual site which forms part of the Proposed Development.

Materials will be stored within the site boundaries. It is proposed to provide on-site car parking spaces for workers and a limited number of visitors during the construction phase.

4.3.7 Site Compound and Facilities

Temporary construction compounds are proposed for the construction phase of the proposed development, which will be located within the site boundary of each phase of the proposed developments. The proposed temporary compound area incorporates temporary site offices, staff facilities and car-parking areas.

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A dedicated waste management area will be located within each compound, with waste to be sorted and collected from site by permitted collectors. In the absence of a temporary water supply, potable drinking water will be supplied via water coolers located within the staff facilities, which will be restocked on a regular basis as required during the construction phase. A supply contract will be set up with a water cooler supply company with water supplies delivered to site as required for the duration of the construction period.

Temporary port-a-loo toilets located within portacabins will be used during the construction phase. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to wastewater treatment plants. Power will be supplied by either a temporary electricity connection and/or through the use of a diesel generator, located within the compound. The construction compound will be used for temporary storage of some construction materials, prior to their delivery to the required area of the site.

4.3.8 Site Landscaping

Before completion of the construction phase for each phase of the Proposed Development, landscaping works will be carried out to improve the visual amenity of the site. These landscaping works will follow the layout of the landscape plan provided in the Landscape Masterplan which is included as in Volume 3 of this EIAR in the following appendices:

- Site A – Volume 3a Appendix 4-7
- Site B – Volume 3b Appendix 4-7
- Site C – Volume 3c(i) Appendix 4-7
- MOOR – Appendix 3d Appendix 4-5

4.4 Construction Methodologies

This section describes the construction methodologies that will be used for the Proposed Development. Further details are also provided in the Construction and Environmental Management Plan (CEMP) for each component of each application of the Proposed Development.

4.4.1 General Construction Measures

Communication with the public, local residents and businesses adjacent the development will be an important responsibility of the Project Manager and delegated persons. All parties will be kept up to date and informed about each phase of development both prior to and throughout the construction period. Two to three weeks before any work commencing, reasonable efforts will be made to inform all parties of the upcoming works.

- All personnel will be inducted and made familiar with Risk Assessments / Method Statements (RAMS) and Traffic Management Plans.
- All site-specific safety rules will be adhered to.
- All plant operators will have appropriate CSCS training.
- All personnel will have SOLAS Safe Pass training
- Fire extinguishers and first aid supplies will be available in the work area.
- All adjacent roadways will be maintained in clean condition at all times.
- Helmets, high visibility clothing and safety footwear will be worn at all times.
- Competent foremen will be on site at all times

A Traffic Management Plan (TMP) will be issued to both Meath and Kildare County Councils for approval prior to works commencing on each site. The approved TMP and any revisions thereto will be set up and implemented on each site. All necessary signage will be erected in the weeks prior to any

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works commencing along and on adjacent roads to the Proposed Development giving advance warning to traffic, pedestrians / members of the public. Every effort will be made to minimise the impact of the above works on local residences and traffic. A copy of the Design Stage Traffic Management Plan is included in Volume 3 of this EIAR in the following appendices

- Volume 3a Appendix 4-8
- Volume 3b Appendix 4-8
- Volume 3c(i) Appendix 4-8

4.4.2 Soil Excavation/Stripping, Redistribution & Temporary Stockpiling

The excavation and stripping of soils and subsoils will be required across much of the site, and this soil will need to be redistributed and temporarily stockpiled around the sites as the Proposed Development progresses. Prior to the construction of each phase of the proposal, site levelling will be undertaken. During these works, topsoil will be stripped and stored in temporary storage areas for reuse. As the Proposed Development sites currently support seminatural grassland, the seedbank within the topsoil will be used within the green spaces during final landscaping work. This will ensure that the green spaces comprise of plant species of a local origin and reduce a requirement for reseeding. Full details of the soil/subsoil and the cut and fill is provided in the Construction and Environmental Management Plans provided for each site, and in the Engineering Services Report as Appendix 4-9 in Volumes 3a, 3b & 3c(i) of the EIAR. Where these works occur, the following will apply:

- The area where excavations are planned will be surveyed and all existing services will be identified.
- All relevant bodies i.e., ESB, Bord Gáis, Irish Water, Eircom, Meath County Council, Kildare County Council etc. will be contacted and all drawings for all existing services sought.
- All plant operators and general operatives will be inducted and informed as to the location of any services.
- All plant operators and general operatives will be inducted and informed as to the identification of invasive species.
- A tracked 360-degree excavator will be used to excavate the material, and a dumper will be used to move the excavated materials to the temporary stockpile location.
- All excavated material which is not required for future landscaping works or for backfill of excavations will be removed to an authorised waste recovery facility. This will also apply to material which is not suitable for reuse on site.
- All stockpiles will be damped down or covered in a sheet of polythene, as required, which will prevent the creation of nuisance dust, and will also prevent sediment runoff in times of heavy precipitation.
- A silt filtration system will be used as appropriate to prevent contamination of any watercourse.

4.4.3 Site Roads

The construction methodology for the proposed roads is outlined as follows:

- Excavation will take place until a competent stratum is reached.
- The competent stratum will be overlain with up to 450mm of granular fill.
- A layer of geogrid/geotextile may be required at the surface of the competent stratum.
- A final hard surface layer will be placed over the excavated road to provide a road profile to accommodate construction traffic.

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- Prior to completion of the construction works on site, the finished road surface will be applied.
- Roads will be designed in line with Section 4.4.9 of DMURS. All footpaths within the development will be a minimum of 1.80m wide and will run parallel to the proposed road infrastructure.
- The design of the MOOR and the realignment of the R157 Regional Road and L6219 local road will consist of a carriageway width of 7.0m, 1.5m verge, footpath and also 1.75m off road cycle tracks along the R157 designed in accordance with the National Cycle Manual.
- All works on public roads will be carried out subject to, and under a Road Opening Licence from the Local Authority. All works will be carried out as per the Local Authority and HAS guidelines for working on public roads, with appropriate traffic management guidelines

4.4.4 Excavation and Services Installation

Services will be required to each building in the Proposed Development. Where these are located, the following will apply:

- The area where excavations are planned will be surveyed and all existing services will be identified.
- All relevant bodies i.e. ESB, Bord Gáis, Eircom, Meath and Kildare County Councils etc. will be contacted and all drawings for all existing services sought.
- A traffic management plan will be produced if required for connection works to the existing service network.
- A road opening licence will be obtained where required for connection to existing services.
- All plant operators and general operatives will be inducted and informed as to the location of any services.
- A tracked 360-degree excavator or similar will be used to excavate the trench to the required dimensions.
- All excess excavated material will be removed to an authorised waste recovery facility or, if suitable, stockpiled and reused for backfilling and landscaping where appropriate.
- Once the trench has been excavated the ducting/pipework will then be placed in the trench as per specification.
- Once the service ducts/pipework has been installed couplers will be fitted as required and capped to prevent any dirt etc. entering the ducts/pipes.
- The built location of the ducting/pipework will be surveyed using a total station/GPS.
- Backfill material will be carefully placed so as not to displace the ducting/pipework within the trench.
- The appropriate warning/marker tape will be installed above the ducts/pipes at the appropriate depths.
- The surface will be reinstated as per original specification or to the requirements of the development designer/Local Authority as appropriate.

4.4.4.1 Existing Underground Services

Any underground services encountered during the works will be surveyed for level and where possible will be left in place. If there is a requirement to move the service, then the appropriate body (ESB, Gas Networks Ireland, etc.) will be contacted, and the appropriate procedure put in place. Back fill around any utility services will be with dead sand/pea shingle where appropriate. All works will be in compliance with required specifications.

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4.4.5 Building Construction

The buildings will be constructed by the following methodology:

- The area of each building will be marked out using ranging rods or wooden posts and the soil and overburden stripped and removed to nearby storage area for later use in landscaping (if not already done so). Any excess material will be sent to an authorised recovery facility.
- A tracked 360-degree excavator or similar will be used to excavate the area down to the level indicated by the designer and appropriately shuttered reinforced concrete will be laid over it;
- The block work walls will be built up from the foundation (including a DPC) and the floor slab constructed, having first located any ducts or trenches required by the follow on mechanical and electrical contractors;
- The block work and/or timber frame will then be raised to wall plate level and the gables & internal partition walls formed. Scaffold will be erected around the outside of the buildings for this operation;
- Any concrete slabs will be lifted into position using an adequately sized mobile crane;
- The timber roof trusses will then be lifted into position using a telescopic load all or mobile crane depending on site conditions. The roof trusses will then be felted, battened, tiled and sealed against the weather.
- Windows, electrics, plumbing and all other building components and services will be installed in as timely a manner as is possible.
- Each building will be inspected and certified by an engineer at the appropriate stages of construction.

4.4.6 Bridge Construction

All of the bridges to be constructed as part of the proposed development share a number of key characterises. The bridges include:

- Piled foundations;
- Cast in situ abutments;
- Precast deck elements
- On deck cast in situ slabs or screeds;
- Post-fix parapets.

In advance of any construction of bridges, a bridge specific Risk Assessment and Method Statement (RAMS) will be produced by the contractor. The RAMS will also be reviewed by the designer to ensure that the construction methodology is compatible with the individual bridge design.

The construction sequence below is envisaged at this juncture to likely be adopted for construction:

- Clear the works area and install silt traps and drainage controls under archaeological and ecological supervision as required;
- Prepare the area with geotextile and piling mat of approximately 300 to 600mm of 6F material;
- Install bored piles for the foundations by way of a mobile CFA piling rig;
- Mobilise the in situ reinforced concrete team of steel fixers and carpenters under engineering supervision to build the abutments and central piers (where required);
- Place the main deck structure in accordance with a bespoke lifting plan prepared by a competent person;
- Fix and pour the bridge deck;
- Erect parapets and complete the bridge construction.

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The bridges are designed to be constructed without carrying out works in the wetted areas of the watercourses. All structures in proximity to water and over water will be planned and built in line with a detailed Risk Assessment and Method Statement that takes into account the requirements of Inland Fisheries Ireland and the mitigation measures outlined in this EIAR. Full details are provided in the Construction and Environmental Management Plans and Bridge Options Reports which are prepared for each application within the proposed development.

4.4.7 Headwalls

The sustainable drainage network requires the construction of outfalls along the Rye Water River and the Blackhall Little Stream, which consist of the construction of new concrete headwalls along the watercourses.

All headwalls required for the construction of the proposed development will be small in nature and will be precast. As such, the site work will be minimised. The contractor will set out the position of the headwall and prepare the base with lean mix concrete or CI 808 crushed stone. Once the base is prepared the headwall will be placed on the base in the pipeline and will be constructed from the back of the headwall.

4.4.8 Directional Drilling

Drilling will be required for the installation of the wastewater line beneath the Rye Water River. The horizontal directional drilling method of installation is carried out using bespoke plant such as a Vermeer D36 x 50 Directional Drill (approximately 22 tonnes), or similar plant. The launch and reception pits will be approximately 2.5m wide, 2.5m long and 2.0m deep. The pits will be excavated with a suitably sized excavator. The drilling rig will be securely anchored to the ground by means of anchor pins which will be attached to the front of the machine. The drill head will then be secured to the first drill rod and the operator will commence to drill into the launch pit to a suitable angle which will enable him to obtain the depths and pitch required to the line and level of the required profile. Drilling of the pilot bore will continue with the addition of 3.0m long drill rods, mechanically loaded and connected into position.

During the drilling process, a mixture of a natural, inert and fully biodegradable drilling fluid such as Clear Bore™ and water is pumped through the centre of the drill rods to the reamer head and is forced in to void and enables the annulus which has been created to support the surrounding subsoil and thus prevent collapse of the reamed length. Depending on the prevalent ground conditions, it may be necessary to repeat the drilling process by incrementally increasing the size of the reamers. When the reamer enters the launch pit, it is removed from the drill rods which are then passed back up the bore to the reception pit and the next size reamer is attached to the drill rods and the process is repeated until the required bore with the allowable tolerance is achieved.

The use of a natural, inert and biodegradable drilling fluid such as Clear Bore™ is intended to negate any adverse impacts arising from the use of other, traditional polymer-based drilling fluids and will be used sparingly as part of the drilling operations. It will be appropriately stored prior to use and deployed in the required amounts to avoid surplus. Should any excess drilling fluid accumulate in the reception or drilling pits, it will be contained and removed from the site in the same manner as other subsoil materials associated with the drilling process to a licensed recovery facility.

Backfilling of launch & reception pits will be conducted in accordance with the normal specification for backfilling excavated trenches. Sufficient controls and monitoring, as listed below, will be put in place during drilling to prevent frack-out, such as the installation of casing at entry points where reduced cover and bearing pressure exits.

- The area around the Clear Bore™ batching, pumping and recycling plants shall be bunded using terram and sandbags in order to contain any spillages;

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- One or more lines of silt fences shall be placed between the works area and adjacent rivers and streams on both banks;
- The area around the Clear Bore™ batching, pumping and recycling plants shall be bunded using terram and sandbags in order to contain any spillages;
- One or more lines of silt fences shall be placed between the works area and adjacent rivers and streams on both banks;
- Accidental spillage of fluids shall be cleaned up immediately and transported off site for disposal at a licensed facility; and,
- Adequately sized skips will be used for temporary storage of drilling arisings during directional drilling works. This will ensure containment of drilling arisings and drilling flush.

4.4.9 Construction Site Management Measures Incorporated into Project Design

The following measures pertaining to water quality have been incorporated into the design phase of the project to mitigate the potential for significant effects on sensitive environmental receptors.

4.4.9.1 Pollution Prevention Control Measures

The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRIA, 2001), which provides guidance. This will ensure that surface water arising during the course of construction activities will not contain excess sediment. The following methods and best practice measures will ensure that potential sediment release and the potential for pollution during the construction phase is minimised.

4.4.9.1.1 *Drainage*

For the initial phase of construction, i.e., during the ground works phase when the constructed drainage systems are not yet in place, control measures will be implemented as follows,

- Hoarding will be constructed around the construction site footprint in order to create a defined perimeter for the proposed works, leaving a natural vegetation buffer between the construction footprint and the River Rye Water and Blackhall Little stream and associated riparian habitats. No works will be undertaken outside the confines of this hoarding fence, with the exception of;
    - The construction of the new single span bridge over the River Rye to facilitate the delivery of the MOOR at Moyglare Close,
    - The construction of the two no. new pedestrian and cycle bridges over the Blackhall Little Stream, which will serve Site C and will be located to the south of Moygaddy Castle,
    - The construction of a new single span bridge over the Blackhall Little Stream to facilitate the delivery of the MOOR and will be located to the northwest of Site A and to the northeast of Moygaddy House,
    - The construction of a new single span pedestrian/cycle bridge located adjacent to the existing Kildare Bridge to improve accessibility across the Kildare Bridge for pedestrians and cyclists.
    - Installation of the surface water outfall locations at the River Rye and Blackhall Little, and;
    - Minor landscaping works including plantings and the installation of a silt fence, which will be undertaken as a separate element of the development that is described below.

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- A silt fence will also be attached to this boundary fence. This will protect each watercourse from any potential sediment laden surface water run-off generated during construction activities.
- The silt fence will comprise a geotextile membrane that will buried beneath the ground to filter any run-off that may occur as a result of the proposed works. The silt fence will be monitored throughout the proposed works and will remain in place after the works are completed and until the exposed earth has re-vegetated.
- As construction advances there may be a requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground;
- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing;
- Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present;
- Daily monitoring and inspections of site drainage during construction will be completed;
- Earthworks will take place during periods of low rainfall to reduce run-off and potential siltation of watercourses; and,
- Good construction practices such wheel washers and dust suppression on site roads, and regular plant maintenance, which will be implemented, will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRlA, 2001), which provides information on these issues. This will ensure that surface water arising during the course of construction activities will contain minimum sediment.
- Preventative measures during construction have been incorporated into the Construction and Environmental Management Plan for each component of the Proposed Development, which will be updated upon grant of permission and to provide any additional measures required pursuant to planning conditions and agreements with the planning authority.

Once the drainage systems and the majority of the buildings are constructed, it is proposed to separate the surface water and wastewater drainage networks, which will serve the Proposed Development, and provide independent connections for attenuated surface water discharge to the adjacent watercourse (River Rye Water and Blackhall Little) and the separate wastewater connection to the local wastewater sewer network respectively.

The proposed development will be split into a number of surface water catchments that will contribute to the surface water drainage network. Full detail including maps on the individual catchment areas are provided in the Engineering Services Report, attached as Appendix 4-9 in Volumes 3a, 3b & 3c(i) of this EIAR. All remaining areas within the Proposed Development are considered green space and allowed to drain naturally, and therefore do not contribute to the surface water drainage networks. All catchments are to discharge treated and attenuated surface water flows at a rate that is less than greenfield run off rates to surface water outfall locations along the Rye Water River and the Blackhall Little Stream.

The Proposed Development is to contain a series of measures for Sustainable Urban Drainage Systems, the details of which are described in Section 4.6.1 below and in further detail in the following appendices:

- Volume 3a – Appendix 4-9
- Volume 3b – Appendix 4-9

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- Volume 3c(i) – Appendix 4-9

Watercourse Crossings

Five new watercourse crossings are required as part of the Proposed Development. 2 no. of these crossings are to facilitate the delivery of the MOOR in the form of an integral single span bridge over the River Rye, located at ITM X693697, Y739265, and a new single span bridge over the Blackhall Little Stream, located at ITM X694635, Y739417.

There are two crossings of the Blackhall Little Stream included as part of the planning application for Site C to provide a new dedicated pedestrian and cycle bridge, the first of which is located at ITM X694259, Y739139, linking the residential areas to the west and the public park to the west and a second pedestrian and cycle bridge which is located at ITM X694257 Y739163 linking the residential areas to the scout den and creche/childcare facilities to the east.

The other crossing at the Rye water River is associated with the Kildare Bridge application, located at ITM X694632, Y739421, to facilitate a standalone pedestrian and cycle bridge adjacent to the existing Kildare Bridge.

The location of these crossings are shown in further detail in the following appendices of this EIAR.

- Volume 3a – Appendix 4-6
- Volume 3b – Appendix 4-6
- Volume 3c(i) – Appendix 4-6
- Volume 3d – Appendix 4-4
- Volume 3e – Appendix 4-4
- Volume 3e – Appendix 4-4

Both watercourse crossings associated with the MOOR will require a 7-metre single span road bridge as shown in the standard design drawings which accompanies this application.

The pedestrian/cycle bridges over the Blackhall Little Stream and the Rye Water River adjacent to Kildare Bridge, will require a 2-metre clear span pedestrian and cycle footbridge as shown in the standard design drawings which accompanies this application.

The clear-span watercourse crossing methodologies are presented below:

The standard construction methodology for the installation of a clear-span bridge is as follows:

- Clear the works area and install silt traps and drainage controls under archaeological and ecological supervision as required;
- Prepare the area with a geotextile and piling mat of approximately 300 to 600mm of 6F material;
- Install bored piles for the foundations by way of a mobile CFA piling rig;
- Mobilise the in situ reinforced concrete team of steel fixers and carpenters under engineering supervision to build the abutments and central piers (where required);
- Place the main deck structure in accordance with a bespoke lifting plan prepared by a competent person;
- Install falsework and permanent shutters;
- Fix and pour the bridge deck;
- Erect parapets and complete the bridge construction.

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The clear span bridge's will be constructed to the specifications of the OPW bridge design guidelines 'Construction, Replacement or Alteration of Bridges and Culverts - A Guide to Applying for Consent under Section 50 of the Arterial Drainage Act, 1945', and in consultation with Inland Fisheries Ireland.

If Planning permission is granted for the Proposed Development a separate Section 50 application will be submitted to the OPW for each individual bridge structure and associated infrastructure.

4.4.9.2 Invasive Species

The introduction and/or spread of invasive species such as Japanese Knotweed and Himalayan Knotweed for example, could result in the establishment of the species and this may have knock on effects on the surrounding environs. No invasive species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were recorded during the dedicated invasive species survey.

Appropriate control measures will be incorporated into the design and construction phase of the development to ensure that the relevant measures (outlined in the following section below) will be implemented.

4.4.9.2.1 *Control Measures for the Management of Invasive Species*

Invasive species, such as Japanese Knotweed, Himalayan Knotweed, Himalayan Balsam, Gunnera, and Giant Hogweed pose a serious threat to biodiversity and the health of native vegetation types. Construction machinery can act as a vector for the spread of these plants. Machinery that has worked at an infected site is likely to cause the spread of such species by transferring their tiny seeds or plant fragments, in soil trapped in their tyre tread for instance. Equally, they can cause the spread of species within a site. The duration of the impact could be short-term or permanent depending on whether or not an eradication effort is made but once established, eradication is time-consuming and expensive. Himalayan Knotweed, for example, propagates vegetatively, forming a new plant from even very small plant fragments. Thus, there is a high risk of causing the spread of this species to other parts of the site. The UK Environment Agency's 'Japanese Knotweed Code of Practice' provides guidance on managing Japanese Knotweed and Himalayan Knotweed on development sites. A number of control measures have been drawn up and included in the design and construction phase of the proposed works to avoid the introduction and spread of invasive plant species. The following project design elements have been devised to avoid such effects. The following measures address potential effects associated with the construction phase of the development:

- Invasive species surveys have confirmed that there are no existing stands of invasive species on site. However, should any be found, prior to the commencement of the construction of the development, they will be clearly demarcated by temporary fencing and tracking within them will be strictly avoided. A minimum buffer of seven metres will be applied to avoid disturbance of lateral rhizomes.
- All earthworks machinery will be thoroughly pressure-washed prior to arrival on site and prior to their further use elsewhere.
- Care will be taken not to disturb or cause the movement of invasive species fragments, either intentionally or accidentally.
- All contractors and staff will be briefed about the presence, identification and significance of Japanese Knotweed before commencement of works.
- Good construction site hygiene will be employed to prevent the spread of these species with vehicles thoroughly washed prior to leaving any site with the potential to have supported invasive species. All plant and equipment employed on the construction site (e.g. excavator, footwear, etc.) will be thoroughly cleaned down using a power washer unit prior to arrival on site to prevent the spread of invasive plant species such as Japanese Knotweed and Rhododendron. All washing must be undertaken in areas with no potential to result in the spread of invasive species.

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- When working at locations in proximity to natural watercourses, a suitable barrier will be erected between the watercourse and the stand of invasive species. This will assist in preventing the spread of any invasive species into the watercourse during their removal. Cognizance will be had of any watercourses in the area.
- Any material that is imported onto any site will be verified by a suitably qualified ecologist to be free from any invasive species listed on the 'Third Schedule' of Regulations 49 & 50 of Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011). This will be carried out by searching for rhizomes and plant material.
- If any excavations must be carried out in areas of Japanese Knotweed, the excavated material will not be moved from the location. The machinery must be thoroughly pressure-washed in a designated area at least 25 metres from any watercourse before moving on to an area that is not yet infected.
- Any soils or subsoils contaminated with invasive species will sent for disposal to an authorized waste facility.

The treatment and control of invasive alien species will follow guidelines issued by the National Roads Authority – The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads (NRA 2010) and the Environment Agency (2013) – The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites (Version 3, amended in 2013).

4.4.10 Landscaping Works

Prior to completion of works on the development site, the landscaping works will be carried out. The proposed landscaping plan is shown as Appendix 4-7 in Volumes 3a, 3b & 3c(i) and Appendix 4-5 in Volume 3d of this EIAR. The finishes include green areas for public amenity and swale planting, footpaths and cycling infrastructure and tree planting. This work will be carried out before the completion of each phase in order to ensure that the Proposed Development will be aesthetically pleasing place for those using and working at the Proposed Development. These works will involve the use of plant and machinery in order to carry out tasks such as earth moving. Materials which have been stockpiled for the task will be used as much as possible, and material will only be imported where it is required. Solid barriers will be erected around the site boundary for the duration of the landscaping and construction works.

4.5 Other Site Details

4.5.1 Waste Management

Appendix 4-4 of Volumes 3a, 3b & 3c(i) and Appendix 4-3 of Volumes 3d, 3e, & 3f of this EIAR, provides a construction and demolition waste management plan (CDWMP) which describes the best practice procedures during the construction phase of the project. The CDWMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of construction of the proposed development. Disposal of waste will be seen as a last resort.

The treatment of waste is to be employed by the contractor or a specialist waste management contractor as a trade package. This contractor is responsible for:

- Ensuring the site is kept clean and safe
- The collection of waste from a central point
- Segregation of waste on site

The waste management contractor will ensure that all access routes, fire escapes and staircases are swept and kept clear of debris on a regular basis to maintain high standards of health and safety on the project. No fires will be permitted on site.

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The Contractor will prepare a Construction Waste Management Plan in accordance with the "Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects" (Department of Environment, Heritage and Local Government, 2006) and ensure that all material is disposed of at an appropriately permitted or licensed waste recovery facility.

In order to ensure appropriate segregation of waste on site, a material storage zone will be provided in the compound area. This storage zone will include material recycling areas and facilities. Prior to the commencement of the development, a Construction Waste Manager will be appointed by the Contractor. The Construction Waste Manager will be in charge of the implementation of the plan, ensuring that all hired waste contractors have the necessary authorisations and that the waste management hierarchy is adhered to. The person nominated must have sufficient authority so that they can ensure everyone working on the development adheres to the management plan.

The CDWMP will provide systems that will enable all arisings, movements and treatments of construction waste to be recorded. This system will enable the contractor to measure and record the quantity of waste being generated. It will highlight the areas from which most waste occurs and allows the measurement of arisings against performance targets. The CDWMP can then be adapted with changes that are seen through record keeping.

4.5.2 Dust

Dust prevention measures will be included for control of any site airborne particulate pollution. The Contractor will put in place and monitor dust levels in the vicinity using a Bergerhoff gauge instrument or similar. The minimum criteria to be maintained will be the limit for Environmental Protection Agency (EPA) specification for licensed facilities in Ireland, which is 350mg/m2/day. The Contractor will continuously monitor dust over the variation of weather and material disposal to ensure the limits are not breached throughout the project. Dust suppression systems should be implemented if required based on the continuously monitored dust levels.

Dust control should be achieved by:

- Site roads shall be regularly cleaned and maintained as appropriate;
- Hard surface roads shall be swept to remove mud and aggregate materials from their surface as a result of the development works;
- Any un-surfaced roads shall be restricted to essential site traffic only;
- Any road that has the potential to give rise to fugitive dust may be regularly watered, as appropriate, during extended dry and/or windy conditions;
- On-site speed limits will be stipulated to prevent the unnecessary generation of fugitive dust emissions;
- Material handling systems and site stockpiling of materials shall be designed and laid out to minimise exposure to the wind;
- A complaints register will be maintained on-site and any complaints relating to dust emissions will be immediately dealt with;
- In periods of dry weather when dust emissions would be greatest, a road sweeper, which would also dampen the road, will be employed to prevent the generation of dust;
- Water misting or sprays shall be used as required if particularly dusty activities are necessary during dry or windy periods; and
- If appropriate, dust monitoring will be carried out during the construction phase of the scheme. If the level of dust is found to exceed 350mg/m2day in the vicinity of the site, further mitigation measures will be incorporated into the construction of the proposed scheme.

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4.5.3 Noise

Construction contractors will be required to comply with the requirements of the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations and the Safety, Health and Welfare at Work (Control of Noise at Work) Regulations. Noise levels will be kept below those levels specified in the National Roads Authority – "Guidelines for the Treatment of Noise and Vibration in National Roads Schemes" or such further limits as imposed by Meath County Council. The proposed development will comply with BS 5228 "Noise Control on Construction and open sites Part 1: Code of practice for basic information and procedures for noise control."

Construction equipment for use outdoors will comply with the European Communities Regulations– Noise Emission by Equipment for Use Outdoors – SI 241 - 2006.

All plant items used during the construction phase will comply with standards outlined in the 'Safety, Health and Welfare at Work (Control of Noise at Work) Regulations' and the 'European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations'. The Proposed Development will include the following noise mitigation measures:

- Construction operations will in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 08:00-16:00 h.
- Screening and enclosures will be utilised in areas where construction works are continuing in one area for a long period or around items such as generators or high duty compressors. For maximum effectiveness, a screen will be positioned as close as possible to either the noise source or the receiver. The screen will be constructed of material with a mass of >7kg/m2 and should have no gaps or joints in the barrier material. This can be used to limit noise impact to any noise-sensitive receptors;
- Operators of all mobile equipment will be instructed to avoid unnecessary revving of machinery and mobile equipment will be throttled down or switched off when not in use; and
- All mobile plant onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. Accordingly, where possible all construction traffic to be used on-site will have effective well- maintained silencers. Defective silencers will be immediately replaced;

4.5.4 Road Cleaning and Wheel Washing

The Contractor will make provision for the cleaning by road sweeper etc. of all access routes to and from the site during the course of the works as required. It is intended that cleaning will be undertaken on a daily basis during the excavation works and as required thereafter. A wheel wash facility will be provided on site to clean site traffic leaving the site. Wastewater generated at this washing facility will be suitably treated on site and all settled silts disposed offsite to permitted or licensed waste recovery facility. All road sweeping vehicles will be emptied off site at a suitably permitted or licensed facility as per our construction stage environmental waste management document.

4.5.5 Water Supply

Water will be supplied on site by water tankers for general use. Unless a temporary water supply is secured from Irish Water, potable water will be provided in the form of bottled water for staff use during the construction phase (prior to connections to the municipal water supply).

4.5.6 Wastewater Management

Portable toilets will be provided for those working on the construction sites throughout the Proposed Development. Wastewater arising on-site from these toilets is stored in a sealed tank located within the

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portable toilets, and these will be emptied periodically (as required) by permitted waste contractors and transported to municipal wastewater treatment plants for treatment.

Any sewage or greywater generated during the operational phase of the Proposed Development will be directed to the local municipal wastewater treatment plants for treatment via the proposed onsite pumping station.

4.5.7 Aggregates

The aggregates required for the construction of the Proposed Development will be where possible reused from the various sites within the proposed development, as many have overlapping construction timelines. This will reduce the potential for any negative impacts associated with the haulage of the materials to and from the site of the Proposed Development. Existing soils and subsoils located on the site will be used where possible to reduce the amount of such materials required for import onto the site.

4.5.8 Construction Traffic/Plant

The following mitigation measures will be implemented in relation to construction traffic and plant/machinery in order to minimise and reduce emissions where possible:

- All vehicles to switch off engines when not in use – no idling vehicles
- Effective vehicle cleaning and wheel washing on leaving site and damping down of haul routes.
- On-road vehicles to comply to set emission standards.
- All non-road mobile machinery (NRMM) to be fitted with appropriate exhaust system and be regularly serviced.
- Hard surfacing and effective cleaning of haul routes and appropriate speed limit around site

4.6 Operational Phase

The Proposed Development will require periodic maintenance throughout the operational phase. The operation of Site A (Office Buildings), Site B (Healthcare Facilities), Site C (Residential Development) are not recognised sources of significant environmental emissions or nuisance and so there will be no adverse effects associated with its operation, provided drainage measures, wastewater systems are regularly maintained.

4.6.1 Proposed Surface Water Drainage

Once the drainage systems and the majority of the buildings are constructed, it is proposed to separate the surface water and wastewater drainage networks, which will serve the Proposed Development, and provide independent connections for surface water to the adjacent River Rye Water and Blackhall Little stream and a separate wastewater connection to the local wastewater sewer network respectively. Sites A, B & C will direct surface water from surfaced areas roads, and roofs, via gravity, infiltration area/attenuation storage, hydrocarbon interceptors and filtration drain to outfalls at the River Rye Water, just west of the Kildare Bridge and the Blackhall Little stream. The remaining areas are considered green space and will be allowed to drain naturally to ground, with negligible impact on the performance of the surface water network, and therefore do not contribute to the surface water drainage networks.

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Site A

It is proposed that surface water within Site A (from roads, roofs and hardstanding areas) will drain via gravity, and via hydrocarbon interceptors, and infiltration area/attenuation storage areas, to an existing ditch along the southern boundary, which is to be replaced by a new filter trench as part of the upgraded and re-aligned R157. This drain conveys surface water runoff in a southerly direction, ultimately towards the River Rye at the proposed outfall location described below. Underground attenuation will comprise underground poly-tunnel systems, to be provided within proposed green spaces at Site A.

The discharge rates at the proposed surface outfall, which serves Site A, is to be restricted to a low rate less than than the current greenfield equivalent runoff rate, to ensure that there is no increase in flow rates and volumes to be discharged from the Proposed Development to the receiving infrastructure and waterbodies. Therefore, there will be no adverse impact on the River Rye and other downstream properties

Site B

It is proposed that surface water within Site B (from roads, roofs and hardstanding areas) will drain via gravity, and via hydrocarbon interceptors, and infiltration area/attenuation storage (located in the shared carpark at Site B), to a high-level outfall at the River Rye, just west of the Kildare Bridge. The Proposed Development will direct surface water from surfaced areas roads, and roofs, via gravity, infiltration area/attenuation storage, hydrocarbon interceptors and filtration drain at less than greenfield run off rates to a high-level outfall at the River Rye, just west of the Kildare Bridge. The remaining areas are considered green space and will be allowed to drain naturally to ground, with negligible impact on the performance of the surface water network, and therefore do not contribute to the surface water drainage networks.

The discharge rates at the proposed surface water outfall, which serves Site B, is to be restricted to a flow rate less than less than the current greenfield equivalent runoff rate, to ensure that there is no increase in flow rates and volumes to be discharged from the Proposed Development to the receiving infrastructure and waterbodies. Therefore, there will be no adverse impact on the River Rye and other downstream properties.

Site C (SHD)

It is proposed that surface water within Site C (from roads, roofs and hardstanding areas) will drain via gravity, and via hydrocarbon interceptors, and infiltration area/attenuation storage (located in the open spaces to the south and east of the site), at less than greenfield run off rates to a high-level outfall at the Blackhall Little Stream. The remaining areas are considered green space and will be allowed to drain naturally to ground, with negligible impact on the performance of the surface water network, and therefore do not contribute to the surface water drainage networks.

The discharge rates at the proposed surface water outfall, which serves Site C, is to be restricted to a flow rate less than the current greenfield equivalent runoff rate, to ensure that there is no increase in flow rates and volumes to be discharged from the Proposed Development to the receiving infrastructure and waterbodies. Therefore, there will be no adverse impact on the Blackhall Little Stream and other downstream properties.

Maynooth Outer Orbital Road (MOOR)

It is proposed that surface water run off on the MOOR is to be captured by adequately spaced trapped road gullies, which connect to a main carrier drain under the road. The rainfall runoff on the aligning

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footpath and cycle track shall be intercepted by the dividing tree-lined grass verge, with excess runoff only being collected by the road's gully network. Surface water attenuation will be used to control runoff from all hard surfaces in accordance with the GDSDS, with these being restricted to a maximum flow rate of 5.5 l/s/ha, which is less than the calculated greenfield runoff equivalent.

The proposed surface water network is to be split into 4 no. catchments, in order to optimise the network based on the natural topography of the site.

It is proposed that surface water from the MOOR is to discharge the treated and attenuated runoff from each catchment to the existing watercourses at the proposed outfall locations, namely the Rye Water River and Blackhall Little Stream.

Kildare Bridge Application

It is proposed that surface water run off on the Kildare Bridge is to be captured by the proposed drainage features proposed as part of the MOOR. Adequately spaced trapped road gullies, which connect to a main carrier drain under the road. The rainfall runoff on the aligning footpath and cycle track and bridge shall be intercepted by the dividing tree-lined grass verge, rainfall will be allowed to percolate to ground and/or flow via subsurface flow to the Rye Water River. Surface water attenuation will be used to control runoff from all hard surfaces in accordance with the GDSDS, with these being restricted to a maximum flow rate of 5.5 l/s/ha, which is less than the calculated greenfield runoff equivalent.

Moyglare Bridge Application

It is proposed that surface water run off on the Moyglare Bridge is to be captured by the proposed drainage features proposed as part of the MOOR. Adequately spaced trapped road gullies, which connect to a main carrier drain under the road. The rainfall runoff on the aligning footpath and cycle track shall be intercepted by the dividing tree-lined grass verge, with excess runoff only being collected by the road's gully network. Surface water attenuation will be used to control runoff from all hard surfaces in accordance with the GDSDS, with these being restricted to a maximum flow rate of 5.5 l/s/ha, which is less than the calculated greenfield runoff equivalent.

It is proposed that surface water from the MOOR and Moyglare Bridge is to discharge the treated and attenuated runoff from each catchment to the existing watercourses at the proposed outfall locations, namely the Rye Water River.

4.6.1.2 Operational Phase Sustainable Drainage Systems

The Proposed Development will contain a series of measures for Sustainable Urban Drainage Systems as outlined below:

4.6.1.2.1 *Rainwater Harvesting*

Site A

Rainwater Harvesting will be considered at each of the proposed office facilities, which can re-use the collected rainwater for welfare facilities, or landscaping purposes. Rainwater Harvesting helps to reduce the overall volume of rainfall runoff entering the surface water network.

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Figure 4-7 Example of Rainwater Harvesting System

Site C

Rainwater harvesting is to be considered at individual residential units in the form of 'Water Butts', which can re-use the collected rainwater for gardening and other domestic watering purposes. Rainwater Butts help to reduce the overall volume of rainfall runoff entering the surface water network.

Figure 4-8 Example of Domestic Rainwater Harvesting Butt for Site C

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4.6.1.2.2 Attenuation Storage

Attenuation Storage will be provided at strategic locations, in order to temporarily store excessive surface water, due to the restricted flow rates during rainfall events up to, and including, the design 1% AEP with a 20% additional allowance for climate change. This will allow for the limiting discharge rates to less than greenfield run off rates at the Proposed Development outfall, as outlined above.

Attenuation will be provided in the form of unlined proprietary poly-tunnel storage units (or similar approved). These poly-tunnel storage units will be underground, in proposed green-spaces for both Site A and Site C and in the car parking area for Site B, for the attenuation of rainfall runoff prior to discharge. The attenuation for the proposed MOOR are to comprise of largely enclosed vegetated ponds, and be preceded by a Class 1 bypass fuel separator.

Typical poly-tunnel storage systems comprise plastic arch-units with open-graded crushed rock bedding and surround. These units are arranged in rows, with an isolator row for efficient operation and maintenance. These systems also allow for interception of initial rainfall to be provided at the base of the system, by elevating the outlet relative to the systems base. The attenuation systems are to be installed in the greenfield areas of sites A and C and in the parking areas of Site B and was calculated to support a discharge rate that is less than the natural greenfield runoff rate.

Figure 4-9 Typical Poly Tunnel Installation Arrangement

4.6.1.2.3 Limiting Discharge

The discharge rate from the catchments are to be restricted to a maximum discharge rate which is less than the equivalent greenfield runoff. The Proposed Development discharge rates are to be restricted by using a flow control device, in a chamber upstream of the outfalls, such as Hydro-Brake Optimum Vortex Flow control unit, or similar approved by Meath and Kildare County Councils, downstream of the proposed attenuation systems as outlined above.

4.6.1.2.4 Permeable Paving

Permeable Paving is to be provided for all in-curtilage car parking space within the Residential Development (Site C), which will have a layer of drainage stone underneath. This will provide at-source treatment, interception, and attenuate rainfall runoff throughout the site, prior to entering the main

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surface water drainage network. A **Type B** porous asphalt, with a 300mm depth of open graded crushed rock as base course, is to be provided in all car parking spaces that serve the Apartments and Duplex homes in Site C and the Primary Care and Nursing Home in Site B.

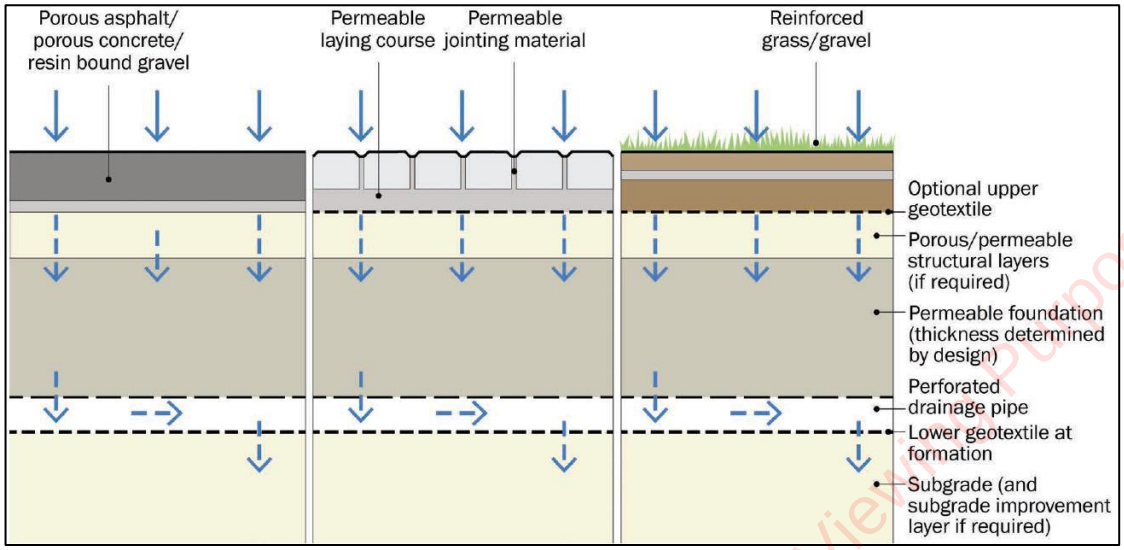

Figure 4-10 Detail of Type B Pervious Paving (CIRIA C753)

4.6.1.2.5 Trapped Road Gullies

Trapped Road Gullies will be provided for all road gullies serving the Proposed Development, to help prevent sediment and gross pollutants from entering the surface water network, and thus improving the water quality discharging from site. The road gullies will have grated covers with a minimum load classification of D400, for frequent vehicular traffic, and shall be lockable, as required by MCC.

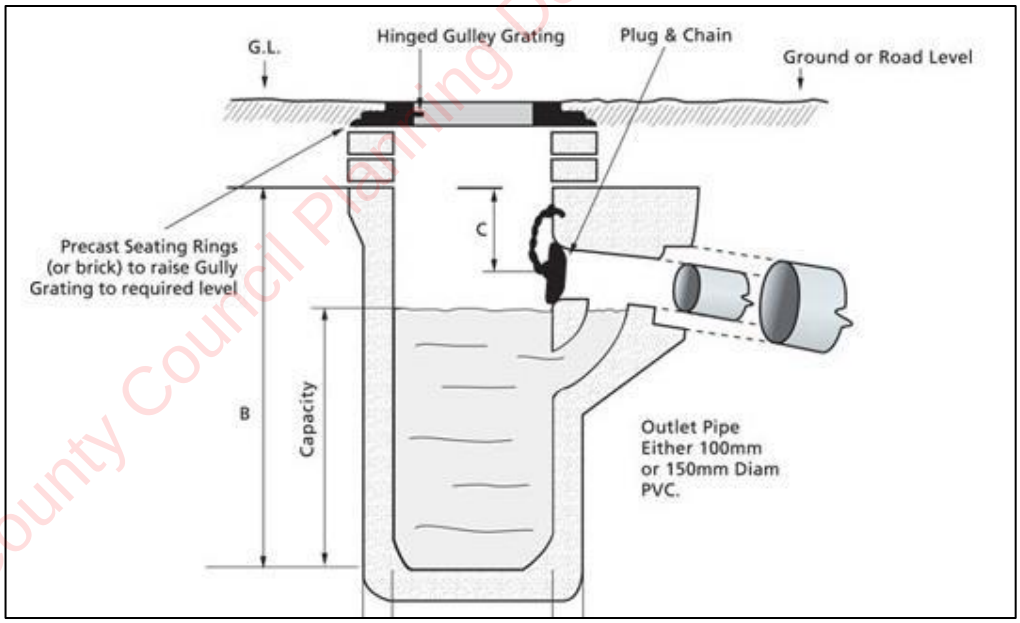

Figure 4-11 Trapped Road Gully (Typical Detail)

4.6.1.2.6 Summary of Measures

Water quality of the surface water, discharging from site, is to be improved with the following provisions:

- Permeable Paving in all private driveways, as described above;

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- Intensive landscaping, where practical;
- Trapped road gullies on all road carriageways, to trap silt and gross pollutants;
- Traditional gravity pipe and manhole network will be provided, to convey the collected rainfall runoff as far as the development's outfall. Manholes are provided for maintenance access at branched connections, change in pipe size and gradient, and at intervals no greater than 90m distance.
- Silt traps to be provided on manholes immediately upstream of attenuation systems, as a further preventative measure to trap silt and other gross pollutants;
- Surface water attenuation storage in the form of poly-tunnel installation at both Site A and Site C (green spaces) and Site B (car parking area);
- A Class 1 Bypass Fuel/Oil Separator is to be provided as an additional and final mitigation measure, prior to surface water discharge from the Proposed Development sites.

4.6.2 Proposed Wastewater Infrastructure

4.6.2.1 Site A, Site B & Site C

It is proposed to provide an onsite underground wastewater pumping station constructed to IW standards and specifications to the west of the proposed nursing home building at Site B within the Proposed Development. Both Site A to the north and Site B to the east and Site C to the west of the proposed pumping station, will drain by gravity to the Pumping Station where it will then be pumped along the R157 and L1013 Local Road towards the existing Irish Water network at Maynooth Municipal Wastewater Pumping Station in County Kildare, approximately 1km south of the proposed pumping station. All wastewater is to discharge to the public infrastructure, this is subject to agreement with Irish Water through the PCE process. In order to achieve this, a new gravity wastewater network is to be installed across the Rye Water River, as part of the proposed bridge structure. The wastewater from the proposed crèche facility is to discharge to the main wastewater network that is to be provided within the residential development, via independent packaged pump system.

Individual buildings will connect to the 225mm diameter foul drains via individual 100mm diameter connections, as per Irish Water Code of Practice for Wastewater Infrastructure. The wastewater discharge from each dwelling is to connect, via a private outfall chamber, to the new development's gravity wastewater network, which is to be designed in accordance with the Irish Water Code of Practice for Wastewater Infrastructure. A Pre-Connection Enquiry Form has been submitted to Irish Water for review, for both the Proposed Development, as well as the masterplan development for the LAP lands. Irish Water (IW) issued a Confirmation of Feasibility Letter (Refer to Appendix 4-9 in Volumes 3a, 3b & 3c(i) of this EIAR) for the Proposed Development, subject to upgrade works being carried out.

The foul sewers will be sealed and there will be no discharge of wastewater to ground within the Proposed Development. Wastewater will be pumped from the Proposed Development to the Maynooth pumping station, and onwards from Maynooth pumping station to the Leixlip Wastewater Treatment Plant.

4.6.3 Proposed Water Supply

4.6.3.1 Site A and Site B

A proposed new connection to one of the existing watermains local to Site A and Site B will be made for the Proposed Development. There is an existing 200mm watermain to the south of the Site B, in County Kildare, just south of the Kildare bridge. An extension from the existing 200mm watermain will be provided along/within the existing R157 Regional Road, to the connection point at the Proposed Development. It is anticipated that a metered 150mm high density polyethylene connection will be

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required. Internal distribution network of 150mm HDPE watermain will be provided to serve the proposed Nursing Home and Primary Care Centre and Biotechnology & Life Sciences Campus.

The Proposed Development will be subject to a New Connection Agreement with Irish Water, with all details in accordance with their requirements.

There is no proposed extraction of groundwater at the site for drinking water purposes.

4.6.3.2 Site C

A proposed new connection to one of the existing watermains local to Site C (SHD) will be made for the Proposed Development. It is proposed to provide an extension to the existing 200mm ductile iron watermain at Moyglare Close, with a metered 200mm high density polyethylene connection provided to serve the Proposed Development. Internal distribution networks of 100mm and 150mm HDPE watermain will be provided to serve the proposed residential units. An extension from the Proposed Development's watermain will be provided to serve the proposed crèche facility, adjacent.

The Proposed Development will be subject to a New Connection Agreement with Irish Water, with all details in accordance with their requirements.

There is no proposed extraction of groundwater at the site for drinking water purposes.

4.6.4 Access Arrangements

As described in Section 4.2.2 above the Proposed Development once operational will be accessible from new site entrances that will be constructed as part of each planning application. The Proposed Development includes for road upgrade works along the existing Dunboyne Road, L6219 and L22143 Local Roads, as well as providing pedestrian and cycle infrastructure, linking the Proposed Development to Maynooth town via the new Moyglare bridge and via a new pedestrian and cycle bridge adjacent to the Kildare Bridge.

A Mobility Manager/Travel Coordinator will be appointed at the Proposed Development by the management company relevant to each component of the Proposed Development. It is envisaged that the management company will oversee the implementation of the Mobility Management Pan including the Mobility Manager and can update the plan regularly following feedback from staff and residents, once occupied. Further details on the Mobility Management Plan can be found in Appendix 4-1 of Volumes 3a, 3b & 3c(i) of this EIAR. The duties of the Mobility Manager will include inter alia:

- Conducting travel surveys at regular intervals once the development is completed and operational. These surveys will provide detailed and up-to-date information on travel habits which can be used to develop new strategies that encourage travel by alternate modes;
- Implementation of various schemes/plans aimed at encouraging the uptake of more sustainable means of travel;
- Acting as an information point;
- Negotiating with public transport companies and other service providers;
- Setting up and administering registers for particular measures such as taxis if the need arises;
- Branding of the plan;
- Ongoing promotion and marketing of the plan through various mediums;
- Evaluation and adaptation of the plan in the light of experience.

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4.6.5 Resource, Waste Management & Energy Use

4.6.5.1 Site A

Site A is designed to comply with Irish Building Regulations Part L 2017 nZEB (near zero energy building). Full details of the thermal performance and energy saving measures proposed for the development are given in the Building Services Reports, which forms Appendix 9-1 of Volume 3a of this EIAR. A new Unit Substation will be required to supply electricity to each building. It is proposed to use Unit Subs rather than a standard substation in order to maintain landscape views in keeping with the open plan design.

The ESB supply to the development will be a Three Phase and Neutral (TPN) supply. Each individual floor will have a TPN Distribution Board which will be supplied from the main distribution board off loader from the Unit Sub. There will be a TPN supply for a vertical transportation system and Landlord Supplies for the common areas.

Each office block within Strategic Employment Zone will have solar PV panels fitted to the roof of each building, with the inverter, meter and distribution board housed within the buildings, to facilitate the supply of renewable electricity for energy demands of the buildings.

Waste generated throughout the operational phase of the site will be dealt in accordance with waste legislation. A detailed Operational Waste Management Plan can be found in Appendix 4-5 of Volume 3a of this EIAR.

4.6.5.2 Site B

Site B is designed to comply with Irish Building Regulations Part L 2017 nZEB (near zero energy building). Full details of the thermal performance and energy saving measures proposed for the development are given in the Building Services Report, which forms Appendix 9-1 of Volume 3b of this EIAR. A new Unit Substation will be required to supply electricity to both the Primary Care Centre and Nursing Home buildings.

The ESB supply to the developments will be a Three Phase and Neutral (TPN) supply. Each individual floor will have a TPN Distribution Board which will be supplied from the main distribution board off loader from the Unit Sub. There will be a TPN supply for a vertical transportation system and Landlord Supplies for the common areas. A substation will be required to supply electricity to the healthcare facilities.

Each of the Primary Care Centre and Nursing Homes will have solar PV panels fitted to the roof of each building, with the inverter, meter and distribution board housed within the buildings, to facilitate the supply of renewable electricity for energy demands of the buildings.

Waste generated throughout the operational phase of the site will be dealt in accordance with waste legislation. A detailed Operational Waste Management Plan can be found in Appendix 4-5 of Volume 3b of this EIAR.

4.6.5.3 Site C

The Proposed Development is designed to comply with Irish Building Regulations Part L 2017 nZEB (near zero energy building). Full details of the thermal performance and energy saving measures proposed for the development are given in the Building Services Planning Report, which forms Appendix 9-1 of Volume 3c(i) of this EIAR. 3. No substations will be required to supply electricity to the residential development.

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Waste generated throughout the operational phase of the site will be dealt in accordance with waste legislation. A detailed Operational Waste Management Plan can be found in Appendix 4-5 Volume 3c(i) of this EIAR.

4.6.6 Operational Phase Noise

Low noise levels are important for good living, in the case of residential development (Site C) and nursing home residents (Site B) and working conditions (in the case of Site A and Site B). Mechanical and electrical systems will be designed for lowest possible noise emission conducive with efficient operation. At Sites A and B, noise emissions may arise from dispersed sources such as extraction fans, vents and air conditioning cassettes. Noise emissions from these sources are unlikely to be audible beyond 10m and are thus highly unlikely to affect offsite receptors. Noise generated by occupants will be minimised by the use of acoustic panels, where necessary, which will be strategically located throughout the building. Increases in traffic noise levels on the surrounding road network including the MOOR will be minor, and no specific mitigation measures are required.

Operational phase noise mitigation required onsite relates to road-facing facades of Site A, where moderately enhanced glazing will be required to reduce internal LAFmax levels (with windows closed) below 45 dB.

At Site C, operational phase mitigation required onsite relates solely to inward impacts associated with L6219 and MOOR traffic noise. Internal LAeq T criteria will be met at most residential units using standard thermal glazing. However, certain facades will require enhanced glazing to meet ProPG and BS 8233:2014 criteria. At these façades, it is proposed to install glazing with a minimum RW value of 33 dB in living rooms and dining rooms, and 38 dB on bedrooms. Standard glazing will suffice in kitchens, bathrooms, hallways and stairwells.

The RW 33 dB specification is readily achievable, and a number of suppliers offer suitable products. See Section 10.5.2 of this EIAR for further details in relation noise during the operational phase of the Proposed Development.

4.7 Decommissioning Phase

It is not intended that the proposed buildings or roads will be removed, as permanent planning permission is being sought for the entirety of the Proposed Development (each planning application). The Proposed Development will form an integral part of the local area plan for Moygaddy as outlined in the Meath County Development Plan. Therefore, it is intended that the Proposed Development will be retained as permanent and will not be decommissioned.

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5. POPULATION & HUMAN HEALTH

5.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) identifies, describes, and assesses the potential effects of the 'Proposed Development' on human health and population. This section of the EIAR has been completed in accordance with the EIA guidance and legislation set out in Chapter 1: Introduction. The full description of the Proposed Development is provided in Chapter 4 of this EIAR.

For the purposes of this EIAR, where the Proposed Development is referred to, this relates to all the project components described in detail in Chapter 4 of this EIAR. In order to assess the population on the vicinity of the Proposed Development, the Study Area for the Population section of this EIAR was defined in terms of the DEDs where the Proposed Development is located.

One of the principal concerns in the development process is that individuals or communities, should experience no significant diminution in their quality of life from the direct or indirect effects arising from the construction and operation of a development. Ultimately, all the impacts of a development impinge on human health, directly or indirectly, positively or negatively. The key issues examined in this chapter of the EIAR include population trends, human health, employment and economic activity, land-use, residential amenity community facilities and services, tourism, property values, noise, and health and safety (with potential indirect potential effects on population and human health).

5.1.1 Statement of Authority

This section of the EIAR has been prepared by Niamh McHugh, David Naughton, Daire O'Shaughnessy and reviewed by Michael Watson, of MKO. Niamh is a Graduate Environmental Scientist and holds a BSc (Hons) in Environmental Science from the National University of Ireland, Galway. Since joining the company in 2021, Niamh has been involved in the preparation of chapters for a number of Environmental Impact Assessment Reports for large-scale developments. David is an Environmental Scientist with five years of consultancy experience with MKO and has been involved in a number of EIAR applications, predominantly in renewable energy, namely onshore wind. David has worked as project manager for a number of EIAR applications, providing a pivotal link liaising between the applicant and the EIAR project team to ensure all work is carried out to a high standard. David holds a BSc (Hons) in Environmental Science. Daire O'Shaughnessy is an Environmental Scientist who holds a B.Sc (Hons) in Environmental Science with three years of consultancy experience with MKO and has been involved in a range of EIAR applications. Michael Watson is a Project Director with MKO; with over 20 years' experience in the environmental sector. His project experience includes the management and completion of Environmental Impact Assessments (EIS/EIAR) including Population and Human Health chapters across a range of sectors.

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5.2 Population

5.2.1 Receiving Environment

This socio-economic study of the receiving environment included an examination of the population and employment characteristics of the area. Information regarding the population and general socio-economic data were sourced from the Central Statistics Office (CSO), the Meath County Development Plan 2021 - 2026, The Kildare County Development Plan 2017-2023, Fáilte Ireland and any other literature pertinent to the area. This information was sourced from the Census of Ireland 2016, which is the most recent census for which a complete dataset is available, also the Census of Ireland 2011, the Census of Agriculture 2020, and from the CSO website (www.cso.ie). At the time of writing, the Census data for 2022 was not available. Census information is divided into State, Provincial, County, Major Town and District Electoral Division (DED) level.

The Proposed Development is located in south County Meath and to the northeast environs of Maynooth town. The proposed strategic employment zone (Site A) is located approximately 1km north of Maynooth at its closest point, the proposed healthcare facilities (Site B) are located approximately 500m north of Maynooth town at its closest point, the proposed strategic housing development (Site C) is located approximately 1.1km to the north of Maynooth, the Maynooth outer orbital road (MOOR) is located approximately 1km from Maynooth town at its nearest point along the existing R157. Please refer to Figure 1-1 of Chapter: Introduction for the site location. Both the strategic employment zone (Site A) and the healthcare site (Site B) within the Proposed Development are accessed by the existing R157 Regional Road. The strategic housing development (Site C) is accessed to the north by the existing L2214 Local Road and the existing L6219 & L2214-3 Local Roads to the west. The MOOR will ink the existing R157 Regional Road, located to the east of Site B, to the Moyglare Hall road in Mariavilla, located southwest of the SHD (Site C) site.

For the purposes of this EIAR, where the Proposed Development is referred to, this relates to all the project components described in detail in Chapter 4 of this EIAR. In order to assess the impact on population in the vicinity of the Proposed Development, the Study Area for the Population section of this EIAR was defined in terms of the Electoral Districts (DEDs) where the Proposed Development is located.

The site of the Proposed Development lies predominately within the Rodanstown DED while also lying partly in Maynooth DED as shown in Figure 5-1. The Study Area has a population of 17,121 persons, as of 2016 and comprises a total land area of 63.3 km^2, (Source: CSO Census of the Population 2016). Rodanstown DED encompasses rural lands and so does not have any primary population centres. Maynooth DED includes a large town which acts as a primary population centre. Maynooth is classed under the Kildare County Development Plan 2017-2023 settlement hierarchy as a Large Growth II Smaller in scale but strong active growth town.

5.2.2 Population Trends

In the period between the 2011 and the 2016 Census, the population of Ireland increased by 3.8 %. During this time, the population of County Meath increased by 5.9% to 195,044 persons and the population of County Kildare by 5.8% to 222,504. Other population statistics for the State, County Meath, County Kildare and the Study Area have been obtained from the Central Statistics Office (CSO) and are presented in Table 5-1 below:

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Table 5-1 Population Statistics 2011 - 2016 (Source CSO)

Area	Population		% Population Change
	2011	2016	2011-2016
State	4,588,252	4,761,865	3.8
Co. Meath	184,135	195,044	5.9
Co. Kildare	210,312	222,504	5.8
Study Area	14,656	17,121	16.8

The data presented in Table 5-1 shows that the population of the Study Area increased by 16.8% in the period between 2011 and 2016. This rate of population growth is significantly higher than that which was recorded at State level, and higher than the figure recorded for both Co. Meath and Co. Kildare also.

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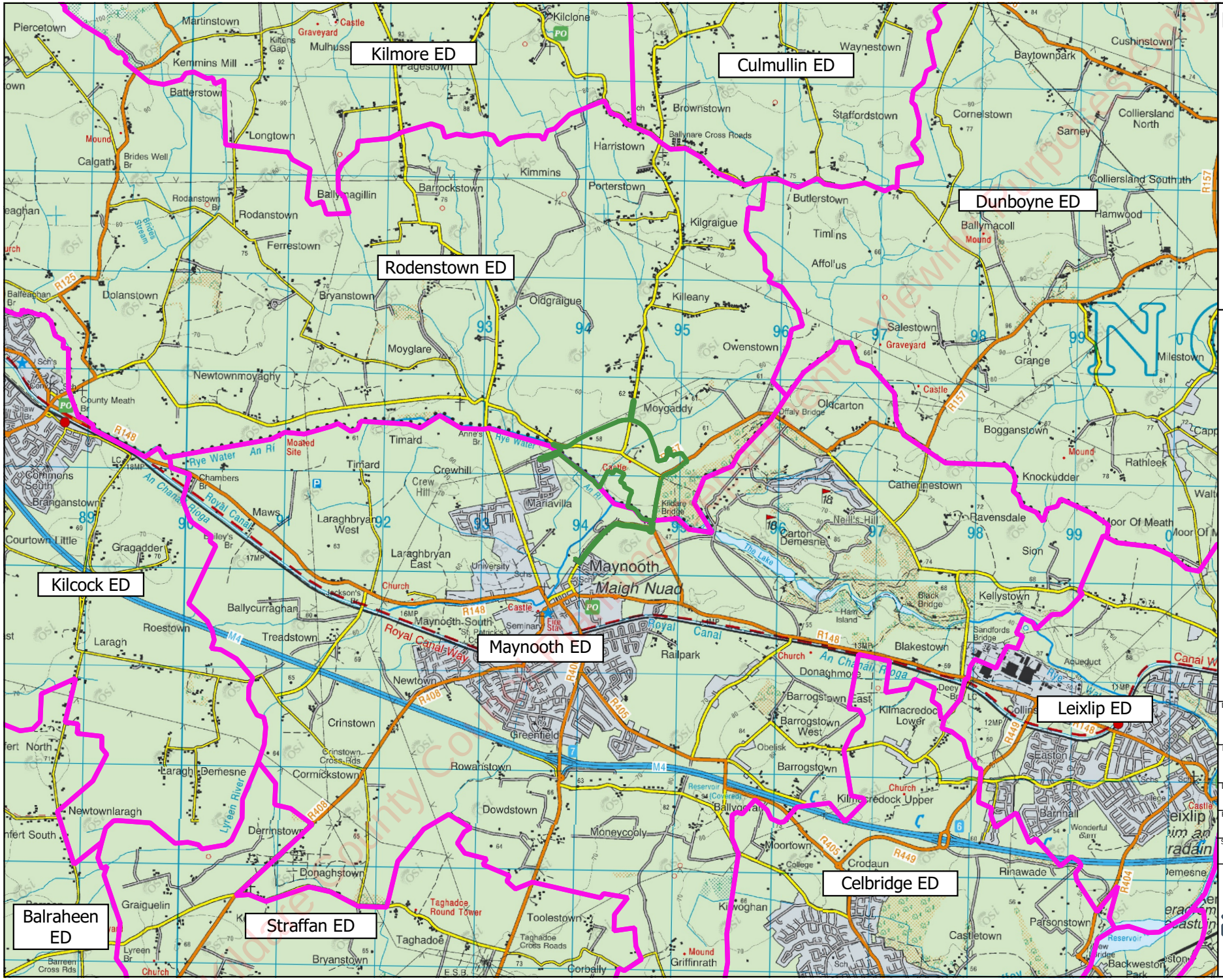

Map Legend

- EIAR Site Boundary
- Electoral Divisions

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Drawing Title: Electoral Division Map

Project Title: Moygaddy Mixed-Use Development

Drawn By	Checked By
TM	MW
Project No.	Drawing No.
210414	Figure 5-1
Scale	Date
1:50,000	19.08.2022

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

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5.2.3 Population Density

The population densities recorded within the State, County Meath, County Kildare and the Study Area during the 2011 and 2016 Census are shown in Table 5-2.

Table 5-2 Population Density in 2011 and 2016 (Source: CSO)

Area	Population Density (Persons per square kilometre)	
	2011	2016
State	65.57	68.06
County Meath	78.62	83.28
County Kildare	124.08	131.27
Study Area	231.53	270.47

The population figures for the study area show that the population density in 2011 was recorded as being 231.53 persons per km^2, and the same figure recorded in 2016 was 270.47persons per km^2. This figure is higher than both the figures recorded at the State and Counties Level.

5.2.4 Household Statistics

The number of households and average household size recorded within the State, County Meath, County Kildare and the Study Area during the 2011 and 2016 Census are presented in Table 5-3 below.

Table 5-3 Number of Households and Average Household Size 2011 – 2016 (Source: CSO)

Area	2011		2016	
	No. of Households	Avg. Size (persons)	No. of Households	Avg. Size (persons)
State	1,654,208	2.8	1,697,665	2.8
County Meath	62,201	3.0	64,234	3.0
County Kildare	70,763	2.9	73,569	3.0
Study Area	4,887	2.9	5,409	3.0

In general, the figures presented in the table above show the rate of household growth to be broadly similar at State, County and Study Area level. The average size of a household within the Study Area increased by 0.1 persons in the period between 2011 and 2016. The figures for State and County level remained the unchanged at 2.8 persons and 3.0 persons respectively between 2011 and 2016.

5.2.4.1 Employment by Socio-Economic Group

Socio-economic grouping divides the population into categories depending on the level of skill or educational attainment required. The 'Higher Professional' category includes scientists, engineers, solicitors, town planners and psychologists. The 'Lower Professional' category includes teachers, lab

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technicians, nurses, journalists, actors and driving instructors. Skilled occupations are divided into manual skilled such as bricklayers and building contractors; semi-skilled such as roofers and gardeners; and unskilled, which includes construction labourers, refuse collectors and window cleaners. Figure 5-2 shows the percentages of those employed in each socio-economic group in the State, County Meath, Co. Kildare and the Study Area, as reported during the 2016 Census.

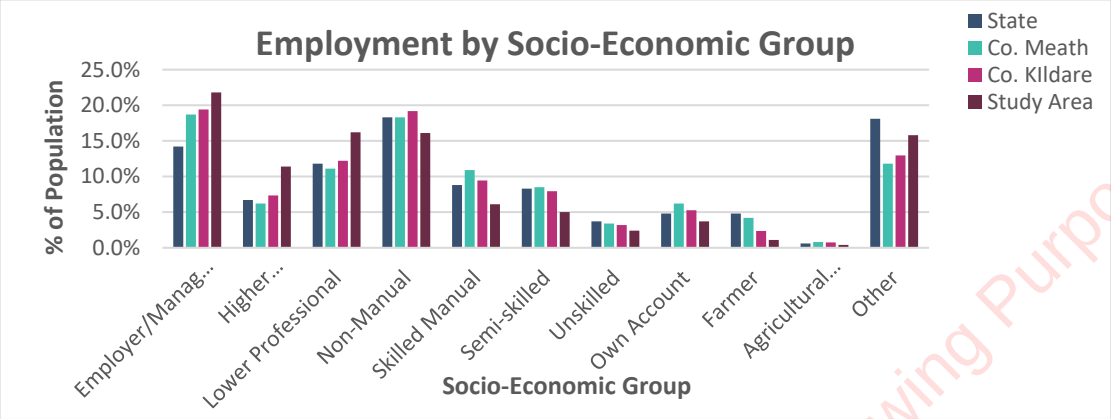

Figure 5-2 Employment by Socio-Economic Group in 2016 (Source: CSO)

The highest levels of employment within the Study Area were recorded in the Employer/Manager category. The employment in this category was significantly higher than the figures recorded at a state and county level. The levels of employment in the Higher Professional category and Lower Professional category were also higher in the Study Area than at a State and County level. The levels of employment recorded for Non-Manual, Skilled Manual, Semi-Skilled, Unskilled, Own Account, Farmer and Agricultural Workers in the Study Area were lower than figures recorded at both a state and County level.

The CSO figures for socio-economic groupings have a limitation of including the entire population, rather than just those who are in the labour force. It is likely that this is what gives rise to the high proportion of the population shown to be in the 'Other' category in Figure 5-2.

5.2.5 Land Use

The existing land use of the Proposed Development comprises agricultural grassland, with smaller areas of existing hedgerows and public roads. The total area of farmland surrounding the Proposed Development in the Study Area measures 4987.5 hectares, which is approximately 78.8% of the land within the Study Area. There are 73 farms located within the Study Area with an average farm size of approximately 72.85 hectares. Within the Study Area, farming employs 184 people, and the majority of farms are family-owned and run. Table 5-4 shows the breakdown of farmed lands within the Study Area.

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Table 5-4 Farm Size and Classification within the Study Area in 2020 (Source: CSO)

Characteristic	Value
Size of Study Area	6,330hectares
Total Area Farmed within Study Area	4,987.8hectares
Farmland as % of Study Area	78.8%
Breakdown of Farmed Land	**Area (hectares)**
Total Grassland	3,802.7 ha
Total Livestock Units	4,773

5.2.6 Services

5.2.6.1 Education

The closest primary school to the Proposed Development is Gaelscoil Ruairi, which is located approximately 350m west of the proposed Moyglare Bridge which will be constructed as part of the Proposed Development. The nearest Secondary School, Maynooth Community College, is located approximately 150m west of the Proposed Development, close to the proposed Moyglare Bridge. There are also a number of preschools and creches in the vicinity of the Proposed Development, specifically within the environs of Maynooth town.

The nearest third-level institution to the Proposed Development is the National University of Ireland, Maynooth, which is located approximately 750m west of the Proposed Development site.

5.2.6.2 Access to Public Transport

Within the site and surrounding vicinity, there are many local transport links and amenities which are available to all residents in the local area.

- Maynooth train station is located in Maynooth town centre and is approximately 820m southwest of the Proposed Development site. The station is an 11-minute walk, or an 3-minute drive from the Proposed Development and the train line serves Dublin and Sligo, as well as intervening stations.
- Buses also depart from the University which serve Dublin City centre and environs. This bus stop is approximately 750m southwest of the Proposed Development site, taking approximately 3 minutes to reach by car and 10 minutes on foot.

Within the Proposed Development site, the provision and maintenance of pedestrian and cycle infrastructure will be provided by the construction of the facilities and road upgrade works, ensuring connectivity with adjoining routes and off-site networks. High quality secure bicycle parking facilities for both short term and long-term bicycle parking requirements will also be provided within each component of the Proposed Development.

5.2.6.3 Amenities and Community Facilities

Maynooth town, which is the closest urban area to the Proposed Development, possesses a number of amenities and community facilities, including GAA, Rugby and other sports clubs and recreational areas. The closest church to the Proposed Development site is St. Mary's Catholic Church in Maynooth, which is located approximately 420m to the southwest of the Proposed Development.

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There are a wide range of services available in the area, retail and personal services are centred in Maynooth town centre, with further industrial areas and business parks located in the environs of Maynooth town.

The area around the Proposed Development has many opportunities for walking and cycling in the countryside. Carton House demesne is located directly adjacent to the east of the Proposed Development, on the eastern side of the R157 Regional Road. Carton House demesne possesses 1,100 acres of woodland and walking trails. The Royal Canal Greenway runs 130 km from Maynooth to Longford. The Greenway is accessible from Maynooth Town Centre approximately 700m south of the Proposed Development site.

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5.3 Tourism

5.3.1 Tourism numbers and Revenue

Tourism is one of the major contributors to the national economy and is a significant source of full time and seasonal employment. During 2019, total tourism revenue generated in Ireland was approximately €9.5 billion, an increase on the €9.4 billion revenue recorded in 2018. Overseas tourist visits to Ireland in 2019 grew by 0.7% to 9.7 million ('*Tourism Facts 2019*, Fáilte Ireland, March 2021).

Ireland is divided into seven tourism regions. Table 5-5 shows the total revenue and breakdown of overseas tourist numbers to each region in Ireland during 2019 ('*Tourism Facts 2019*, Fáilte Ireland, March 2021).

Table 5-5 Overseas Tourists Revenue and Numbers 2019 (Source: Fáilte Ireland)

Region	Total Revenue (€m)	Total Number of Overseas Tourists (000s)
Dublin	€2,210m	6,644
Mid-East/Midlands	**€ 348m**	**954**
South-East	€261m	945
South-West	€970m	2,335
Mid-West	€472 m	1,432
West	€653m	1,943
Border	€259m	768
Total	**€5,174 m**	**15,021**

The Proposed Development site is located within the Mid-East/Midlands region. According to '*Regional tourism performance in 2019'* (Fáilte Ireland, March 2021) the Mid-East/Midlands region which comprises Counties Louth, Laois, Longford, Offaly, Meath, Kildare, Wicklow, and Westmeath benefitted from approximately 6.4% of the total number of overseas tourists to the country and approximately 6.7% of the associated tourism income generated in Ireland in 2019.

Although the data for 2019 or 2018 is not available, Table 5-6 presents the breakdown of overseas tourist numbers and revenue to the Mid-East region during 2017 ('*2017 Topline Tourism Performance by Region,* Fáilte Ireland, August 2018). As can be observed in Table 5-6, County Kildare had the highest tourism revenue within the Region during 2017 at €91 million, which is almost double the revenue of County Meath.

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Table 5-6 Overseas Tourism to Mid-East Region during 2017 (Source: Fáilte Ireland)

Region	Total Revenue (€m)	Total Number of Overseas Tourists (000s)
Meath	**€44m**	**162**
Kildare	€91m	211
Wicklow	**€73m**	**275**

5.3.2 Tourism Attractions

The closest significant tourist attraction to the Proposed Development is Moygaddy House, which is a protected structure. Moygaddy House is located directly adjacent to the north of Site C (SHD). Further to this, Moygaddy Castle Towerhouse is also located within the Proposed Development to the south of Moygaddy House within the area that is designated as a Public Park as part of the proposed Development. Moygaddy Castle is also a protected structure of cultural heritage and archaeological importance. The majority of listed tourist attractions on the Discover Ireland (www.discoverireland.ie) and Irish Tourists website are located in the Boyne Valley Region, Maynooth Town and Curragh Region. These include but are not limited to the following:

- Moygaddy Castle – protected structure of heritage and archaeological importance, located within the proposed Strategic Housing Development within the Proposed Development.
- Moygaddy House – protected structure of heritage and archaeological importance, located to the north of the Strategic within the Proposed Development.
- Maynooth Castle – stone castle founded in the early thirteenth century, it was home to one of the most powerful Norman families and was home to the Great Earl of Kildare, who governed Ireland in the name of the King from 1487 to 1513. Maynooth castle is located approximately 1.4km south of the Proposed Development.
- Maynooth University Campus – Maynooth University possesses two campuses in Maynooth town, with the older southern campus possessing 19th-century buildings which are shared with St. Patrick's College. The Southern Campus buildings are of particular interest from a tourism point of view as the National Science Museum and Russell Library are situated here. Maynooth University is located approximately 600m southwest of the Proposed Development.
- Carton House and Golf Club – Carton House is a 5-star luxury hotel which sits in 1,100 acres of privately owned woodland as well as 2 championship golf courses. These woodlands provide amenities for walking and cycling. The golf courses are nationally renowned and provide opportunities for both golfing regulars and beginners as lessons are provided. Carton House Golf Club is located approximately 550m east of the Proposed Development.
- The Curragh – The Curragh is possibly Ireland's only example of surviving ancient lowland unenclosed grassland. It stretches for 5,000 acres from Kildare town to Newbridge. The Curragh is unique in terms of its natural and cultural heritage. It houses a training facility for the Irish Army, and also possesses a military museum and premier racecourse, Pollardstown Fen and the Royal Curragh Golf Club. The curragh is located approximately 31km southwest of the Proposed Development.
- Trim Castle – Trim Castle is the largest Anglo-Norman fortification in Ireland and was originally commissioned by Hugh de Lacy. Modern walkways within the castle have made it possible for extensive tours to take place inside the castle. The castle has been used as a backdrop for many television programmes and movies, such as Braveheart (1995). This is an OPW owned and operated site and is located approximately 22.5 km northwest of the Proposed Development.

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- Bective Abbey – Bective Abbey was founded in 1147 for the Cistercian order by Murchad O'Maeil-Sheachlainn, the King of Meath. Bective Abbey is an extremely important monastic settlement and remains of high importance from a cultural heritage and archaeological point of view. In recent years, the Abbey and its surroundings have been used in Hollywood films such as Braveheart (1995) and The Last Duel (2021). Bective Abbey is located approximately 22km northwest of the Proposed Development.
- Hill of Tara – the Hill of Tara is often regarded as the 'jewel in the crown of the Boyne Valley landscape'. The site is of huge heritage and archaeological importance as it has been a place of burial and assembly for 5,000 years. The Hill of Tara was also known as being the legendary inauguration site of Ireland's High Kings and attracts large volumes of tourists each year due to this association with Ireland's ancient past, and also due to the walking trails and views of the lowlands of Meath and beyond which can be seen from the ridges of the Hill. The Hill of Tara is located approximately 20km north of the Proposed Development.

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5.4 Human Health

The consideration of potential impacts on human health are examined separately in the Air & Climate, Noise & Vibration, Geology and Soils, Hydrology & Hydrogeology and Traffic Sections of the EIAR. These chapters should be consulted for detailed information on potential impacts, however a brief summary of the key information is provided in below. Potential issues relating to health and safety, and amenity concerns are also discussed below.

5.4.1 Natural Disaster and Major Accidents

The EIA Directive requires an assessment of the vulnerability of the project to natural disasters and the potential for the project to cause natural disasters with a view to understanding the associated environmental effects. Firstly, the Proposed Development is not a recognised source of pollution. It is not an activity that is subject to any environmental emissions controls consenting process such as EPA licensing or local authority permitting. Should a major accident or natural disaster occur the potential sources of pollution onsite during the construction and operational phases is limited. Sources of pollution at the Proposed Development with the potential to cause significant environmental pollution and associated negative effects on health such as bulk storage of hydrocarbons or chemicals, storage of wastes etc. will not occur. Small amounts of hydrocarbons will be present onsite during both construction and operational phases as described in Chapter 4 and these will be managed in accordance with best practice.

There is no site-specific mitigation required for the Proposed Development. Ireland is a geologically stable country with a mild temperate climate. The potential natural disasters that may occur are therefore limited to flooding and fire. The risk of flooding is addressed in Chapter 7 of this EIAR: Hydrology and Hydrogeology. It is considered that the risk of significant fire occurring, affecting the proposed site and causing the site to have significant environmental effects is limited. As described earlier, there are no significant sources of pollution within the Proposed Development with the potential to cause significant environmental or health effects.

Secondly, due to the nature, scale and location of the Proposed Development there is low potential for the project to cause any natural disasters or major accidents. The proposed construction works are shallow and will occur on stable, relatively flat lands. Major industrial accidents involving dangerous substances pose a significant threat to humans and the environment; such accidents can give rise to serious injury to people or serious damage to the environment, both on and off the site of the accident. The Proposed Development site is not regulated or connected to or close to any site regulated under the Control of Major Accident Hazards Involving Dangerous Substances Regulations i.e., SEVESO sites and so there are no potential effects from this source.

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5.5 Residential Amenity

Residential amenity relates to the human experience of one's home, derived from the general environment and atmosphere associated with the residence. The quality of residential amenity is influenced by a combination of factors, including site setting and local character, land-use activities in the area and the relative degree of peace and tranquillity experienced in the residence. Impacts on residential amenity have the potential for indirect negative effects on Population.

As previously noted, the Proposed Development is currently used for agricultural grassland, with no commercial or residential developments within the development site. There is therefore a limited level of existing receptors associated with the site, which will assist in the assimilation of the Proposed Development into the immediate receiving environment. The closest dwelling is located within the EIAR site boundary approximately 100 metres to the north of the Strategic Housing Development within the Proposed Development at its nearest point. There are 3 no. additional dwellings located approximately 45m south of the proposed healthcare facilities which form part of the Proposed Development at its nearest point.

There are two main impacts upon residential amenity when considering the Proposed Development, one is noise while the other is visual amenity. Others include air emissions, in particular dust as well as traffic all of which have been assessed and mitigated to ensure no significant negative effects. Noise is a quantifiable aspect of residential amenity while visual amenity is more subjective. A detailed noise assessment has been completed as part of this EIAR and is discussed in more detail in Chapter 10. A comprehensive landscape and visual impact assessment has also been carried out, as presented in Chapter 11 of this EIAR. Impacts on human beings during the construction and operational phases of the Proposed Development is assessed in relation to each of these key issues and other environmental factors such as noise, traffic, and dust; see Section 5.6 below. The impact on residential amenity is then derived from an overall judgement of the combination of impacts due to changes to land-use and visual amenity, noise, traffic, dust, and general disturbance.

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5.6 Likely Significant Impacts and Associated Mitigation Measures

The Department of Environment, Community and Local Government provide a proposed approach to reflect the requirements of the 2014 EIA Directive in relation to Population and Human Health in their Key Issues Consultation Paper. It states that,

'*it is intended that the consideration of the effects on populations and on human health should focus on health issues and environmental hazards arising from the other environmental factors, for example water contamination, air pollution, noise, accidents, disasters, and not requiring a wider consideration of human health effects which do not relate to the factors identified in the Directive'*

As described in Section 5.4 above, the potential environmental effects for the various environmental factors required for the EIAR, and the potential human health effects as addressed in the individual chapters and are referred to here. The reader is therefore directed to the relevant environmental chapter of this EIAR document for a more detailed assessment

5.6.1 'Do-nothing' Scenario

If the Proposed Development were not to proceed, no changes would be made to the current land-use practice. The site would continue to be managed under the existing farming and agricultural practices. The potential for additional investment and employment in the area in relation to the construction and operation of the Proposed Development would be lost.

5.6.2 Construction Phase

During the construction phase, all potential impacts are assessed in regard to the Proposed Development. The construction impacts may affect all aspects of the Proposed Development in some manner and occur simultaneously within the expected construction programme.

5.6.2.1 Strategic Employment Zone (Site A)

5.6.2.1.1 *Health and Safety*

Pre-Mitigation Impacts

Construction of Site A will necessitate the presence of a construction site. Construction sites and the machinery used on them pose a potential health and safety hazard to construction workers if site rules are not properly implemented.

The presence and operation of heavy machinery and traffic entering and leaving the site also poses a potential risk to members of the public that make use of the surrounding access roads.

These are considered to be short-term potential significant negative impacts.

Proposed Mitigation Measures

Site A will be constructed and operated in accordance with all relevant Health and Safety Legislation, including:

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- Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005);
- Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. No. 299 of 2007), as amended;
- Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. 291 of 2013), as amended; and
- Safety, Health and Welfare at Work (Work at Height) Regulations 2006 (S.I. No. 318 of 2006).

During construction of Site A, all staff will be made aware of and adhere to the Health & Safety Authority's '*Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2006'.* This will encompass the use of all necessary Personal Protective Equipment, Risk Assessment and Method Statements and adherence to the site Health and Safety Plan.

Fencing will be erected in areas of the site where uncontrolled access is not permitted. Appropriate health and safety signage will also be erected on this fencing and at locations around the site. Only appropriately qualified and trained personnel will be permitted to operate machinery onsite. Site A will not be accessible to members of the public during the construction phase. A Construction and Environmental Management Plan (CEMP) has been prepared for each site and submitted with the relevant planning applications, and if planning permission is granted, it is envisaged that the Developer will engage with the local authority to agree an appropriate Traffic Management plan for the purposes of the Construction phase so as to minimise the impact of the construction works on the local road network.

Residual Impact

With the implementation of the above, there will no significant negative impact on health and safety during the construction phase of Site A.

Significance of Effects

Based on the assessment above there will be no significant direct and indirect effects on health and safety during the construction phase of Site A.

5.6.2.1.2 *Employment and Investment*

There will be an opportunity for increased employment during the construction phase of Site A as it is anticipated that there will be an increase in job opportunities for those working in the construction sector, building services and supplies, as well as in local businesses.

The injection of money in the form of salaries and wages to those employed during the construction phase of the project has the potential to result in an increase in household spending and demand for goods and services in the local area. This would result in local retailers and businesses experiencing a short-term positive impact on their cash flow. This will have a short-term slight positive indirect impact.

The construction of Site A will result in an influx of skilled people into the area, bringing specialist skills for both the construction and operational phases that could result in the transfer of these skills into the local workforce, thereby having a long-term positive impact on the local skills base.

5.6.2.1.3 *Population*

During the construction phase of Site A there will be no negative impact on population, as it is predicted that the majority of staff and construction workers on site will be from the local community. The construction phase will have no impact on the population of the area in terms of changes to population trends or density, household size or age structure.

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5.6.2.1.4 *Tourism and Amenity*

The Construction Phase of Site A may give rise to short-term imperceptible negative effects on nearby tourist attractions, namely Moygaddy House and Moygaddy Castle, through increases in road traffic volumes and noise emissions.

With regard to tourist attractions and amenity use around the site, described in Section 5.3.2, traffic management safety measures will be in place as part of the Construction & Environmental Management Plan prepared for each component of the Proposed Development. Please see traffic impacts below for further details on proposed mitigation measures. Noise impacts will be mitigated for as outlined in Section 5.6.2.1.5 below.

5.6.2.1.5 *Noise*

Pre-Mitigation Impacts

There will be an increase in noise levels in the vicinity of Site A during the construction phase, as a result of heavy machinery and construction work which has the potential to cause a nuisance to sensitive receptors located closest to Site A. These impacts will be short-term in duration.

Construction noise at any given noise sensitive location will be variable throughout the construction project, depending on the activities underway and the distance from the main construction activities to the receiving properties. The potential noise impacts that will occur during the construction phase of Site A are further described in Chapter 10: Noise and Vibration.

Proposed Mitigation Measures

Best practice measures for noise control will be adhered to onsite during the construction phase of Site Ain order to mitigate the slight short-term negative impact associated with this phase of the development. These measures will include:

- Construction operations will in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 0800-1600 h.
- Where it is proposed to operate plant during the period 0700-0800 h at locations within 100 m of offsite receptors, standard 'beeper' reversing alarms will be replaced with flat spectrum alarms.
- Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoiding hooting at all times.
- Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced.
- Queuing of trucks near offsite receptors will be prohibited.
- Machinery not in active use will be shut down.
- A site representative will be appointed as a liaison officer with the local community.
- Where evening or night-time operations are required, local residents will be notified through the liaison officer.
- All complaints of noise received during the construction phase will be logged in a register and investigated immediately. Details of follow-up action will be included in the register.
- Where it is proposed to import potentially noisy plant to the site, the potential impact of noise emissions will be assessed in advance.
- Where generators or compressors are required within 100 m of offsite receptors, or previously completed receptors onsite, these will be fitted with manufacturers'

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acoustic enclosures, or alternatively will be screened by a local acoustic screen or subsoil stockpile.
- Guidance set out in British Standard BS 5228-1:2009+A1:2014 with respect to noise control will be applied throughout the construction phase.

Residual Impact

Following the implementation of the above mitigation measures, there will be a short-term slight negative residual impact due to an increase in noise levels during the construction phase of Site A.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.1.6 *Dust and Air Quality*

Pre-Mitigation Impacts

Potential dust and vehicle emission sources during the construction phase of Site A include the use of machinery, plant equipment and on-site vehicular traffic. The entry and exit of vehicles from the site may result in the transfer of mud to the public road, particularly if the weather is wet. This may cause nuisance to residents and other road users. These impacts will not be significant and will be relatively short-term in duration. The potential dust impacts that may occur during the construction phase of Site A are further described in Chapter 9 of this EIAR: Air and Climate.

Proposed Mitigation Measures

The following measure will be enforced to ensure that dust and vehicle emission nuisance during the construction phase beyond the site boundary is minimised.

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Overburden will be progressively removed from the working area in advance of construction.
- Dampening down the dust at the source by the use of barriers such as debris netting on scaffolding around the building to block dust escaping where the building is within 10m of existing residential properties.
- Site roadways will be maintained in a stoned hard-core condition not allowing soil to accumulate which when dry can create dust.
- Wheel wash equipment will be set up at the site exit gate for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways.
- Plant and equipment that have the potential to create volumes of dust will have appropriate attachments to allow water source to dampen dust to not allow it to get airborne.
- Road Sweepers may be deployed as required on public roadways in the unlikely event that mud or dust be transported from the site.

Residual Impact

Following the implementation of the above mitigation measures, there will be a short-term imperceptible negative impact due to dust emissions from the construction of Site A.

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Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.1.7 *Traffic*

Pre-Mitigation Impacts

Construction traffic will be comprised of Heavy Goods Vehicle (HGV) and Light Goods Vehicle (LGV) movements involved in the delivery of construction materials to the site and the export of excess construction materials and plant from the site. A complete Traffic and Transportation Assessment (TTA) of the Proposed Development has been carried out by O'Connor Sutton Cronin & Associates. The full results of the TTA are presented in Section 13.1 of Chapter 13: Material Assets.

The types of vehicles that will be required to negotiate the local network represent abnormal size loads and a detailed assessment of the geometry of the proposed route was therefore undertaken. This will have a temporary slight to moderate negative impact on existing road users, which will be minimised with the implementation of the mitigation measures included in the proposed traffic management plan.

Proposed Mitigation Measures

A Traffic Management Plan will be developed and implemented to ensure any impact is short term in duration and slight in significance during the construction of Site A. Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be made clear. Local access to properties will also be maintained throughout any construction works and local residents will also be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum.

Residual Impact

Once a traffic management plan is implemented for the construction phase of Site A, there will be a short-term imperceptible negative residual impact on local road users.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.1.8 *Residential Amenity*

Pre-Mitigation Impacts

Potential impacts on residential amenity during the construction phase of Site A could arise primarily due to noise, dust or changes to visual amenity. Detailed noise modelling has been carried out as part of this EIAR and show that due to the nature and size of the proposed development it is clear that construction phase noise emissions will vary, and it is not possible or practical to calculate a single sound power output figure for the entire site. With respect to surrounding noise sensitive receptors, worst case scenario emissions will arise when localised works are undertaken close to their respective boundaries.

The types of vehicles that will be required to negotiate the local network represent abnormal size loads and a detailed assessment of the geometry of the proposed route was therefore undertaken. This will have a temporary slight to moderate negative impact on existing road users, which will be minimised with the implementation of the mitigation measures included in the proposed traffic management plan.

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Proposed Mitigation Measures

A Traffic Management Plan will be developed and implemented to ensure any impact is short term in duration and slight in significance during the construction of Site A. Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be made clear. Local access to properties will also be maintained throughout any construction works and local residents will also be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum. The construction and environmental management plans (CEMP) include mitigation measures related to noise, dust and landscaping which will be in place to protect residential amenity. Construction operations will also in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 0800-1600 h, reducing noise emissions in the local area during social hours.

Residual Impact

Once a traffic management plan and noise mitigation measures are implemented for the construction phase of Site A, there will be a short-term imperceptible negative residual impact on local residents and road users.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.2 Healthcare Facilities (Site B)

5.6.2.2.1 *Health and Safety*

Pre-Mitigation Impacts

Construction of Site B will necessitate the presence of a construction site. Construction sites and the machinery used on them pose a potential health and safety hazard to construction workers if site rules are not properly implemented.

The presence and operation of heavy machinery and traffic entering and leaving the site also poses a potential risk to members of the public that make use of the surrounding access roads.

These are considered to be short-term potential significant negative impacts.

Proposed Mitigation Measures

Site B will be constructed and operated in accordance with all relevant Health and Safety Legislation, including:

- Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005);
- Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. No. 299 of 2007), as amended;
- Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. 291 of 2013), as amended; and
- Safety, Health and Welfare at Work (Work at Height) Regulations 2006 (S.I. No. 318 of 2006).

During construction of Site B, all staff will be made aware of and adhere to the Health & Safety Authority's '*Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2006'.* This will encompass the use of all

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necessary Personal Protective Equipment, Risk Assessment and Method Statements and adherence to the site Health and Safety Plan.

Fencing will be erected in areas of the site where uncontrolled access is not permitted. Appropriate health and safety signage will also be erected on this fencing and at locations around the site. Only appropriately qualified and trained personnel will be permitted to operate machinery onsite. Site B will not be accessible to members of the public during the construction phase. A Construction and Environmental Management Plan (CEMP) has been prepared for each site and submitted with the relevant planning applications, and if planning permission is granted, it is envisaged that the Developer will engage with the local authority to agree an appropriate Traffic Management plan for the purposes of the Construction phase so as to minimise the impact of the construction works on the local road network.

Residual Impact

With the implementation of the above, there will no significant negative impact on health and safety during the construction phase of Site B.

Significance of Effects

Based on the assessment above there will be no significant direct and indirect effects on health and safety during the construction phase of Site B.

5.6.2.2.2 *Employment and Investment*

There will be an opportunity for increased employment during the construction phase of Site B, as it is anticipated that there will be an increase in job opportunities for those working in the construction sector, building services and supplies, as well as in local businesses.

The injection of money in the form of salaries and wages to those employed during the construction phase of the project has the potential to result in an increase in household spending and demand for goods and services in the local area. This would result in local retailers and businesses experiencing a short-term positive impact on their cash flow. This will have a short-term slight positive indirect impact.

The construction of Site B will result in an influx of skilled people into the area, bringing specialist skills for both the construction and operational phases that could result in the transfer of these skills into the local workforce, thereby having a long-term positive impact on the local skills base.

5.6.2.2.3 *Population*

During the construction phase of Site B, there will be no negative impact on population, as it is predicted that the majority of staff and construction workers on site will be from the local community. The construction phase will have no impact on the population of the area in terms of changes to population trends or density, household size or age structure.

5.6.2.2.4 *Tourism and Amenity*

The Construction Phase of Site B may give rise to short-term imperceptible negative effects on nearby tourist attractions, namely Moygaddy House and Moygaddy Castle, through increases in road traffic volumes and noise emissions.

With regard to tourist attractions and amenity use around the site, described in Section 5.3.2, traffic management safety measures will be in place. Please see traffic impacts below for further details on proposed mitigation measures. Noise impacts will be mitigated for as outlined in Section 5.6.2.2.5 below.

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5.6.2.2.5 *Noise*

Pre-Mitigation Impacts

There will be an increase in noise levels in the vicinity of Site B during the construction phase, as a result of heavy machinery and construction work which has the potential to cause a nuisance to sensitive receptors located closest to Site B. These impacts will be short-term in duration.

Construction noise at any given noise sensitive location will be variable throughout the construction project, depending on the activities underway and the distance from the main construction activities to the receiving properties. The potential noise impacts that will occur during the construction phase of Site B are further described in Chapter 10: Noise and Vibration.

Proposed Mitigation Measures

Best practice measures for noise control will be adhered to onsite during the construction phase of Site B in order to mitigate the slight short-term negative impact associated with this phase of the development. These measures will include:

- Construction operations will in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 0800-1600 h.
- Where it is proposed to operate plant during the period 0700-0800 h at locations within 100 m of offsite receptors, standard 'beeper' reversing alarms will be replaced with flat spectrum alarms.
- Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoiding hooting at all times.
- Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced.
- Queuing of trucks near offsite receptors will be prohibited.
- Machinery not in active use will be shut down.
- A site representative will be appointed as a liaison officer with the local community.
- Where evening or night-time operations are required, local residents will be notified through the liaison officer.
- All complaints of noise received during the construction phase will be logged in a register and investigated immediately. Details of follow-up action will be included in the register.
- Where it is proposed to import potentially noisy plant to the site, the potential impact of noise emissions will be assessed in advance.
- Where generators or compressors are required within 100 m of offsite receptors, or previously completed receptors onsite, these will be fitted with manufacturers' acoustic enclosures, or alternatively will be screened by a local acoustic screen or subsoil stockpile.
- Guidance set out in British Standard BS 5228-1:2009+A1:2014 with respect to noise control will be applied throughout the construction phase.

Residual Impact

Following the implementation of the above mitigation measures, there will be a short-term slight negative residual impact due to an increase in noise levels during the construction phase of Site B.

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Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.2.6 *Dust and Air Quality*

Pre-Mitigation Impacts

Potential dust and vehicle emission sources during the construction phase of Site B include the use of machinery, plant equipment and on-site vehicular traffic. The entry and exit of vehicles from the site may result in the transfer of mud to the public road, particularly if the weather is wet. This may cause nuisance to residents and other road users. These impacts will not be significant and will be relatively short-term in duration. The potential dust impacts that may occur during the construction phase of Site B are further described in Chapter 9 of this EIAR: Air and Climate.

Proposed Mitigation Measures

The following measures will be enforced to ensure that dust and vehicle emission nuisance during the construction phase beyond the site boundary is minimised.

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Overburden will be progressively removed from the working area in advance of construction.
- Dampening down the dust at the source by the use of barriers such as debris netting on scaffolding around the building to block dust escaping where the building is within 10m of existing residential properties.
- Site roadways will be maintained in a stoned hard-core condition not allowing soil to accumulate which when dry can create dust.
- Wheel wash equipment will be set up at the site exit gate for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways.
- Plant and equipment that have the potential to create volumes of dust will have appropriate attachments to allow water source to dampen dust to not allow it to get airborne.
- Road Sweepers may be deployed as required on public roadways in the unlikely event that mud or dust be transported from the site.

Residual Impact

Following the implementation of the above mitigation measures, there will be a short-term imperceptible negative impact due to dust emissions from the construction of Site B.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.2.7 *Traffic*

Pre-Mitigation Impacts

Construction traffic will be comprised of Heavy Goods Vehicle (HGV) and Light Goods Vehicle (LGV) movements involved in the delivery of construction materials to the site and the export of excess construction materials and plant from the site. A complete Traffic and Transportation Assessment

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(TTA) of the Proposed Development has been carried out by O'Connor Sutton Cronin & Associates. The full results of the TTA are presented in Section 13.1 of Chapter 13: Material Assets.

The types of vehicles that will be required to negotiate the local network represent abnormal size loads and a detailed assessment of the geometry of the proposed route was therefore undertaken. This will have a temporary slight to moderate negative impact on existing road users, which will be minimised with the implementation of the mitigation measures included in the proposed traffic management plan.

Proposed Mitigation Measures

A Traffic Management Plan will be developed and implemented to ensure any impact is short term in duration and slight in significance during the construction of Site B. Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be made clear. Local access to properties will also be maintained throughout any construction works and local residents will also be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum.

Residual Impact

Once a traffic management plan is implemented for the construction phase of Site B, there will be a short-term imperceptible negative residual impact on local road users.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.2.8 *Residential Amenity*

Pre-Mitigation Impacts

Potential impacts on residential amenity during the construction phase of Site B could arise primarily due to noise, dust or changes to visual amenity. Detailed noise modelling has been carried out as part of this EIAR and show that due to the nature and size of the proposed development it is clear that construction phase noise emissions will vary, and it is not possible or practical to calculate a single sound power output figure for the entire site. With respect to surrounding noise sensitive receptors, worst case scenario emissions will arise when localised works are undertaken close to their respective boundaries.

The types of vehicles that will be required to negotiate the local network represent abnormal size loads and a detailed assessment of the geometry of the proposed route was therefore undertaken. This will have a temporary slight to moderate negative impact on existing road users, which will be minimised with the implementation of the mitigation measures included in the proposed traffic management plan.

Proposed Mitigation Measures

A Traffic Management Plan will be developed and incorporated into the CEMP and implemented to ensure any impact is short term in duration and slight in significance during the construction of Site B. Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be made clear. Local access to properties will also be maintained throughout any construction works and local residents will also be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum. The construction and environmental management plans (CEMP) include mitigation measures related to noise, dust and landscaping which will be in place to protect residential amenity. Construction

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operations will also in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 0800-1600 h, reducing noise emissions in the local area during social hours.

Residual Impact

Once a traffic management plan and noise mitigation measures are implemented for the construction phase of Site B, there will be a short-term imperceptible negative residual impact on local residents and road users.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.3 Strategic Housing Development (SHD: Site C)

5.6.2.3.1 *Health and Safety*

Pre-Mitigation Impacts

Construction of Site C will necessitate the presence of a construction site. Construction sites and the machinery used on them pose a potential health and safety hazard to construction workers if site rules are not properly implemented.

The presence and operation of heavy machinery and traffic entering and leaving the site also poses a potential risk to members of the public that make use of the surrounding access roads.

These are considered to be short-term potential significant negative impacts.

Proposed Mitigation Measures

Site C will be constructed and operated in accordance with all relevant Health and Safety Legislation, including:

- Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005);
- Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. No. 299 of 2007), as amended;
- Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. 291 of 2013), as amended; and
- Safety, Health and Welfare at Work (Work at Height) Regulations 2006 (S.I. No. 318 of 2006).

During construction of Site C, all staff will be made aware of and adhere to the Health & Safety Authority's '*Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2006'.* This will encompass the use of all necessary Personal Protective Equipment, Risk Assessment and Method Statements and adherence to the site Health and Safety Plan.

Fencing will be erected in areas of the site where uncontrolled access is not permitted. Appropriate health and safety signage will also be erected on this fencing and at locations around the site. Only appropriately qualified and trained personnel will be permitted to operate machinery onsite. Site C will not be accessible to members of the public during the construction phase. A Construction and Environmental Management Plan (CEMP) has been prepared for each site and submitted with the relevant planning applications, and if planning permission is granted, it is envisaged that the Developer will engage with the local authority to agree an appropriate Traffic Management plan for the purposes

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of the Construction phase so as to minimise the impact of the construction works on the local road network.

Residual Impact

With the implementation of the above, there will no significant negative impact on health and safety during the construction phase of Site C.

Significance of Effects

Based on the assessment above there will be no significant direct and indirect effects on health and safety during the construction phase of Site C.

5.6.2.3.2 *Employment and Investment*

There will be an opportunity for increased employment during the construction phase of Site C, as it is anticipated that there will be an increase in job opportunities for those working in the construction sector, building services and supplies, as well as in local businesses.

The injection of money in the form of salaries and wages to those employed during the construction phase of the project has the potential to result in an increase in household spending and demand for goods and services in the local area. This would result in local retailers and businesses experiencing a short-term positive impact on their cash flow. This will have a short-term slight positive indirect impact.

The construction of Site C will result in an influx of skilled people into the area, bringing specialist skills for both the construction and operational phases that could result in the transfer of these skills into the local workforce, thereby having a long-term positive impact on the local skills base.

5.6.2.3.3 *Population*

During the construction phase of Site C, there will be no negative impact on population, as it is predicted that the majority of staff and construction workers on site will be from the local community. The construction phase will have no impact on the population of the area in terms of changes to population trends or density, household size or age structure.

5.6.2.3.4 *Tourism and Amenity*

The Construction Phase of Site C may give rise to short-term imperceptible negative effects on nearby tourist attractions, namely Moygaddy House and Moygaddy Castle, through increases in road traffic volumes and noise emissions.

With regard to tourist attractions and amenity use around the site, described in Section 5.3.2, traffic management safety measures will be in place. Please see traffic impacts below for further details on proposed mitigation measures. Noise impacts will be mitigated for as outlined in Section 5.6.2.3.7 below.

5.6.2.3.5 *Noise*

Pre-Mitigation Impacts

There will be an increase in noise levels in the vicinity of Site C during the construction phase, as a result of heavy machinery and construction work which has the potential to cause a nuisance to sensitive receptors located closest to Site C. These impacts will be short-term in duration.

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Construction noise at any given noise sensitive location will be variable throughout the construction project, depending on the activities underway and the distance from the main construction activities to the receiving properties. The potential noise impacts that will occur during the construction phase of Site C are further described in Chapter 10: Noise and Vibration.

With regard to the construction of the proposed underground services and utilities connecting to Kildare, excavation works may give rise to noise impacts on sensitive receptors in the area, however these noise impacts will be temporary in nature as the works move along the proposed route.

Proposed Mitigation Measures

Best practice measures for noise control will be adhered to onsite during the construction phase of Site C in order to mitigate the slight short-term negative impact associated with this phase of the development. These measures will include:

- Construction operations will in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 0800-1600 h.
- Where it is proposed to operate plant during the period 0700-0800 h at locations within 100 m of offsite receptors, standard 'beeper' reversing alarms will be replaced with flat spectrum alarms.
- Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoiding hooting at all times.
- Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced.
- Queuing of trucks near offsite receptors will be prohibited.
- Machinery not in active use will be shut down.
- A site representative will be appointed as a liaison officer with the local community.
- Where evening or night-time operations are required, local residents will be notified through the liaison officer.
- All complaints of noise received during the construction phase will be logged in a register and investigated immediately. Details of follow-up action will be included in the register.
- Where it is proposed to import potentially noisy plant to the site, the potential impact of noise emissions will be assessed in advance.
- Where generators or compressors are required within 100 m of offsite receptors, or previously completed receptors onsite, these will be fitted with manufacturers' acoustic enclosures, or alternatively will be screened by a local acoustic screen or subsoil stockpile.
- Guidance set out in British Standard BS 5228-1:2009+A1:2014 with respect to noise control will be applied throughout the construction phase.

Residual Impact

Following the implementation of the above mitigation measures, there will be a short-term slight negative residual impact due to an increase in noise levels during the construction phase of Site C.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.3.6 *Dust and Air Quality*

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Pre-Mitigation Impacts

Potential dust and vehicle emission sources during the construction phase of Site C include the use of machinery, plant equipment and on-site vehicular traffic. The entry and exit of vehicles from the site may result in the transfer of mud to the public road, particularly if the weather is wet. This may cause nuisance to residents and other road users. These impacts will not be significant and will be relatively short-term in duration. The potential dust impacts that may occur during the construction phase of Site C are further described in Chapter 9 of this EIAR: Air and Climate.

Proposed Mitigation Measures

The following measures will be enforced to ensure that dust and vehicle emission nuisance during the construction phase beyond the site boundary is minimised.

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Overburden will be progressively removed from the working area in advance of construction.
- Dampening down the dust at the source by the use of barriers such as debris netting on scaffolding around the building to block dust escaping where the building is within 10m of existing residential properties.
- Site roadways will be maintained in a stoned hard-core condition not allowing soil to accumulate which when dry can create dust.
- Wheel wash equipment will be set up at the site exit gate for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways.
- Plant and equipment that have the potential to create volumes of dust will have appropriate attachments to allow water source to dampen dust to not allow it to get airborne.
- Road Sweepers may be deployed as required on public roadways in the unlikely event that mud or dust be transported from the site.

Residual Impact

Following the implementation of the above mitigation measures, there will be a short-term imperceptible negative impact due to dust emissions from the construction of Site C.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.3.7 *Traffic*

Pre-Mitigation Impacts

Construction traffic will be comprised of Heavy Goods Vehicle (HGV) and Light Goods Vehicle (LGV) movements involved in the delivery of construction materials to the site and the export of excess construction materials and plant from the site. A complete Traffic and Transportation Assessment (TTA) of the Proposed Development has been carried out by O'Connor Sutton Cronin & Associates. The full results of the TTA are presented in Section 13.1 of Chapter 13: Material Assets.

The types of vehicles that will be required to negotiate the local network represent abnormal size loads and a detailed assessment of the geometry of the proposed route was therefore undertaken. This will

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have a temporary slight to moderate negative impact on existing road users, which will be minimised with the implementation of the mitigation measures included in the proposed traffic management plan.

Proposed Mitigation Measures

A Traffic Management Plan will be developed and implemented to ensure any impact is short term in duration and slight in significance during the construction of Site C. Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be made clear. Local access to properties will also be maintained throughout any construction works and local residents will also be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum.

Residual Impact

Once a traffic management plan is implemented for the construction phase of Site C, there will be a short-term slight negative impact on local road users.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.3.8 *Residential Amenity*

Pre-Mitigation Impacts

Potential impacts on residential amenity during the construction phase of Site C could arise primarily due to noise, dust or changes to visual amenity. Detailed noise modelling has been carried out as part of this EIAR and show that due to the nature and size of the proposed development it is clear that construction phase noise emissions will vary, and it is not possible or practical to calculate a single sound power output figure for the entire site. With respect to surrounding noise sensitive receptors, worst case scenario emissions will arise when localised works are undertaken close to their respective boundaries.

The types of vehicles that will be required to negotiate the local network represent abnormal size loads and a detailed assessment of the geometry of the proposed route was therefore undertaken. This will have a temporary slight to moderate negative impact on existing road users, which will be minimised with the implementation of the mitigation measures included in the proposed traffic management plan.

Proposed Mitigation Measures

A Traffic Management Plan and the CEMP will be developed and implemented to ensure any impact is short term in duration and slight in significance during the construction of Site C. Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be made clear. Local access to properties will also be maintained throughout any construction works and local residents will also be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum. The construction and environmental management plans (CEMP) include mitigation measures related to noise, dust and landscaping which will be in place to protect residential amenity. Construction operations will also in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 0800-1600 h, reducing noise emissions in the local area during social hours.

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Residual Impact

Once the CEMP, traffic management plan and noise mitigation measures are implemented for the construction phase of Site C, there will be a short-term imperceptible negative residual impact on local residents and road users.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.4 Maynooth Outer Orbital Road (MOOR)

5.6.2.4.1 *Health and Safety*

Pre-Mitigation Impacts

Construction of the MOOR will necessitate the presence of a construction site. Construction sites and the machinery used on them pose a potential health and safety hazard to construction workers if site rules are not properly implemented.

The presence and operation of heavy machinery and traffic entering and leaving the site also poses a potential risk to members of the public that make use of the surrounding access roads.

These are considered to be short-term potential significant negative impacts.

Proposed Mitigation Measures

The MOOR will be constructed and operated in accordance with all relevant Health and Safety Legislation, including:

- Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005);
- Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. No. 299 of 2007), as amended;
- Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. 291 of 2013), as amended; and

During construction of the MOOR, all staff will be made aware of and adhere to the Health & Safety Authority's '*Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2006'.* This will encompass the use of all necessary Personal Protective Equipment, Risk Assessment and Method Statements and adherence to the site Health and Safety Plan.

Fencing will be erected in areas of the site where uncontrolled access is not permitted. Appropriate health and safety signage will also be erected on this fencing and at locations around the site. Only appropriately qualified and trained personnel will be permitted to operate machinery onsite. The MOOR site will not be accessible to members of the public during the construction phase. A Construction and Environmental Management Plan (CEMP) has been prepared for each site and submitted with the relevant planning applications, and if planning permission is granted, it is envisaged that the Developer will engage with the local authority to agree an appropriate Traffic Management plan for the purposes of the Construction phase so as to minimise the impact of the construction works on the local road network.

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Residual Impact

With the implementation of the mitigation measures above, there will be a short-term imperceptible negative impact on health and safety during the construction phase of the MOOR.

Significance of Effects

Based on the assessment above there will be no significant direct and indirect effects on health and safety during the construction phase of the MOOR.

5.6.2.4.2 *Employment and Investment*

There will be an opportunity for increased employment during the construction phase of the MOOR, as it is anticipated that there will be an increase in job opportunities for those working in the construction sector, building services and supplies, as well as in local businesses.

The injection of money in the form of salaries and wages to those employed during the construction phase of the project has the potential to result in an increase in household spending and demand for goods and services in the local area. This would result in local retailers and businesses experiencing a short-term positive impact on their cash flow. This will have a short-term slight positive indirect impact.

The construction of the MOOR will result in an influx of skilled people into the area, bringing specialist skills for the construction phase that could result in the transfer of these skills into the local workforce, thereby having a long-term positive impact on the local skills base.

5.6.2.4.3 *Population*

During the construction phase of the MOOR, there will be no negative impact on population, as it is predicted that the majority of staff and construction workers on site will be from the local community. The construction phase will have no impact on the population of the area in terms of changes to population trends or density, household size or age structure.

5.6.2.4.4 *Tourism and Amenity*

The Construction Phase of the MOOR may give rise to short-term imperceptible negative effects on nearby tourist attractions, namely Moygaddy House and Moygaddy Castle, through increases in road traffic volumes and noise emissions.

With regard to tourist attractions and amenity use around the site, described in Section 5.3.2, traffic management safety measures will be in place. Please see traffic impacts below for further details on proposed mitigation measures. Noise impacts will be mitigated for as outlined in Section 5.6.2.4.5 below.

5.6.2.4.5 *Noise*

Pre-Mitigation Impacts

There will be an increase in noise levels in the vicinity of the MOOR during the construction phase, as a result of heavy machinery and construction work which has the potential to cause a nuisance to sensitive receptors located closest to the MOOR. These impacts will be short-term in duration.

Construction noise at any given noise sensitive location will be variable throughout the construction project, depending on the activities underway and the distance from the main construction activities to the receiving properties. Excavation works may give rise to noise impacts on sensitive receptors in the area, however these noise impacts will be temporary in nature as the works move along the proposed

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route. The potential noise impacts that will occur during the construction phase of the MOOR are further described in Chapter 10: Noise and Vibration.

Proposed Mitigation Measures

Best practice measures for noise control will be adhered to onsite during the construction phase of the MOOR in order to mitigate the slight short-term negative impact associated with this phase of the development. These measures will include:

- Construction operations will in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 0800-1600 h.
- Where it is proposed to operate plant during the period 0700-0800 h at locations within 100 m of offsite receptors, standard 'beeper' reversing alarms will be replaced with flat spectrum alarms.
- Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoiding hooting at all times.
- Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced.
- Queuing of trucks near offsite receptors will be prohibited.
- Machinery not in active use will be shut down.
- A site representative will be appointed as a liaison officer with the local community.
- Where evening or night-time operations are required, local residents will be notified through the liaison officer.
- All complaints of noise received during the construction phase will be logged in a register and investigated immediately. Details of follow-up action will be included in the register.
- Where it is proposed to import potentially noisy plant to the site, the potential impact of noise emissions will be assessed in advance.
- Where generators or compressors are required within 100 m of offsite receptors, or previously completed receptors onsite, these will be fitted with manufacturers' acoustic enclosures, or alternatively will be screened by a local acoustic screen or subsoil stockpile.
- Guidance set out in British Standard BS 5228-1:2009+A1:2014 with respect to noise control will be applied throughout the construction phase.

Residual Impact

Following the implementation of the above mitigation measures, there will be a short-term imperceptible negative residual impact due to an increase in noise levels during the construction phase of the MOOR.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.4.6 *Dust and Air Quality*

Pre-Mitigation Impacts

Potential dust and vehicle emission sources during the construction phase of the MOOR include the use of machinery, plant equipment and on-site vehicular traffic. The entry and exit of vehicles from the site may result in the transfer of mud to the public road, particularly if the weather is wet. This may

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cause nuisance to residents and other road users. These impacts will not be significant and will be relatively short-term in duration. The potential dust impacts that may occur during the construction phase of the MOOR are further described in Chapter 9 of this EIAR: Air and Climate.

Proposed Mitigation Measures

The following measures will be enforced to ensure that dust and vehicle emission nuisance during the construction phase beyond the site boundary is minimised.

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Overburden will be progressively removed from the working area in advance of construction.
- Dampening down the dust at the source by the use of barriers such as debris netting on scaffolding around the building to block dust escaping where the building is within 10m of existing residential properties.
- Site roadways will be maintained in a stoned hard-core condition not allowing soil to accumulate which when dry can create dust.
- Wheel wash equipment will be set up at the site exit gate for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways.
- Plant and equipment that have the potential to create volumes of dust will have appropriate attachments to allow water source to dampen dust to not allow it to get airborne.
- Road Sweepers may be deployed as required on public roadways in the unlikely event that mud or dust be transported from the site.

Residual Impact

Following the implementation of the above mitigation measures, there will be a short-term imperceptible negative impact due to dust emissions from the construction of the MOOR.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.4.7 *Traffic*

Pre-Mitigation Impacts

Construction traffic will be comprised of Heavy Goods Vehicle (HGV) and Light Goods Vehicle (LGV) movements involved in the delivery of construction materials to the site and the export of excess construction materials and plant from the site. A complete Traffic and Transportation Assessment (TTA) of the MOOR has been carried out by O'Connor Sutton Cronin & Associates. The full results of the TTA are presented in Section 13.1 of Chapter 13: Material Assets.

The types of vehicles that will be required to negotiate the local network represent abnormal size loads and a detailed assessment of the geometry of the proposed route was therefore undertaken. This will have a temporary slight to moderate negative impact on existing road users, which will be minimised with the implementation of the mitigation measures included in the proposed traffic management plan.

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Proposed Mitigation Measures

A Traffic Management Plan will be developed and implemented to ensure any impact is short term in duration and slight in significance during the construction of the MOOR. Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be made clear. Local access to properties will also be maintained throughout any construction works and local residents will also be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum.

Residual Impact

Once the CEMP and a traffic management plan is implemented for the construction phase of the **MOOR**, there will be a short-term slight negative residual impact on local road users.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.4.8 *Residential Amenity*

Pre-Mitigation Impacts

Potential impacts on residential amenity during the construction phase of the MOOR could arise primarily due to noise, dust or changes to visual amenity. Detailed noise modelling has been carried out as part of this EIAR and show that due to the nature and size of the MOOR it is clear that construction phase noise emissions will vary, and it is not possible or practical to calculate a single sound power output figure for the entire site. With respect to surrounding noise sensitive receptors, worst case scenario emissions will arise when localised works are undertaken close to their respective boundaries.

The types of vehicles that will be required to negotiate the local network represent abnormal size loads and a detailed assessment of the geometry of the proposed route was therefore undertaken. This will have a temporary slight to moderate negative impact on existing road users, which will be minimised with the implementation of the mitigation measures included in the proposed traffic management plan.

Proposed Mitigation Measures

A Traffic Management Plan will be developed and implemented to ensure any impact is short term in duration and slight in significance during the construction of the MOOR. Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be made clear. Local access to properties will also be maintained throughout any construction works and local residents will also be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum. The construction and environmental management plans (CEMP) include mitigation measures related to noise, dust and landscaping which will be in place to protect residential amenity. Construction operations will also in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 0800-1600 h, reducing noise emissions in the local area during social hours.

Residual Impact

Once the CEMP and a traffic management plan and noise mitigation measures are implemented for the construction phase of the MOOR, there will be a short-term imperceptible negative residual impact on local residents and road users.

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Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.5 Kildare Bridge

5.6.2.5.1 *Health and Safety*

Pre-Mitigation Impacts

Construction of the works included within the Kildare Bridge application will necessitate the presence of a construction site. Construction sites and the machinery used on them pose a potential health and safety hazard to construction workers if site rules are not properly implemented.

The presence and operation of heavy machinery and traffic entering and leaving the site also poses a potential risk to members of the public that make use of the surrounding access roads.

These are considered to be short-term potential significant negative impacts.

Proposed Mitigation Measures

The Kildare Bridge works will be constructed and operated in accordance with all relevant Health and Safety Legislation, including:

- Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005);
- Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. No. 299 of 2007), as amended;
- Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. 291 of 2013), as amended; and
- Safety, Health and Welfare at Work (Work at Height) Regulations 2006 (S.I. No. 318 of 2006).

During construction of the Kildare Bridge works, all staff will be made aware of and adhere to the Health & Safety Authority's '*Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2006'.* This will encompass the use of all necessary Personal Protective Equipment, Risk Assessment and Method Statements and adherence to the site Health and Safety Plan.

Fencing will be erected in areas of the site where uncontrolled access is not permitted. Appropriate health and safety signage will also be erected on this fencing and at locations around the site. Only appropriately qualified and trained personnel will be permitted to operate machinery onsite. The Kildare Bridge site works will not be accessible to members of the public during the construction phase.

A Construction and Environmental Management Plan (CEMP) has been prepared for each site and submitted with the relevant planning applications, and if planning permission is granted, it is envisaged that the Developer will engage with the local authority to agree an appropriate Traffic Management plan for the purposes of the Construction phase so as to minimise the impact of the construction works on the local road network.

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Residual Impact

With the implementation of the mitigation measures above, there will be a short-term imperceptible negative impact on health and safety during the construction phase of the Kildare Bridge

Significance of Effects

Based on the assessment above there will be no significant direct and indirect effects on health and safety during the construction phase of the Kildare Bridge works.

5.6.2.5.2 *Employment and Investment*

There will be an opportunity for increased employment during the construction phase of the Kildare Bridge works, as it is anticipated that there will be an increase in job opportunities for those working in the construction sector, building services and supplies, as well as in local businesses.

The injection of money in the form of salaries and wages to those employed during the construction phase of the project has the potential to result in an increase in household spending and demand for goods and services in the local area. This would result in local retailers and businesses experiencing a short-term positive impact on their cash flow. This will have a short-term slight positive indirect impact.

The construction of the Kildare Bridge works will result in an influx of skilled people into the area, bringing specialist skills for the construction phase that could result in the transfer of these skills into the local workforce, thereby having a long-term positive impact on the local skills base.

5.6.2.5.3 *Population*

During the construction phase of the Kildare Bridge works, there will be no negative impact on population, as it is predicted that the majority of staff and construction workers on site will be from the local community. The construction phase will have no impact on the population of the area in terms of changes to population trends or density, household size or age structure.

5.6.2.5.4 *Tourism and Amenity*

The Construction Phase of the Kildare Bridge works may give rise to short-term imperceptible negative effects on nearby tourist attractions, namely Moygaddy House and Moygaddy Castle, through increases in road traffic volumes and noise emissions.

With regard to tourist attractions and amenity use around the site, described in Section 5.3.2, traffic management safety measures will be in place. Please see traffic impacts below for further details on proposed mitigation measures. Noise impacts will be mitigated for as outlined in Section 5.6.2.5.5 below.

5.6.2.5.5 *Noise*

Pre-Mitigation Impacts

There will be an increase in noise levels in the vicinity of the Kildare Bridge works during the construction phase, as a result of heavy machinery and construction work which has the potential to cause a nuisance to sensitive receptors located closest to the Kildare Bridge works. These impacts will be short-term in duration.

Construction noise at any given noise sensitive location will be variable throughout the construction project, depending on the activities underway and the distance from the main construction activities to the receiving properties. Excavation works may give rise to noise impacts on sensitive receptors in the

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area, however these noise impacts will be temporary in nature as the works move along the proposed route. The potential noise impacts that will occur during the construction phase of the Kildare Bridge works are further described in Chapter 10: Noise and Vibration.

Proposed Mitigation Measures

Best practice measures for noise control will be adhered to onsite during the construction phase of the Kildare Bridge works in order to mitigate the slight short-term negative impact associated with this phase of the development. These measures will include:

- Construction operations will in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 0800-1600 h.
- Where it is proposed to operate plant during the period 0700-0800 h at locations within 100 m of offsite receptors, standard 'beeper' reversing alarms will be replaced with flat spectrum alarms.
- Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoiding hooting at all times.
- Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced.
- Queuing of trucks near offsite receptors will be prohibited.
- Machinery not in active use will be shut down.
- A site representative will be appointed as a liaison officer with the local community.
- Where evening or night-time operations are required, local residents will be notified through the liaison officer.
- All complaints of noise received during the construction phase will be logged in a register and investigated immediately. Details of follow-up action will be included in the register.
- Where it is proposed to import potentially noisy plant to the site, the potential impact of noise emissions will be assessed in advance.
- Where generators or compressors are required within 100 m of offsite receptors, or previously completed receptors onsite, these will be fitted with manufacturers' acoustic enclosures, or alternatively will be screened by a local acoustic screen or subsoil stockpile.
- Guidance set out in British Standard BS 5228-1:2009+A1:2014 with respect to noise control will be applied throughout the construction phase.

Residual Impact

Following the implementation of the above mitigation measures, there will be a short-term imperceptible negative residual impact due to an increase in noise levels during the construction phase of the Kildare Bridge works.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.5.6 *Dust and Air Quality*

Pre-Mitigation Impacts

Potential dust and vehicle emission sources during the construction phase of the Kildare Bridge works include the use of machinery, plant equipment and on-site vehicular traffic. The entry and exit of

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vehicles from the site may result in the transfer of mud to the public road, particularly if the weather is wet. This may cause nuisance to residents and other road users. These impacts will not be significant and will be relatively short-term in duration. The potential dust impacts that may occur during the construction phase of the Kildare Bridge works are further described in Chapter 9 of this EIAR: Air and Climate.

Proposed Mitigation Measures

The following measures will be enforced to ensure that dust and vehicle emission nuisance during the construction phase beyond the site boundary is minimised.

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Overburden will be progressively removed from the working area in advance of construction.
- Dampening down the dust at the source by the use of barriers such as debris netting on scaffolding around the building to block dust escaping where the building is within 10m of existing residential properties.
- Site roadways will be maintained in a stoned hard-core condition not allowing soil to accumulate which when dry can create dust.
- Wheel wash equipment will be set up at the site exit gate for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways.
- Plant and equipment that have the potential to create volumes of dust will have appropriate attachments to allow water source to dampen dust to not allow it to get airborne.
- Road Sweepers may be deployed as required on public roadways in the unlikely event that mud or dust be transported from the site.

Residual Impact

Following the implementation of the above mitigation measures, there will be a short-term imperceptible negative impact due to dust emissions from the construction of the Kildare Bridge works.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.5.7 *Traffic*

Pre-Mitigation Impacts

Construction traffic will be comprised of Heavy Goods Vehicle (HGV) and Light Goods Vehicle (LGV) movements involved in the delivery of construction materials to the site and the export of excess construction materials and plant from the site. A complete Traffic and Transportation Assessment (TTA) of the Proposed Development has been carried out by O'Connor Sutton Cronin & Associates. The full results of the TTA are presented in Section 13.1 of Chapter 13: Material Assets.

The types of vehicles that will be required to negotiate the local network represent abnormal size loads and a detailed assessment of the geometry of the proposed route was therefore undertaken. This will have a temporary slight to moderate negative impact on existing road users, which will be minimised with the implementation of the mitigation measures included in the proposed traffic management plan.

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Proposed Mitigation Measures

A CEMP and Traffic Management Plan will be developed and implemented to ensure any impact is short term in duration and slight in significance during the construction of the Kildare Bridge works. Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be made clear. Local access to properties will also be maintained throughout any construction works and local residents will also be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum.

Residual Impact

Once a CEMP and traffic management plan is implemented for the construction phase of the Kildare Bridge works, there will be a short-term imperceptible negative residual impact on local road users.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.5.8 *Residential Amenity*

Pre-Mitigation Impacts

Potential impacts on residential amenity during the construction phase of Kildare Bridge works could arise primarily due to noise, dust or changes to visual amenity. Detailed noise modelling has been carried out as part of this EIAR and show that due to the nature and size of the proposed development it is clear that construction phase noise emissions will vary, and it is not possible or practical to calculate a single sound power output figure for the entire site. With respect to surrounding noise sensitive receptors, worst case scenario emissions will arise when localised works are undertaken close to their respective boundaries.

The types of vehicles that will be required to negotiate the local network represent abnormal size loads and a detailed assessment of the geometry of the proposed route was therefore undertaken. This will have a temporary slight to moderate negative impact on existing road users, which will be minimised with the implementation of the mitigation measures included in the proposed traffic management plan.

Proposed Mitigation Measures

A CEMP and Traffic Management Plan will be developed and implemented to ensure any impact is short term in duration and slight in significance during the construction of Kildare Bridge works. Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be made clear. Local access to properties will also be maintained throughout any construction works and local residents will also be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum. The construction and environmental management plans (CEMP) include mitigation measures related to noise, dust and landscaping which will be in place to protect residential amenity. Construction operations will also in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 0800-1600 h, reducing noise emissions in the local area during social hours.

Residual Impact

Once a CEMP and traffic management plan and noise mitigation measures are implemented for the construction phase of Kildare Bridge works, there will be a short-term imperceptible negative residual impact on local residents and road users.

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Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.6 Moyglare Bridge

5.6.2.6.1 *Health and Safety*

Pre-Mitigation Impacts

Construction of the Moyglare Bridge will necessitate the presence of a construction site. Construction sites and the machinery used on them pose a potential health and safety hazard to construction workers if site rules are not properly implemented.

The presence and operation of heavy machinery and traffic entering and leaving the site also poses a potential risk to members of the public that make use of the surrounding access roads.

These are considered to be short-term potential significant negative impacts.

Proposed Mitigation Measures

The Moyglare Bridge will be constructed and operated in accordance with all relevant Health and Safety Legislation, including:

- Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005);
- Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. No. 299 of 2007), as amended;
- Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. 291 of 2013), as amended; and
- Safety, Health and Welfare at Work (Work at Height) Regulations 2006 (S.I. No. 318 of 2006).

During construction of the Moyglare Bridge, all staff will be made aware of and adhere to the Health & Safety Authority's '*Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2006*'. This will encompass the use of all necessary Personal Protective Equipment, Risk Assessment and Method Statements and adherence to the site Health and Safety Plan.

Fencing will be erected in areas of the site where uncontrolled access is not permitted. Appropriate health and safety signage will also be erected on this fencing and at locations around the site. Only appropriately qualified and trained personnel will be permitted to operate machinery onsite. The Moyglare Bridge site will not be accessible to members of the public during the construction phase.

A Construction and Environmental Management Plan (CEMP) has been prepared for each site and submitted with the relevant planning applications, and if planning permission is granted, it is envisaged that the Developer will engage with the local authority to agree an appropriate Traffic Management plan for the purposes of the Construction phase so as to minimise the impact of the construction works on the local road network.

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Residual Impact

With the implementation of the mitigation measures above, there will be a short-term imperceptible negative impact on health and safety during the construction phase of the Moyglare Bridge.

Significance of Effects

Based on the assessment above there will be no significant direct and indirect effects on health and safety during the construction phase of the Moyglare Bridge.

5.6.2.6.2 *Employment and Investment*

There will be an opportunity for increased employment during the construction phase of the Moyglare Bridge, as it is anticipated that there will be an increase in job opportunities for those working in the construction sector, building services and supplies, as well as in local businesses.

The injection of money in the form of salaries and wages to those employed during the construction phase of the project has the potential to result in an increase in household spending and demand for goods and services in the local area. This would result in local retailers and businesses experiencing a short-term positive impact on their cash flow. This will have a short-term slight positive indirect impact.

The construction of the Moyglare Bridge will result in an influx of skilled people into the area, bringing specialist skills for the construction phase that could result in the transfer of these skills into the local workforce, thereby having a long-term positive impact on the local skills base.

5.6.2.6.3 *Population*

During the construction phase of the Moyglare Bridge, there will be no negative impact on population, as it is predicted that the majority of staff and construction workers on site will be from the local community. The construction phase will have no impact on the population of the area in terms of changes to population trends or density, household size or age structure.

5.6.2.6.4 *Tourism and Amenity*

The Construction Phase of the Moyglare Bridge may give rise to short-term imperceptible negative effects on nearby tourist attractions, namely Moygaddy House and Moygaddy Castle, through increases in road traffic volumes and noise emissions.

With regard to tourist attractions and amenity use around the site, described in Section 5.3.2, traffic management safety measures will be in place. Please see traffic impacts below for further details on proposed mitigation measures. Noise impacts will be mitigated for as outlined in Section 5.6.2.6.5 below.

5.6.2.6.5 *Noise*

Pre-Mitigation Impacts

There will be an increase in noise levels in the vicinity of the Moyglare Bridge during the construction phase, as a result of heavy machinery and construction work which has the potential to cause a nuisance to sensitive receptors located closest to the Moyglare Bridge. These impacts will be short-term in duration.

Construction noise at any given noise sensitive location will be variable throughout the construction project, depending on the activities underway and the distance from the main construction activities to the receiving properties. Excavation works may give rise to noise impacts on sensitive receptors in the

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area, however these noise impacts will be temporary in nature as the works move along the proposed route. The potential noise impacts that will occur during the construction phase of the Moyglare Bridge are further described in Chapter 10: Noise and Vibration.

Proposed Mitigation Measures

Best practice measures for noise control will be adhered to onsite during the construction phase of the Moyglare Bridge in order to mitigate the slight short-term negative impact associated with this phase of the development. These measures will include:

- Construction operations will in general be confined to the period Monday-Friday 0700-1700 h, and Saturday 0800-1600 h.
- Where it is proposed to operate plant during the period 0700-0800 h at locations within 100 m of offsite receptors, standard 'beeper' reversing alarms will be replaced with flat spectrum alarms.
- Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoiding hooting at all times.
- Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced.
- Queuing of trucks near offsite receptors will be prohibited.
- Machinery not in active use will be shut down.
- A site representative will be appointed as a liaison officer with the local community.
- Where evening or night-time operations are required, local residents will be notified through the liaison officer.
- All complaints of noise received during the construction phase will be logged in a register and investigated immediately. Details of follow-up action will be included in the register.
- Where it is proposed to import potentially noisy plant to the site, the potential impact of noise emissions will be assessed in advance.
- Where generators or compressors are required within 100 m of offsite receptors, or previously completed receptors onsite, these will be fitted with manufacturers' acoustic enclosures, or alternatively will be screened by a local acoustic screen or subsoil stockpile.
- Guidance set out in British Standard BS 5228-1:2009+A1:2014 with respect to noise control will be applied throughout the construction phase.

Residual Impact

Following the implementation of the above mitigation measures, there will be a short-term imperceptible negative residual impact due to an increase in noise levels during the construction phase of the Moyglare Bridge.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.6.6 *Dust and Air Quality*

Pre-Mitigation Impacts

Potential dust and vehicle emission sources during the construction phase of the Moyglare Bridge include the use of machinery, plant equipment and on-site vehicular traffic. The entry and exit of

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vehicles from the site may result in the transfer of mud to the public road, particularly if the weather is wet. This may cause nuisance to residents and other road users. These impacts will not be significant and will be relatively short-term in duration. The potential dust impacts that may occur during the construction phase of the Moyglare Bridge are further described in Chapter 9 of this EIAR: Air and Climate.

Proposed Mitigation Measures

The following measures will be enforced to ensure that dust and vehicle emission nuisance during the construction phase beyond the site boundary is minimised.

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Overburden will be progressively removed from the working area in advance of construction.
- Dampening down the dust at the source by the use of barriers such as debris netting on scaffolding around the building to block dust escaping where the building is within 10m of existing residential properties.
- Site roadways will be maintained in a stoned hard-core condition not allowing soil to accumulate which when dry can create dust.
- Wheel wash equipment will be set up at the site exit gate for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways.
- Plant and equipment that have the potential to create volumes of dust will have appropriate attachments to allow water source to dampen dust to not allow it to get airborne.
- Road Sweepers may be deployed as required on public roadways in the unlikely event that mud or dust be transported from the site.

Residual Impact

Following the implementation of the above mitigation measures, there will be a short-term imperceptible negative impact due to dust emissions from the construction of the Moyglare Bridge.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.6.7 *Traffic*

Pre-Mitigation Impacts

Construction traffic will be comprised of Heavy Goods Vehicle (HGV) and Light Goods Vehicle (LGV) movements involved in the delivery of construction materials to the site and the export of excess construction materials and plant from the site. A complete Traffic and Transportation Assessment (TTA) of the Proposed Development has been carried out by O'Connor Sutton Cronin & Associates. The full results of the TTA are presented in Section 13.1 of Chapter 13: Material Assets.

The types of vehicles that will be required to negotiate the local network represent abnormal size loads and a detailed assessment of the geometry of the proposed route was therefore undertaken. This will have a temporary slight to moderate negative impact on existing road users, which will be minimised with the implementation of the mitigation measures included in the proposed traffic management plan.

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Proposed Mitigation Measures

A CEMP and Traffic Management Plan will be developed and implemented to ensure any impact is short term in duration and slight in significance during the construction of the Moyglare Bridge. Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be made clear. Local access to properties will also be maintained throughout any construction works and local residents will also be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum.

Residual Impact

Once a CEMP and traffic management plan is implemented for the construction phase of the Moyglare Bridge, there will be a short-term slight negative residual impact on local road users.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.2.6.8 *Residential Amenity*

Pre-Mitigation Impacts

Potential impacts on residential amenity during the construction phase of Moyglare Bridge could arise primarily due to noise, dust or changes to visual amenity. Detailed noise modelling has been carried out as part of this EIAR and show that due to the nature and size of the proposed development it is clear that construction phase noise emissions will vary, and it is not possible or practical to calculate a single sound power output figure for the entire site. With respect to surrounding noise sensitive receptors, worst case scenario emissions will arise when localised works are undertaken close to their respective boundaries.

The types of vehicles that will be required to negotiate the local network represent abnormal size loads and a detailed assessment of the geometry of the proposed route was therefore undertaken. This will have a temporary slight to moderate negative impact on existing road users, which will be minimised with the implementation of the mitigation measures included in the proposed traffic management plan.

Proposed Mitigation Measures

A CEMP and Traffic Management Plan will be developed and implemented to ensure any impact is short term in duration and slight in significance during the construction of Moyglare Bridge. Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be made clear. Local access to properties will also be maintained throughout any construction works and local residents will also be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum. The construction and environmental management plans (CEMP) include mitigation measures related to noise, dust and landscaping which will be in place to protect residential amenity. Construction operations will also in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 0800-1600 h, reducing noise emissions in the local area during social hours.

Residual Impact

Once a traffic management plan and noise mitigation measures are implemented for the construction phase of Moyglare Bridge, there will be a short-term imperceptible negative residual impact on local residents and road users.

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Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects.

5.6.3 Operational Phase

The effects set out below relate to the operational phase of the Proposed Development. During the operational phase, all potential impacts on the Proposed Development are assessed. The construction impacts may affect all aspects of the Proposed Development in some manner and occur simultaneously within the expected construction programme.

5.6.3.1 Strategic Employment Zone (Site A)

5.6.3.1.1 *Health and Safety*

Upon completion, Site A is unlikely to have any significant impact on human health or health and safety through the operation of the proposed office buildings.

Residual Impacts

No negative impacts.

Significance of Effects

Based on the assessment above there will be no significant effects.

5.6.3.1.2 *Employment and Investment*

Site A includes for a strategic employment zone consisting of 3 no. standalone offices. Site A will facilitate employment in the creation of temporary and full-time employment positions consisting of both office-based roles in the proposed commercial units. All of these elements of Site A will provide for approximately 1,000 full-time positions post-construction.

Residual Impact

Long-term significant positive impact.

Significance of Effects

Site A includes for a strategic employment zone consisting of 3 no. standalone office buildings. Based on the assessment above there will be a long-term significant positive impact for employment and investment opportunities in the local area associated with Site A.

5.6.3.1.3 *Population*

Site A includes for a strategic employment zone consisting of 3 no. standalone office buildings. Site A will have a slight positive impact on the local population, providing employment opportunities to the local population.

Residual Impact

Slight long-term positive impact.

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Significance of Effects

Based on the assessment above there will be a slight long-term positive impact for Population in the local area.

5.6.3.1.4 *Tourism and Amenity*

Site A includes for road widening and upgrade works, new junctions, cycle lanes and improved facilities for cyclists and pedestrians. This improved access to the area from Maynooth town and surround areas, will benefit the existing tourism and amenity features surrounding Site A, namely Moygaddy House and Moygaddy Castle to the west and Carton House Demesne to the east. The improved facilities and access to these areas, following the construction of Site A, will offer a long term significant positive impact on local tourism and amenities.

Residual Impact

Long-term significant positive impact.

Significance of Effects

Based on the assessment above there will be a long-term positive impact for tourism in the local area associated with Site A.

5.6.3.1.5 *Residential Amenity*

Pre-Mitigation Impacts

Potential impacts on residential amenity during the operational phase of Site A could arise primarily due to noise, changes to visual amenity and potential impact of dust and traffic.

Noise

There will be an imperceptible increase in noise levels in the vicinity of Site A once the development has been built, as a result of air handling units (AHUs). The potential noise impacts that will occur during the operational phase of Site A are further described in Chapter 10: Noise and Vibration, which shows that will be capable of meeting all required guidelines in relation to noise thresholds.

Visual Amenity

The visual impact of Site A is addressed comprehensively in Chapter 11: Landscape and Visual. The location of the Site A has been strategically sited to screen it within localised topography and vegetation which mitigates potential visual effects.

Dust and Air Quality

There will be no impact on human health from dust emissions in the vicinity of Site A once the development has been built and all construction vehicles and personal are offsite.

Any further works which may need to occur on site as part of maintenance and repairs during the operation of the site, may cause slight short-term dust emissions, and is unlikely to have any negative significant impact on human health. The potential dust and air quality impacts that will occur during the operational phase of Site A are further described in Chapter 9 of this EIAR: Air and Climate.

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No mitigation will be required on site as the impact of Site A once constructed, is assessed as being imperceptible.

Traffic

As detailed in Chapter 13, Section 13.1, the development of Site A will have a long-term moderate positive impact on the receiving traffic and transport network.

Proposed Mitigation Measures

All mitigation as outlined under noise and vibration, dust, traffic, and visual amenity in this EIAR will be implemented in order to reduce, insofar as possible, impacts on residential amenity at properties located in the vicinity of Site A.

Residual Impact

With the implementation of the mitigation measures outlined in relation to noise and vibration, dust, traffic, and visual amenity, Site A will have an imperceptible impact on residential amenity.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects on residential amenity.

5.6.3.2 Healthcare Facilities (Site B)

5.6.3.2.1 *Health and Safety*

Upon completion, Site B is unlikely to have any significant impact on human health or health and safety through the operation of the proposed healthcare facilities.

Residual Impacts

No negative impacts.

Significance of Effects

Based on the assessment above there will be no significant effects.

5.6.3.2.2 *Employment and Investment*

Site B includes for community infrastructure use comprising a Nursing Home and Primary Care Centre. Site B will facilitate employment in the creation of temporary and full-time employment positions consisting of healthcare roles in the proposed primary care building and nursing home facility as well as operations management and administration roles.

Residual Impact

Long-term significant positive impact.

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Significance of Effects

Site B includes for community infrastructure comprising a Nursing Home and Primary Care Centre. Based on the assessment above there will be a long-term significant positive impact on healthcare, employment and investment opportunities in the local area associated with Site B.

5.6.3.2.3 *Population*

Site B includes for community infrastructure comprising of a Nursing Home and Primary Care Centre. Site B will have a slight positive impact on the local population, providing much needed accommodation for older persons in the area through the provision of the proposed nursing home along with employment opportunities in the area. The provision of a Primary Care Centre will improve non-acute healthcare facilities available to the local community.

Residual Impact

Slight long-term positive impact.

Significance of Effects

Based on the assessment above there will be a slight long-term positive impact for Population in the local area.

5.6.3.2.4 *Tourism and Amenity*

Site B includes for road widening and upgrade works, new junctions, cycle lanes and improved facilities for cyclists and pedestrians. This improved access to the area from Maynooth town and surrounding areas, will benefit the existing tourism and amenity features surrounding Site B, namely Moygaddy House and Moygaddy Castle to the west and Carton House Demesne to the east. The improved facilities and access to these areas, following the construction of Site B, will offer a long term significant positive impact on local tourism and amenities.

Residual Impact

Long-term significant positive impact.

Significance of Effects

Based on the assessment above there will be a long-term positive impact for tourism in the local area associated with Site B.

5.6.3.2.5 *Residential Amenity*

Pre-Mitigation Impacts

Potential impacts on residential amenity during the operational phase of Site B could arise primarily due to noise, changes to visual amenity and potential impact of dust and traffic.

Noise

There will be an imperceptible increase in noise levels in the vicinity of Site B once the development has been built, as a result of increased traffic volumes in the area. The potential noise impacts that will

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occur during the operational phase of Site B are further described in Chapter 10: Noise and Vibration, which shows that will be capable of meeting all required guidelines in relation to noise thresholds.

Visual Amenity

The visual impact of Site B is addressed comprehensively in Chapter 11: Landscape and Visual. The location of the Site B has been strategically sited to screen it within localised topography and vegetation which mitigates potential visual effects.

Dust and Air Quality

There will be no impact on human health from dust emissions in the vicinity of Site B once the development has been built and all construction vehicles and personal are offsite.

Any further works which may need to occur on site as part of maintenance and repairs during the operation of the site, may cause slight short-term dust emissions, and is unlikely to have any negative significant impact on human health. The potential dust and air quality impacts that will occur during the operational phase of Site B are further described in Chapter 9 of this EIAR: Air and Climate.

No mitigation will be required on site as the impact of Site B once constructed, is assessed as being imperceptible.

Traffic

As detailed in Chapter 13, Section 13.1, proposed development will have a long-term moderate positive impact on the receiving traffic and transport network.

Proposed Mitigation Measures

All mitigation as outlined under noise and vibration, dust, traffic, and visual amenity in this EIAR will be implemented in order to reduce, insofar as possible, impacts on residential amenity at properties located in the vicinity of Site B.

Residual Impact

With the implementation of the mitigation measures outlined in relation to noise and vibration, dust, traffic, and visual amenity, Site B will have an imperceptible impact on residential amenity.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects on residential amenity.

5.6.3.3 Strategic Housing Development (Site C)

5.6.3.3.1 *Health and Safety*

Site C will be constructed in compliance with all current health and safety regulation and specifications. Therefore, upon completion of Site C it's unlikely to have any negative significant impact on human health.

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Residual Impacts

No negative impacts.

Significance of Effects

Based on the assessment above there will be no significant effects.

5.6.3.3.2 *Employment and Investment*

Once Site C has been developed and is fully operational, the site will require the hiring of those with specialist skills in regard to upkeep and maintenance of the development, which could result in the transfer of these skills into the local workforce, thereby having a long-term moderate positive impact on the local skills base.

Residual Impact

Long-term moderate positive impact.

Significance of Effects

Based on the assessment above there will be a long-term moderate positive impact on housing, employment and investment opportunities in the local area associated with Site C.

5.6.3.3.3 *Population*

Once the site has been developed and is fully operational, there will be a change to the population of the Study Area, where an increase in housing will cause an influx of new residents into the area. This will allow for changes in population trends, population density, household size and age structure in a manner that has been planned for and provided for in the Meath County Development Plan, Maynooth Environs Local Area Plan and National Planning Framework.

Residual Impact

Slight long-term positive impact.

Significance of Effects

Based on the assessment above there will be a slight long-term positive impact for Population in the local area.

5.6.3.3.4 *Tourism and Amenity*

During the operational phase of Site C there will be no negative impact on tourism. The increase in number of residents within the local or regional area, will have a slight long-term positive impact on tourism.

Residual Impact

Slight long-term positive impact.

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Significance of Effects

Based on the assessment above there will be a slight long-term positive impact for tourism in the local area associated with Site C.

5.6.3.3.5 *Land-use*

The site is currently a greenfield site, in use as agricultural land. Site C will result in a change of land-use to an area of housing in the form of a Strategic Housing Development. The total proposed area to be developed measures approximately 19.5 hectares. This change in land use is considered to be a permanent positive impact as the development will reflect the land zoning designations outlined in the Meath County Development Plan (2013-2019) and Maynooth Environs Local Area Plan (2013-2019).

Residual Effect

There will be a slight, long-term positive effect in terms of tourism during the operational phase.

5.6.3.3.6 *Residential Amenity*

Pre-Mitigation Impacts

Potential impacts on residential amenity during the operational phase of Site C could arise primarily due to noise, changes to visual amenity and potential impact of dust and traffic.

Noise

There will be permanent, slight negative impact in terms of noise once Site C has been built, as a result of increased population and increased vehicles making use of Site C. The potential noise impacts that will occur during the operational phase of Site C are further described in Chapter 10: Noise and Vibration, which shows that will be capable of meeting all required guidelines in relation to noise thresholds.

Visual Amenity

The visual impact of Site C is addressed comprehensively in Chapter 11: Landscape and Visual. The location of the Site C has been strategically sited to screen it within localised topography and vegetation which mitigates potential visual effects.

Dust and Air Quality

There will be no impact on human health from dust emissions in the vicinity of Site C once the development has been built and all construction vehicles and personal are offsite.

Any further works which may need to occur on site as part of maintenance and repairs during the operation of the site, may cause slight short-term dust emissions, and is unlikely to have any negative significant impact on human health. The potential dust and air quality impacts that will occur during the operational phase of Site C are further described in Chapter 9 of this EIAR: Air and Climate.

No mitigation will be required on site as the impact of Site C once constructed, is assessed as being imperceptible.

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Traffic

As detailed in Chapter 13, Section 13.1, the operational phase of the proposed development will have a long-term moderate positive impact on the receiving traffic and transport network.

Proposed Mitigation Measures

All mitigation as outlined under noise and vibration, dust, traffic, and visual amenity in this EIAR will be implemented in order to reduce, insofar as possible, impacts on residential amenity at properties located in the vicinity of Site C.

Residual Impact

With the implementation of the mitigation measures outlined in relation to noise and vibration, dust, traffic, and visual amenity, Site C will have an imperceptible impact on residential amenity.

Significance of Effects

Based on the assessment above there will be slight negative indirect effects on residential amenity.

5.6.3.4 Maynooth Outer Orbital Road (MOOR)

5.6.3.4.1 *Health and Safety*

The MOOR will be constructed in compliance with all current health and safety regulation and specifications. Therefore, upon completion the MOOR is unlikely to have any negative significant impact on human health.

Residual Impacts

No negative impacts.

Significance of Effects

Based on the assessment above there will be no significant effects.

5.6.3.4.2 *Employment and Investment*

Once the MOOR has been developed and is fully operational, the site will require the hiring of those with specialist skills in regard to upkeep and maintenance of the development, which could result in the transfer of these skills into the local workforce, thereby having a long-term moderate positive impact on the local skills base.

Residual Impact

Long-term moderate positive impact.

Significance of Effects

Based on the assessment above there will be a long-term moderate positive impact on transport and employment opportunities in the local area associated with the MOOR.

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5.6.3.4.3 Population

Once the MOOR has been developed and is fully operational, there will be a change to transport characteristics, amenity and economic impacts to the population of the local area. The MOOR will have a moderate positive impact in terms of the provision of enhanced pedestrian and cycle networks and a moderate positive impact on local journey times and journey reliability due to the upgrade of existing regional and local roads along with connecting the R157 Regional Road to the Moyglare Hall road in Mariavilla.

Residual Impact

Long-term Slight positive impact.

Significance of Effects

Based on the assessment above there will be a long-term Slight positive impact on transport for the local population in the local area associated with the MOOR.

5.6.3.4.4 Tourism and Amenity

During the operational phase of the MOOR, there will be no negative impact on tourism. The accessibility to the local or regional area due to the MOOR, will have a slight long-term positive impact on tourism.

Residual Impact

Slight long-term positive impact.

Significance of Effects

Based on the assessment above there will be a slight long-term positive impact for tourism in the local area associated with the MOOR.

5.6.3.4.5 Residential Amenity

Pre-Mitigation Impacts

Potential impacts on residential amenity during the operational phase of the MOOR could arise primarily due to noise, changes to visual amenity and potential impact of dust and traffic.

Noise

There will be a moderate increase in noise levels in the vicinity of the MOOR once the development has been built, as a result of increased traffic volumes in the area. The potential noise impacts that will occur during the operational phase of the MOOR are further described in Chapter 10: Noise and Vibration, which shows that will be capable of meeting all required guidelines in relation to noise thresholds.

Visual Amenity

The visual impact of the MOOR is addressed comprehensively in Chapter 11: Landscape and Visual. The location of the MOOR has been strategically sited to screen it within localised topography and vegetation which mitigates potential visual effects.

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Dust and Air Quality

There will be a long-term imperceptible impact on human health from dust emissions in the vicinity of the MOOR once the development has been built due to an increased traffic volume in the area.

Any further works which may need to occur on site as part of maintenance and repairs during the operation of the site, may cause slight short-term dust emissions, and is unlikely to have any negative significant impact on human health. The potential dust and air quality impacts that will occur during the operational phase of the MOOR are further described in Chapter 9 of this EIAR: Air and Climate.

No mitigation will be required on site as the impact of the MOOR once constructed, is assessed as being imperceptible.

Traffic

As detailed in Chapter 13, Section 13.1, The operational phase of the proposed development will have a long-term significant positive effect on the receiving traffic and transport network.

Proposed Mitigation Measures

All mitigation as outlined under noise and vibration, dust, traffic, and visual amenity in this EIAR will be implemented in order to reduce, insofar as possible, impacts on residential amenity at properties located in the vicinity of the MOOR.

Residual Impact

With the implementation of the mitigation measures outlined in relation to noise and vibration, dust, traffic, and visual amenity, the MOOR will have an imperceptible impact on residential amenity.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects on residential amenity.

5.6.3.5 Kildare Bridge

5.6.3.5.1 *Health and Safety*

The Kildare Bridge application will be constructed in compliance with all current health and safety regulation and specifications. Therefore, upon completion the Kildare Bridge works is unlikely to have any negative significant impact on human health.

Residual Impacts

No negative impacts.

Significance of Effects

Based on the assessment above there will be no significant effects.

5.6.3.5.2 *Employment and Investment*

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Once the Kildare Bridge works have been developed and is fully operational, the site will require the hiring of those with specialist skills in regard to upkeep and maintenance of the development and also will facilitate the other components of the Kildare Bridge works, thereby having a long-term slight positive impact on the local potential for employment and investment.

Residual Impact

Long-term slight positive impact.

Significance of Effects

Based on the assessment above there will be a long-term slight positive impact on transport and employment opportunities in the local area associated with the Kildare Bridge works.

5.6.3.5.3 *Population*

Once the site has been developed and is fully operational, there will be a change to transport characteristics and amenity to the population of the local area. The Kildare Bridge works will have a moderate positive impact in terms of local journey times and journey reliability due to the upgrade of existing regional and local roads along with the provision of a standalone pedestrian and cycle bridge.

Residual Impact

Long-term slight positive impact.

Significance of Effects

Based on the assessment above there will be a long-term slight positive impact on transport the local population in the local area associated with the Kildare Bridge works.

5.6.3.5.4 *Tourism and Amenity*

During the operational phase of the Kildare Bridge works, there will be no negative impact on tourism. The accessibility to the local or regional area due to the Kildare Bridge works, will have a slight long-term positive impact on tourism.

Residual Impact

Slight long-term positive impact.

Significance of Effects

Based on the assessment above there will be a slight long-term positive impact for tourism in the local area associated with the Kildare Bridge works.

Residual Effect

There will be a slight, long-term positive effect in terms of tourism during the operational phase.

5.6.3.5.5 *Residential Amenity*

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Pre-Mitigation Impacts

Potential impacts on residential amenity during the operational phase of the Kildare Bridge works could arise primarily due to noise, changes to visual amenity and potential impact of dust and traffic.

Noise

There will be a slight increase in noise levels in the vicinity of the Kildare Bridge works once the development has been built, as a result of increased traffic volumes in the area. The potential noise impacts that will occur during the operational phase of the Kildare Bridge works are further described in Chapter 10: Noise and Vibration, which shows that will be capable of meeting all required guidelines in relation to noise thresholds.

Visual Amenity

The visual impact of the Kildare Bridge works is addressed comprehensively in Chapter 11: Landscape and Visual. The location of the Kildare Bridge works has been strategically sited to screen it within localised topography and vegetation which mitigates potential visual effects.

Dust and Air Quality

There will be a long-term imperceptible impact on human health from dust emissions in the vicinity of the Kildare Bridge works once the development has been built due to an increased traffic volume in the area.

Any further works which may need to occur on site as part of maintenance and repairs during the operation of the site, may cause slight short-term dust emissions, and is unlikely to have any negative significant impact on human health. The potential dust and air quality impacts that will occur during the operational phase of the Kildare Bridge works are further described in Chapter 9 of this EIAR: Air and Climate.

No mitigation will be required on site as the impact of the Kildare Bridge works once constructed, is assessed as being imperceptible.

Traffic

As detailed in Chapter 13, Section 13.1, The Kildare Bridge works will have a long-term moderate positive effect in terms of traffic and transport.

Proposed Mitigation Measures

All mitigation as outlined under noise and vibration, dust, traffic, and visual amenity in this EIAR will be implemented in order to reduce, insofar as possible, impacts on residential amenity at properties located in the vicinity of the Kildare Bridge works.

Residual Impact

With the implementation of the mitigation measures outlined in relation to noise and vibration, dust, traffic, and visual amenity, the Kildare Bridge works will have an imperceptible impact on residential amenity.

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Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects on residential amenity.

5.6.3.6 Moyglare Bridge

5.6.3.6.1 *Health and Safety*

The Moyglare Bridge will be constructed in compliance with all current health and safety regulation and specifications. Therefore, upon completion the Moyglare Bridge is unlikely to have any negative significant impact on human health.

Residual Impacts

No negative impacts.

Significance of Effects

Based on the assessment above there will be no significant effects.

5.6.3.6.2 *Employment and Investment*

Once the Moyglare Bridge has been developed and is fully operational, the site will require the hiring of those with specialist skills in regard to upkeep and maintenance of the development and also will facilitate the other components of the Moyglare Bridge, thereby having a long-term slight positive impact on the local potential for employment and investment.

Residual Impact

Long-term slight positive impact.

Significance of Effects

Based on the assessment above there will be a long-term slight positive impact on transport and employment opportunities in the local area associated with the Moyglare Bridge.

5.6.3.6.3 *Population*

Once the site has been developed and is fully operational, there will be a change to transport characteristics, amenity and economic impacts to the population of the local area. The Moyglare Bridge will have a slight positive impact in terms of local journey times and journey reliability due to the upgrade of existing regional and local roads along with connecting the R157 Regional Road to the Moyglare Hall road in Mariavilla.

Residual Impact

Long-term slight positive impact.

Significance of Effects

Based on the assessment above there will be a long-term slight positive impact on transport the local population in the local area associated with the Moyglare Bridge.

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5.6.3.6.4 *Tourism and Amenity*

During the operational phase of the Moyglare Bridge, there will be no negative impact on tourism. The accessibility to the local or regional area due to the Moyglare Bridge, will have a slight long-term positive impact on tourism.

Residual Impact

Slight long-term positive impact.

Significance of Effects

Based on the assessment above there will be a slight long-term positive impact for tourism in the local area associated with the Moyglare Bridge.

5.6.3.6.5 *Residential Amenity*

Pre-Mitigation Impacts

Potential impacts on residential amenity during the operational phase of the Moyglare Bridge could arise primarily due to noise, changes to visual amenity and potential impact of dust and traffic.

Noise

There will be a moderate increase in noise levels in the vicinity of the Moyglare Bridge once the development has been built, as a result of increased traffic volumes in the area. The potential noise impacts that will occur during the operational phase of the Moyglare Bridge are further described in Chapter 10: Noise and Vibration, which shows that will be capable of meeting all required guidelines in relation to noise thresholds.

Visual Amenity

The visual impact of the Moyglare Bridge is addressed comprehensively in Chapter 11: Landscape and Visual. The location of the Moyglare Bridge has been strategically sited to screen it within localised topography and vegetation which mitigates potential visual effects.

Dust and Air Quality

There will be a long-term imperceptible impact on human health from dust emissions in the vicinity of the Moyglare Bridge once the development has been built due to an increased traffic volume in the area.

Any further works which may need to occur on site as part of maintenance and repairs during the operation of the site, may cause slight short-term dust emissions, and is unlikely to have any negative significant impact on human health. The potential dust and air quality impacts that will occur during the operational phase of the Moyglare Bridge are further described in Chapter 9 of this EIAR: Air and Climate.

No mitigation will be required on site as the impact of the Moyglare Bridge once constructed, is assessed as being imperceptible.

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Traffic

As detailed in Chapter 13, Section 13.1, the proposed development will have a long-term moderate positive impact in terms of traffic and transport.

Proposed Mitigation Measures

All mitigation as outlined under noise and vibration, dust, traffic, and visual amenity in this EIAR will be implemented in order to reduce, insofar as possible, impacts on residential amenity at properties located in the vicinity of the Moyglare Bridge.

Residual Impact

With the implementation of the mitigation measures outlined in relation to noise and vibration, dust, traffic, and visual amenity, the Moyglare Bridge will have an imperceptible impact on residential amenity.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects on residential amenity.

5.6.4 Cumulative Impacts – Interaction of Effects between Various Elements of the Proposed Development

The potential cumulative impacts from interactions between various elements of the Proposed Development have been considered in terms of impacts on Population and Human Health. Due to the proximity, scale and timelines associated with each element, there is potential for cumulative effects with the Proposed Development.

5.6.4.1 Health and Safety

Any potential cumulative impacts between the construction of the Proposed Development in terms of health and safety will be mitigated by the requirement for all projects to adhere to Health & Safety legislation.

5.6.4.2 Dust and Noise

Potential cumulative impacts associated with noise are addressed in Chapter 10 of this EIAR: Noise and Vibration, which conclude that there will be no adverse noise impact on the local population or human health. In regard to dust, mitigation measures addressed in this chapter will ensure there are no significant effects on local population or human health due to the construction of the Proposed Development.

5.6.4.3 Traffic

Potential cumulative impacts associated with traffic are addressed in Section 13.2.5.4 of this EIAR. The proposed development is predicted to have a long-term positive cumulative effect with regard to traffic and transport for Maynooth town and the Maynooth Environs.

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5.6.4.4 Employment and Investment

In terms of employment and economic benefit, there will be a significant, long-term, positive, cumulative impact between the elements of the Proposed Development due to the majority of construction workers and materials being sourced locally, thereby helping to sustain employment in the construction trade.

The injection of money in the form of salaries and wages to those employed during the construction and operational phases of the proposed development, has the potential to result in a slight increase in household spending and demand for goods and services in the local area. This would result in local retailers and businesses experiencing a short-term, slight positive impact on their cash flow.

5.6.4.5 Population

The Proposed Development includes for the delivery of new offices in the strategic employment zone, a primary care centre, a nursing home and residential housing together with a Public Park, playground and a network of pedestrian and cycle networks. The Proposed Development will have a significant long-term positive impact on the local population, providing employment, healthcare and housing opportunities to the local and regional population together with a network of pedestrian and cycle infrastructure within the High Amenity lands which traverse the combined development.

5.6.4.6 Tourism and Amenity

As discussed in Section 5.3.2 there are a number of tourist attractions pertaining specifically to the site of the Proposed Development, the closest significant tourist attraction to the Proposed Development is Moygaddy House, which is a protected structure. Moygaddy House is located approximately 200m west the site of the Proposed Healthcare Facility and Strategic Business Park. Further to this, Moygaddy Castle is also located approximately 200m west of the Proposed Development to the south of Moygaddy House. Moygaddy Castle is also a protected structure of cultural heritage and archaeological importance. There will be a slight positive cumulative operational impact on tourism between the proposed site and other projects in the area, where the enhanced network of public open spaces, pedestrian and cycle networks, public park and playground and an increase in workers, residents, and tourists within the area will allow for a slight, positive influence on local tourism.

5.6.5 Cumulative In-Combination Effects

The potential cumulative effects of the Proposed Development in combination with the other projects described in Chapter 2 of this report have been considered in terms of impacts on population & human health.

There are a number of proposed or permitted housing developments within the vicinity of the Proposed Development. A description of the developments is provided in Chapter 2, and where appropriate the application documentation, EIAR and NIS for each development have been reviewed

Further information on the above is provided in Table 2-5 in Section 4.2.1 of Chapter 2.

5.6.5.1 Health and Safety

Any potential cumulative impacts between the construction of the proposed residential development and the other projects in terms of health and safety will be mitigated by the requirement for all projects to adhere to Health & Safety legislation. There will therefore be no cumulative effects in terms of health and safety.

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5.6.5.2 Dust and Noise

Potential cumulative effects associated with dust and noise are addressed in Chapters 9 and 10 of this EIAR respectively and conclude that there will be imperceptible effects. Furthermore, it is highly unlikely that all projects listed in Chapter 2 would be constructed at the same time and so the potential for cumulative dust and noise effects during the construction phase is limited. The mitigation measures outlined in Chapter 9 of this EIAR will ensure that cumulative effects on human health in terms of dust and air quality as a result of the proposed development in combination with other projects will be short term, imperceptible, negative.

5.6.5.3 Traffic

Potential cumulative effects associated with traffic are addressed in Section 13.1 of this EIAR. The findings of the assessment indicate that there are a number of large-scale developments that are imminent or have been granted permission that could result in potential cumulative traffic impacts with the proposed development. The cumulative impact of these residential development projects has been accounted for and it will result in a likely, long term, slight negative effect.

5.6.5.4 Employment and Investment

In terms of employment and economic benefit, there will be a significant, short-term, positive, cumulative impact between the proposed residential site and the other projects due to the majority of construction workers and materials being sourced locally, thereby helping to sustain employment in the construction trade.

The injection of money in the form of salaries and wages to those employed during the construction phase of the proposed development and the other projects, has the potential to result in a slight increase in household spending and demand for goods and services in the local area. This would result in local retailers and businesses experiencing a short-term, slight positive impact on their cash flow.

5.6.5.5 Tourism and Amenity

As discussed in Section 5.3.2 there are a number of tourist attractions within the surrounding area of the Proposed Development. There will be a slight positive cumulative operational impact on tourism between the proposed residential site and other projects in the area, where an increase in residents, workers and visitors within the area will allow for a positive influence on local tourism.

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6. BIODIVERSITY

6.1 Introduction

This chapter assesses the likely significant effects (both alone and cumulatively with other plans and projects) that the proposed development may have on Biodiversity, Flora and Fauna and sets out the mitigation measures proposed to avoid, reduce or offset any potential significant effects that are identified. The residual impacts on biodiversity are then assessed. Particular attention has been paid to species and habitats of ecological importance. These include species and habitats with national and international protection under the Wildlife Acts 1976-2012 as amended, EU Habitats Directive 92/43/EEC. The full description of the Proposed Development is provided in Chapter 4 of this EIAR.

The chapter is structured as follows

The Introduction provides a description of the legislation, guidance and policy context applicable to Biodiversity, Flora and Fauna.
This is followed by a comprehensive description of the ecological survey and impact assessment methodologies that were followed to inform the robust assessment of likely significant effects on ecological receptors.
A description of the Baseline Ecological Conditions and Receptor Evaluation is then provided.
This is followed by an Assessment of Effects which are described with regard to each phase of the development: construction phase, operational phase and decommissioning phase. Potential Cumulative effects in combination with other plans and projects are fully assessed.
Proposed mitigation and best practice measures to avoid, reduce or offset the identified effects are described and discussed. This is followed by an assessment of residual effects taking into consideration the effect of the proposed mitigation and best practice measures.
The conclusion provides a summary statement on the overall significance of predicted effects on Biodiversity, Flora and Fauna.

The following defined terms are utilised in this chapter:

For the purposes of this EIAR, the entire project is referred to as the 'Proposed Development'.
For the purpose of this EIAR chapter, the term 'EIAR Site Boundary'/ 'Site Boundary' refers to the site red line boundary as shown in Figure 6-1. Figure 6.2 shows the site boundaries for the 6 separate application sites.
The term 'development footprint' is used to describe the lands that will be subject to the proposed infrastructure and associated construction works.
"Key Ecological Receptor" (KER) is defined as a species or habitat occurring within the zone of influence of the development upon which likely significant effects are anticipated.
"Zones of Influence" (ZOI) for individual ecological receptors refers to the zone within which potential effects are anticipated. ZOIs differ depending on the sensitivities of particular habitats and species and were assigned in accordance with best available guidance and through adoption of a precautionary approach.

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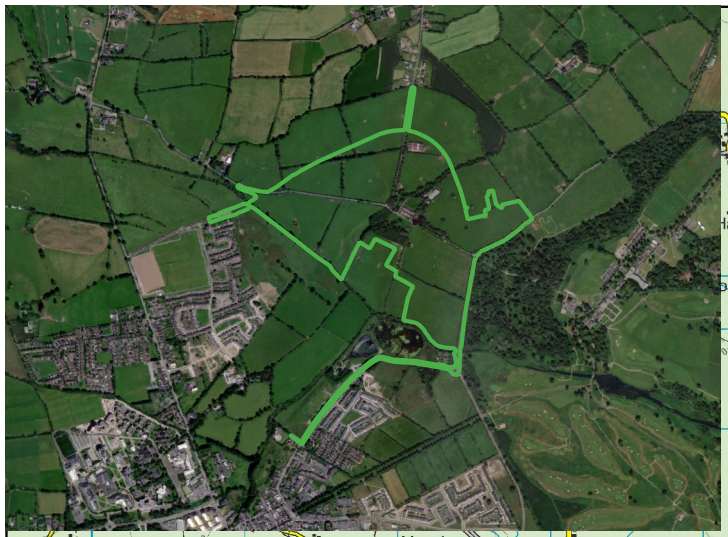

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Map Legend

EIAR Site Boundary

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Drawing Title

EIAR Site Boundary

Project Title

Sky Castle Ltd – Moygaddy Mixed Use Scheme, Co. Meath & Co. Kildare

Drawn By	Checked By
CM	CM
Project No.	**Drawing No.**
210414	Figure 6-1
Scale	**Date**
1:49,500	2022-08-30

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

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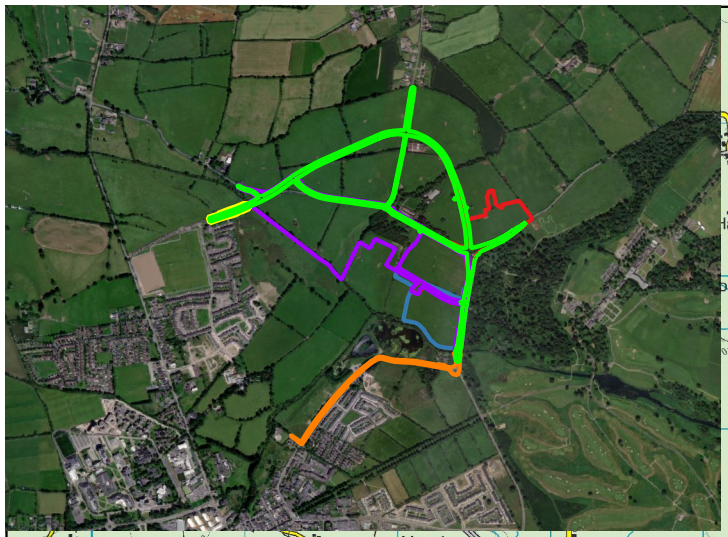

Map Legend

- Site A - Strategic Employment Zone
- Site B - Healthcare Facilities
- Site C - Strategic Housing Development
- MOOR- Maynooth Outer Orbital Road
- Kildare Bridge
- Moyglare Bridge

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Drawing Title
Six Planning Applications Site Boundaries

Project Title
Sky Castle Ltd – Moygaddy Mixed Use Scheme, Co. Meath & Co. Kildare

Drawn By	Checked By
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Project No.	Drawing No.
210414	Figure 6-2
Scale	Date
1:49,500	2022-08-30

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

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6.2 Requirements for Ecological Impact Assessment

National Legislation

The Wildlife Act, 1976–2012 as amended, is the principal piece of legislation governing protection of wildlife in Ireland. The Wildlife Act provides strict protection for species of conservation value. The Wildlife Act conserves wildlife (including game) and protects certain wild creatures and flora. These species are therefore considered in this report as ecological receptors.

Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHAs) are heritage sites that are designated for the protection of flora, fauna, habitats and geological sites. Only NHAs are designated under the Wildlife (Amendment) Act 2017. These sites do not form part of the Natura 2000 network of European sites and the AA process, or screening for same, does not apply to NHAs or pNHAs. Proposed Natural Heritage Areas (pNHAs) were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated[1] However, these sites are considered to be of significance for wildlife and habitats as they may form statutory designated sites in the future (NPWS, 2020).

The Flora (Protection) Order, 2015 (S.I. No. 356 of 2015) lists the species, hybrids and/or subspecies of flora protected under Section 21 of the Wildlife Acts. It provides protection to a wide variety of protected plant species in Ireland including vascular plants, mosses, liverworts, lichens and stoneworts. It illegal to cut, pick, collect, uproot or damage, injure or destroy species listed or their flowers, fruits, seeds or spores or wilfully damage, alter, destroy or interfere with their habitat (unless under licence).

National Policy

The National Biodiversity Action Plan 2017-2021 (Department of Culture, Heritage and the Gaeltacht, 2017) (the "**Plan**") demonstrates Ireland's continuing commitment to meeting and acting on its obligations to protect Ireland's biodiversity for the benefit of future generations through a series of targeted strategies and actions. The main objective of the Plan is to bring biodiversity into the mainstream of policy and decision-making. Objective 1 (*Mainstream biodiversity into decision-making across all sectors*) of the Plan identifies the following relevant measures in relation to future developments:

> "Incorporate into legislation the requirement for consideration of impacts on biodiversity to ensure that conservation and sustainable use of biodiversity are taken into account in all relevant plans and programmes and relevant new legislation;
> Public and Private Sector relevant policies will use best practice in SEA, AA and other assessment tools to ensure proper consideration of biodiversity in policies and plans;
> All Public Authorities and private sector bodies move towards no net loss of biodiversity through strategies, planning, mitigation measures, appropriate offsetting and/or investment in Blue-Green infrastructure;
> Strengthen ecological expertise in local authorities and relevant Government Departments and agencies;
> Local Authorities will review and update their Biodiversity and Heritage Action Plans;
> Local Authorities will review and update their Development Plans and policies to include policies and objectives for the protection and restoration of biodiversity;
> Develop Green Infrastructure at local, regional and national levels and promote the use of nature based solutions for the delivery of a coherent and integrated network;

[1] https://www.npws.ie/protected-sites/nha (accessed May 2021).

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Continue to produce guidance on the protection of biodiversity in designated areas, marine and the wider countryside for Local Authorities and relevant sectors;
Integrate Natura 2000 and Biodiversity financial expenditure tracking into Government Programmes internal paying agency management procedures including linkage to the Prioritised Action Framework and this NBAP;
Develop a Natural Capital Asset Register and national natural capital accounts by 2020, and integrate these accounts into economic policy and decision-making;
Initiate natural capital accounting through sectoral and small scale pilot studies, including the integration of environmental and economic statistics using the framework of the UN System of Experimental-Ecosystem Accounting (SEEA);
Establish a national Business and Biodiversity Platform under the CBD's Global Business Partnership;
Ensure Origin Green produces tangible benefits for biodiversity with increased emphasis on conservation and restoration of biodiversity;
Implement actions from Ireland's Biodiversity Climate Change Sectoral Adaptation Plan;
Identify and take measures to minimise the impact of incentives and subsidies on biodiversity loss, and develop positive incentive measures, where necessary, to assist the conservation of biodiversity;
Establish and implement mechanisms for the payments of ecosystem services including carbon stocks, to generate increased revenue for biodiversity conservation and restoration;
Develop and implement a National Biodiversity Finance Plan to set out in detail how the actions and targets of this NBAP will be delivered from 2017 and beyond; and
Monitor the implementation of the Plan"

Such policies have informed the evaluation of ecological features recorded within the study area and the ecological assessment process.

European Legislation

The EU Habitats Directive (92/43/EEC) (together with the Birds Directive (79/409/EEC), as subsequently codified by Council Directive 2009/147/EC on the conservation of wild birds) forms the cornerstone of Europe's nature conservation within the EU. It is built around two pillars: the Natura 2000 network of protected sites and the strict system of species protection. The Habitats Directive protects over 1,000 animal and plant species and over 200 "habitat types" (e.g. special types of forests, meadows, wetlands, etc.), which are of European importance. The Habitats Directive and Birds Directive, which were transposed into Irish law through Part XAB of the Planning and Development Acts 2000-2019 (from a land use planning perspective) recognise the significance of protecting rare and endangered species of flora and fauna, and more importantly, their habitats.

Annex I of the Habitats Directive lists habitat types whose conservation requires the designation of Special Areas of Conservation (SAC). Priority habitats, such as Turloughs, which are in danger of disappearing within the EU territory are also listed in Annex I. Annex II of the Directive lists animal and plant species (e.g. marsh fritillary, Atlantic salmon, and Killarney fern) whose conservation also requires the designation of SAC. Annex IV lists animal and plant species in need of strict protection such as lesser horseshoe bat and otter, and Annex V lists animal and plant species whose taking in the wild and exploitation may be subject to management measures. In Ireland, species listed under Annex V include Irish hare, common frog and pine marten. Species can be listed in more than one Annex, as is the case with otter and lesser horseshoe bat which are listed on both Annex II and Annex IV.

The disturbance of species under Article 12 of the Habitats Directive (and in particular avoidance of deliberate disturbance of Annex IV species, particularly during the period of breeding, rearing, hibernation and migration and avoidance of deterioration or destruction of breeding sites or resting places) has been specifically assessed in this EIAR.

Council Directive 2009/147/EC on the conservation of wild birds (the "**Birds Directive**") instructs Member States to take measures to maintain populations of all bird species naturally occurring in the

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wild state in the EU (Article 2). According to Recital 1 of the Birds Directive, Council Directive 79/409/EEC on the conservation of wild birds was substantially amended several times and in the interests of clarity and rationality, the Birds Directive codifies Council Directive 79/409/EEC. Such measures may include the maintenance and/or re-establishment of habitats in order to sustain these bird populations (Article 3). A subset of bird species has been identified in the Directive and are listed in Annex I as requiring special conservation measures in relation to their habitats. These species have been listed on account of inter alia: their risk of extinction; vulnerability to specific changes in their habitat; and/or due to their relatively small population size or restricted distribution. Special Protection Areas (SPAs) are to be identified and classified for these Annex I listed species and for regularly occurring migratory species, paying particular attention to the protection of wetlands (Article 4).

In summary, the species and habitats provided National and International protection under these legislative and policy documents have been considered in this Ecological Impact Assessment. A detailed assessment of the likelihood of the proposed development having either a significant effect or an adverse impact on any relevant European Sites (i.e. SACs, cSACs, SPAs or cSPAs) has been carried out in the Appropriate Assessment Screening Report and Natura Impact Statement. A separate assessment has not been carried out in this chapter, to avoid duplication of assessments. However, the relevant conclusions have been cross-referenced and incorporated.

6.3 Relevant Guidance

The assessment methodology is based primarily upon the National Road Authority (NRA)'s Guidelines for Assessment of Ecological Impacts of National Road Schemes Rev 2 (NRA, 2009) (referred to hereafter as the NRA Ecological Impact Assessment Guidelines), and the survey methodology is based on the NRA Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes (NRA, 2009). Although these survey methodologies relate to road schemes, these standard guidelines are recognised survey methodologies that ensure good practice regardless of the development type.

In addition, the following guidelines were consulted in the preparation of this document to provide the scope, structure and content of the assessment:

Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater and Coastal (CIEEM, 2018).
Bats and onshore wind turbines: survey, Assessment and mitigation (SNH, 2019)
Draft Revised guidelines on the information to be contained in Environmental Impact Statements (Environmental Protection Agency (EPA), 2017).
Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment. (Department of the Environment, Community and Local Government (DoEHLG), 2013).
Guidelines for assessment of Ecological Impacts of National Road Schemes, (NRA, 2009).
Environmental Impact Assessment of National Road Schemes – A Practical Guide (NRA, 2009).
Environmental Assessment and Construction Guidelines (NRA, 2006).
Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA, 2003).
Guidelines on the information to be contained in Environmental Impact Statements (EPA, 2002).
Guidance on the preparation of the Environmental Impact Assessment Report (European Commission (EC), 2017)

This assessment has been carried out in accordance with the Environmental Impact Assessment guidance as outlined in Chapter 1 of the EIAR.

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In addition to the above, the following legislation applies with respect to habitats, fauna and water quality in Ireland and has been considered in the preparation of this report:

The International Convention on Wetlands of International Importance especially Waterfowl Habitat (Concluded at Ramsar, Iran on 2 February 1971)
S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009 and S.I. No. 722 of 2003 European Communities (Water Policy) Regulations 2003 which give further effect to EU Water Framework Directive (2000/60/EC).

The following legislation applies with respect to non-native species:

Regulation 49 and 50 of European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011).

This assessment has been prepared with respect to the various planning policies and strategy guidance documents listed below:

Meath County Development Plan 2021 – 2027.
Draft Natura Impact Report on the Meath County Development Plan, Meath County Council, (2021).
National Biodiversity Action Plan 2017-2021
The Regional Planning Guidelines for the Greater Dublin Area 2010-2022

6.3.1 Statement of Authority

A field assessment surveys were undertaken by Julie O'Sullivan (B.Sc., M.Sc.) and Colin Murphy (B.Sc., M.Sc.) across multiple dates in July 2021. Additional follow up surveys were carried out in July 2022. Bat surveys were carried out across various dates in July and August 2021. This report has been prepared by Colin Murphy (B.Sc., M.Sc.). Colin is an experienced ecologist with over two years professional experience in ecological consultancy. This report has been reviewed by Pat Roberts (B.Sc. (Env.)) who has over 16 years' experience in ecological consultancy.

6.4 Methodology

Assessing the impacts of any project and associated activities requires an understanding of the ecological baseline conditions prior to and at the time of the project proceeding. Ecological baseline conditions are those existing in the absence of proposed activities (CIEEM, 2018).

The following sections outline the methodologies utilised to establish the baseline ecological condition of the proposed development site.

6.4.1 Desk Study

The desk study undertaken for this assessment included a thorough review of available ecological data including the following:

Review of online web-mappers: National Parks and Wildlife Service (NPWS), EPA (Envision), Water Framework Directive (WFD), Geological Survey of Ireland (GSI) & Inland Fisheries Ireland (IFI).
Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper.

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Data on potential occurrence of protected bryophytes – as per NPWS online map viewer; Flora Protection Order Map Viewer – Bryophytes[2].
IFI Reports.
Review of specially requested records from the NPWS Rare and Protected Species Database for the hectad N93 in which the Proposed Development is located.
Review of NPWS Article 17 Metadata and GIS Database Files

6.4.2 Scoping and Consultation

MKO undertook a scoping exercise during preparation of this EIAR, as described in Chapter 2, Section 2.6 of this EIAR.

Copies of all scoping responses are included in Appendix 2-1 of this EIAR. The recommendations of the consultees have informed the EIAR preparation process and the contents of this chapter. Issues and concerns highlighted with respect to biodiversity are highlighted in Table 6.1 below.

Table 6-1 Organisations consulted with regard to biodiversity

Consultee	Response
Inland Fisheries Ireland -	The Liffey Catchment is regarded as a very important fishery and so requests due consideration to the catchment area. A buffer zone of 10 meters (minimum) is requested between the River Rye and the Proposed Development. The Blackhall Little Stream which runs through the middle of the site should not be altered or disturbed, and again a buffer zone is requested. Riparian vegetation should be left undisturbed as much as possible. Best practice is recommended at all times in relation to activities that may impact surface waters. Gathering of baseline data (biotic and abiotic) pre-construction to allows for comparison between the current situation and that which may develop over time if the project proceeds Comprehensive surface water management measures must be implemented.

A scoping exercise was undertaken as part of the proposed development. A Scoping Document, providing details of the application site and the proposed development, was prepared by MKO and circulated to the Development Applications Unit in August 2021. As of 23rd August 2022, no response has yet been received.

6.4.3 Field Surveys

A comprehensive survey of the biodiversity of the entire site was undertaken on various dates in 2021. Additional surveys of the study area was undertaken in July 2022. The following sections fully describe the ecological surveys that have been undertaken and provide details of the methodologies, dates of survey and guidance followed.

6.4.3.1 Multi-disciplinary Walkover Surveys (as per NRA Guidelines, 2009)

A Multi-disciplinary ecological walkover surveys was undertaken on the 6th of July 2021 and 21st of July 2022 in accordance with NRA Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes (NRA, 2009). This survey provided baseline data on the ecology of

[2] *NPWS, 2020, Online map viewer; Flora Protection Order Map Viewer – Bryophytes. Online, Available at: http://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=71f8df33693f48edbb70369d7fb26b7e, Accessed: December 2021.*

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the study area and assessed whether further, more detailed habitat or species-specific ecological surveys were required. The multi-disciplinary ecological walkover survey comprehensively covered the entire study area. The site was revisited by MKO Ecologist on multiple occasions throughout July and August 2022.

Habitats were classified in accordance with the Heritage Council's 'Guide to Habitats in Ireland' (Fossitt, 2000). Habitat mapping was undertaken with regard to guidance set out in 'Best Practice Guidance for Habitat Survey and Mapping' (Smith et al., 2011).

Plant nomenclature for vascular plants follows 'New Flora of the British Isles' (Stace, 2010), while mosses and liverworts nomenclature follows 'Mosses and Liverworts of Britain and Ireland - a field guide' (British Bryological Society, 2010).

The walkover surveys were designed to detect the presence, or likely presence, of a range of protected habitats and species that may occur in the vicinity of the proposed development. Incidental sightings/observations of birds and additional fauna were noted during the site visits. Surveys were undertaken in accordance best practice guidance (TII, 2008: Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes).

During the multi-disciplinary ecological walkover surveys, a thorough search of the site for mammals was undertaken and the potential for the study area to support protected mammals listed in the Wildlife Acts, 1976–2019, such as badger, pine marten, red squirrel, Irish hare, pygmy shrew, Irish stoat etc. was also assessed.

During the multidisciplinary surveys, a search for Invasive Alien Species (IAS), with a focus on those listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2011), was also conducted.

The walkover survey was undertaken on the 6th of July 2021 by Julie O'Sullivan and Colin Murphy. An additional walkover survey was undertaken by Colin Murphy on the 21st of July 2022. The survey timing falls within the recognised optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith et al., 2011).

6.4.3.2 Bat Surveys

Bat walkover surveys of the study area were carried out during daylight hours on the 8th July, 22nd July and 9th August 2021. The landscape features on the site were visually assessed for potential use as bat roosting habitats and commuting/foraging habitats using a protocol set out in BCT *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn.) (Collins, 2016). Table 4.1 of the 2016 BCT Guidelines identifies a grading protocol for assessing structures, trees and commuting/foraging habitat for bats. The protocol is divided into four Suitability Categories: *High, Moderate, Low* and *Negligible.*

Full details of the bat survey effort and results can be found in the bat report located in Appendix 6.1

Roost Surveys

During the bat walkover surveys, a search for roosts was undertaken within the boundary of the proposed development. The aim was to determine the presence of roosting bats and the need for further survey work or mitigation. During the walkover, mature trees were assessed for their suitability to support bats.

Trees within the site were also assessed from ground level, with the aid of binoculars. Any potential tree roosts were examined for the presence of rot holes, hazard beams, cracks and splits, partially detached bark, knot holes, gaps between overlapping branches and any other potential roost features (i.e. PRFs) identified by Andrews (2018).

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Dusk and Dawn Surveys

Dusk and dawn activity surveys were carried out on 8th July, 22nd July and 9th August 2021. Two surveyors were equipped with active full spectrum bat detectors, a Batlogger M (Elekon, Lucerne, Switzerland) and walked a transect route within the site, focusing on potentially suitable habitat features for bats. Where possible, species identification was made in the field and any other relevant information was also noted, e.g. numbers, behaviour, features used, etc. All bat echolocation was recorded for subsequent analysis to confirm species identifications.

The dusk survey on 8th July 2021 commenced 30 minutes before sunset and was completed within 3 hours after sunset. Conditions were suitable for bat survey as per Collins (2016); dry, mild (18˚C at sunset) with only light air (Beaufort Scale Force 1). The moon was not visible, and cloud cover was approximately 100% during the dusk survey.

The dawn survey on 22nd July 2021 commenced 2 hours before sunrise and was completed at sunrise. Conditions were suitable for bat survey as per Collins (2016); dry, mild (15˚C at sunrise) with only light air (Beaufort Scale Force 1). Cloud cover was approximately 10% throughout the dawn survey.

The dusk survey on 9th August 2021 commenced 30 minutes before sunset and was completed within 3 hours after sunset. Conditions were suitable for bat survey as per Collins (2016); dry, mild (17˚C at sunset), with only light air to light breeze (Beaufort Scale Force 1). Cloud cover was approximately 25% throughout the dusk survey.

July and August are within the optimum survey period for bat activity surveys, provided weather conditions are favourable (Collins, 2016). No limitations associated with seasonality, timing or weather conditions were identified.

Table 6-2 Bat survey effort

Date	Surveyor	Type	Sunrise/Sunset	Weather
8th July 2021	Tim Murphy and Neil Campbell	Dusk	21:52	18˚C; Dry, Light air
22nd July 2021	Tim Murphy and Neil Campbell	Dawn	05:27	15˚C; Dry, Light air
9th August 2021	Tim Murphy and Neil Campbell	Dusk	21:05	17˚C; Dry, Light air

Static Detector Surveys

Full spectrum bat detectors, Song Meter SM4BAT (Wildlife Acoustics, Maynard, MA, USA), were deployed during static surveys to record bat activity at six fixed locations over 2-week periods in 2021. The six locations of static detectors were selected to represent the range of habitats present within the site, including favourable bat habitats as well as open spaces within the site. Settings used were those recommended by the manufacturer for bats, with minor adjustments in gain settings and band pass filters to reduce background noise when recording. Detectors were set to record from 30 minutes before sunset until 30 minutes after sunrise. The Song Meter automatically adjusts sunset and sunrise times using the Solar Calculation Method when provided with GPS coordinates.

The survey was designed to utilise three static detectors to monitor bat activity. Two Song Meter SM4BAT detectors were deployed on site on 8th July 2021. The Song Meter SM4, dual-channel acoustic recorder is capable of the long-term acoustic monitoring of bats. After approximately two weeks, the static detectors were relocated to three separate new locations within the site. Static detector locations can be found in Figure 3-1 in the bat report. The static detectors were collected on the 9th August 2021.

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Details of the surveys carried out including date, time, duration, location and weather conditions are provided in the Bat report in Appendix 4 of this document.

Badger Survey

Dedicated badger surveys were conducted on the 6th of July 2021. In addition, records of any badger activity within the study area were also recorded during other faunal and habitat surveys of the site. The badger surveys covered the entire development footprint. The site was systematically searched for signs of badger, incidental setts, prints, latrines, foraging signs or sightings. If encountered, setts were classified as per the convention set out in NRA (2009) (i.e. main, annexe, subsidiary, outlier) and camera traps were installed at the entrances and left *in situ* for 3 weeks. The badger survey was not constrained by vegetation given the nature of the habitats within the site and the timing of the surveys (NRA 2006a).

The badger survey was conducted adhering to best practice guidance (NRA, 2009) and followed the 'Guidelines for the Treatment of Badger Prior to the Construction of National Roads Schemes' (NRA, 2006a) and following CIEEM best practice competencies for species surveys (CIEEM, 2013[3]).

Otter Survey

Following a review of the initial site walkover ecological surveys for constraints identification and the results of the multi-disciplinary walkover survey; areas identified as providing potential habitat for otter were subject to specialist targeted survey. The otter survey of the Rye Water River located along the southern end of the site was conducted on the 6th of July 2021.

The otter surveys were conducted as per NRA (2009) guidelines (Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes). This involved a search for all otter signs e.g. spraints, scat, prints, slides, trails, couches and holts. In addition to the width of the rivers/watercourses, a 10m riparian buffer (both banks) was considered to comprise part of the otter habitat (NPWS 2009). The dedicated otter surveys also followed the guidance as set out in NRA (2008) 'Guidelines for the Treatment of Otters Prior to the Construction of National Roads Schemes' and following CIEEM best practice competencies for species surveys (CIEEM, 2013).

Barn owl survey

A dedicated barn owl survey was undertaken at the site on the evening of the 21th of July 2021, by Colin Murphy. The survey followed the methodologies outlined in the TII guidelines, '*Barn Owl Surveying Standards for National Road Projects'* (December, 2017).

The buildings within the site were assessed during the initial walkover survey on the 6th of July in order to determine suitability for breeding Barn Owls. Moygaddy Castle ruin within the northern section of the site was assessed as being potentially suitable as the interior offered potential nesting space.

A nocturnal survey was carried out on the 21th of July and focused on Moygaddy Castle. The building was observed from a discrete vantage point, set back 20m from the building. The dusk survey was carried out during calm and dry conditions for two hours and commenced 30 minutes prior to sunset.

Invasive species survey

During the multi-disciplinary walkover surveys, a search for non-native invasive species was undertaken. The survey focused on the identification of invasive species listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (As Amended) (S.I. 477 of 2015).

[3] *CIEEM, 2013, Technical Guidance Series – Competencies for Species Survey, Online, Available at: https://cieem.net/resource/competencies-for-species-survey-css/ Accessed: May 2021*

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Rye Water Valley/Carton SAC Survey

A survey of the area to the east of Kildare bridge designated as part of Rye Water Valley/Carton House SAC was undertaken on the 21st of July 2022. The purpose of the survey was to identify any Petrifying springs with tufa formation (Cratoneurion) [7220], listed as a QI habitat for Rye Water Valley/Carton House SAC, that may be present in the lands adjacent to the proposed development boundary. The survey was carried out in line with the guidelines set out in Lyons & Kelly (2016).

6.4.4 Methodology for Assessment of Impacts and Effects

6.4.4.1 Identification of Target Receptors and Key Ecological Receptors

The methodology for assessment followed a precautionary screening approach with regard to the identification of Key Ecological Receptors (KERs). Following a comprehensive desk study, site visits were undertaken on the dates listed in Section 6.4.3.1 (not including bat surveys and stakeholder consultation), "Target receptors" likely to occur in the zone of influence of the development were identified. The target receptors included habitats and species that were protected under the following legislation:

Annexes of the EU Habitats Directive
Qualifying Interests (QI) of Special Areas of Conservation (SAC) within the likely zone of impact.
Species protected under the Wildlife Acts 1976-2019
Species protected under the Flora Protection Order 2015

6.4.4.2 Determining Importance of Ecological Receptors

The importance of the ecological features identified within the study area was determined with reference to a defined geographical context. This was undertaken following a methodology that is set out in Chapter 3 of the 'Guidelines for Assessment of Ecological Impacts of National Roads Schemes' (NRA, 2009). These guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned in relation to the importance of any particular receptor. The guidelines provide a basis for determination of whether any particular receptor is of importance on the following scales:

International
National
County
Local Importance (Higher Value)
Local Importance (Lower Value)

The Guidelines clearly set out the criteria by which each geographic level of importance can be assigned. Locally Important (lower value) receptors contain habitats and species that are widespread and of low ecological significance and of any importance only in the local area. Internationally Important sites are either designated for conservation as part of the Natura 2000 Network (SAC or SPA) or provide the best examples of habitats or internationally important populations of protected flora and fauna. Specific criteria for assigning each of the other levels of importance are set out in the guidelines and have been followed in this assessment. Where appropriate, the geographic frame of reference set out above was adapted to suit local circumstances. In addition, and where appropriate, the conservation status of habitats and species is considered when determining the significance of ecological receptors.

Any ecological receptors that are determined to be of National or International, County or Local importance (Higher Value) following the criteria set out in NRA (2009) are considered to be Key

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Ecological Receptors (KERs) for the purposes of ecological impact assessment if there is a pathway for effects thereon. Any receptors that are determined to be of Local Importance (Lower Value) are not considered to be Key Ecological Receptors.

6.4.4.3 Characterisation of Impacts and Effects

The proposed development will result in a number of impacts. The ecological effects of these impacts are characterised as per the CIEEM 'Guidelines for Ecological Impact Assessment in the UK and Ireland' (2018). These guidelines are the industry standard for the completion of Ecological Impact Assessment in the UK and Ireland. This chapter has also been prepared in accordance with the corresponding EPA guidance (EPA 2017). The headings under which the impacts are characterised follow those listed in the guidance document and are applied where relevant. A summary of the impact characteristics considered in the assessment is provided below:

Positive or Negative. Assessment of whether the proposed development results in a positive or negative effect on the ecological receptor.
Extent. Description of the spatial area over which the effect has the potential to occur.
Magnitude Refers to size, amount, intensity and volume. It should be quantified if possible and expressed in absolute or relative terms e.g. the amount of habitat lost, percentage change to habitat area, percentage decline in a species population.
Duration is defined in relation to ecological characteristics (such as the lifecycle of a species) as well as human timeframes. For example, five years, which might seem short-term in the human context or that of other long-lived species, would span at least five generations of some invertebrate species.
Frequency and Timing. This relates to the number of times that an impact occurs and its frequency. A small-scale impact can have a significant effect if it is repeated on numerous occasions over a long period.
Reversibility. This is a consideration of whether an effect is reversible within a 'reasonable' timescale. What is considered to be a reasonable timescale can vary between receptors and is justified where appropriate in the impact assessment section of this report.

6.4.4.4 Determining the Significance of Effects

The ecological significance of the effects of the proposed development are determined following the precautionary principle and in accordance with the methodology set out in Section 5 of CIEEM (2018).

For the purpose of Ecological Impact Assessment (EcIA), 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local (CIEEM, 2018).

When determining significance, consideration is given to whether:

Any processes or key characteristics of key ecological receptors will be removed or changed
There will be an effect on the nature, extent, structure and function of important ecological features
There is an effect on the average population size and viability of ecologically important species.
There is an effect on the conservation status of important ecological habitats and species.

The EPA draft Guidelines on information to be included in Environmental Impact Assessment Reports (EPA, 2017) and the *Guidelines for assessment of Ecological Impacts of National Road Schemes*, (NRA, 2009) were also considered when determining significance and the assessment is in accordance with those guidelines.

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The terminology used in the determination of significance follows the suggested language set out in the Draft EPA Guidelines (2017) as shown in Table 6.3.

Table 6-3 Criteria for determining significance of effect, based on (EPA, 2017) guidelines

Effect Magnitude	Definition
No change	No discernible change in the ecology of the affected feature.
Imperceptible effect	An effect capable of measurement but without noticeable consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight effect	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate effect	An effect that alters the character of the environment that is consistent with existing and emerging trends.
Significant effect	An effect which, by its character, its magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound effect	An effect which obliterates sensitive characteristics.

As per TII (NRA, 2009) and CIEEM (2018) best practice guidelines, the following key elements should also be examined when determining the significance of effects:

The likely effects on 'integrity' should be used as a measure to determine whether an impact on a site is likely to be significant (NRA, 2009).
A 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives (CIEEM, 2018).

Integrity

In the context of EcIA, 'integrity' refers to the coherence of the ecological structure and function, across the entirety of a site, that enables it to sustain all of the ecological resources for which it has been valued (NRA, 2009). Impacts resulting in adverse changes to the nature, extent, structure and function of component habitats and effects on the average population size and viability of component species, would affect the integrity of a site, if it changes the condition of the ecosystem to unfavourable.

Conservation status

An impact on the conservation status of a habitat or species is considered to be significant if it will result in a change in conservation status. According to CIEEM (2018) guidelines the definition for conservation status in relation to habitats and species are as follows:

Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area
Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

As defined in the EU Habitats Directive 92/43/EEC, the conservation of a habitat is favourable when:

Its natural range, and areas it covers within that range, are stable or increasing
The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future

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The conservation status of its typical species is favourable.

The conservation of a species is favourable when:

Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats
The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future
There is and will probably continue to be, a sufficiently large habitat to maintain its population on a long-term basis.

According to the NRA/CIEEM methodology, if it is determined that the integrity and/or conservation status of an ecological feature will be impacted on, then the level of significance of that impact is related to the geographical scale at which the impact will occur (i.e. local, county, national, international).

6.4.4.5 Incorporation of Mitigation

Section 6.7 of this EIAR assesses the potential effects of the proposed development to ensure that all effects on Key Ecological Receptors (KERs) are adequately addressed. Where significant effects on Key Ecological Receptors are predicted, mitigation is incorporated into the project design or layout to address such impacts. The implemented mitigation measures avoid or reduce or offset potential significant residual effects, post mitigation.

6.4.4.6 Limitations

The information provided in this assessment accurately and comprehensively describes the baseline ecological environment following surveys on numerous dates during all seasons and over 3 years; provides an accurate prediction of the likely ecological effects of the proposed development; prescribes best practice and mitigation as necessary; and, describes the residual ecological impacts.

The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines.

The habitats and species on the site were readily identifiable and comprehensive assessments were made during the field visit. No significant limitations in the scope, scale or context of the assessment have been identified.

6.5 Establishing the Ecological Baseline

6.5.1 Desk Study

The following sections describe the results of a survey of published material that was consulted as part of the desk study for the purposes of the ecological assessment. It provides a baseline for the ecology of the existing environment. Material reviewed includes the Site Synopses for Designated Sites for their conservation importance compiled by the National Parks and Wildlife Service (NPWS) of the Department of Culture, Heritage and the Gaeltacht, bird and plant distribution atlases and other research publications.

6.5.1.1 Designated Sites

Identification of the Designated Sites within the Likely Zone of Influence of the Proposed Development

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The potential for the proposed development to impact on sites that are designated for nature conservation was considered in this Ecological Impact Assessment.

Special Areas of Conservation (SACs) and Special Protection Areas for Birds (SPAs) are designated under the EU Habitats Directive and EU Birds Directive, respectively and are collectively known as 'European Sites'. The potential for significant effects and/or adverse impacts on the integrity of European Sites is fully assessed in the AA Screening Report and Natura Impact Statement that accompanies this application. As per EPA draft Guidance 2017, *"a biodiversity section of an EIAR, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement"* but should *"incorporate their key findings as available and appropriate"*. Section 6.7.2 of this EIAR provides a summary of the key assessment findings with regard to European Designated Sites.

Natural Heritage Areas (NHAs) are designated under Section 18 the Wildlife (Amendment) Act 2000 and their management and protection is provided for by this legislation and planning policy. The potential for effects on these designated sites is fully considered in this EcIA.

Proposed Natural Heritage Areas (pNHAs) were designated on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. However, the potential for effects on these designated sites is fully considered in this EcIA.

The following methodology was used to establish which sites that are designated for nature conservation have the potential to be impacted by the proposed development:

> Initially the most up to date GIS spatial datasets for European and Nationally designated sites and water catchments were downloaded from the NPWS website (www.npws.ie) and the EPA website (www.epa.ie) on the 13/01/2022. The datasets were utilised to identify Designated Sites which could feasibly be affected by the proposed development.
> All designated sites within a distance of 15km surrounding the development site were identified. In addition, the potential for connectivity with European or Nationally designated sites at distances of greater than 15km from the proposed development was also considered in this initial assessment. In this case, no potential for impact on sites located at a distance of over 15km from the proposed development was identified due to the absence of direct hydrological connections (e.g. without the Atlantic Ocean as a buffer).
> A map of all the European Sites within 15km is provided in Figure 6-3. All Nationally designated sites shown in Figure 6-4.
> Table 6.4 provides details of all relevant Nationally designated sites as identified in the preceding steps and assesses which are within the likely Zone of Impact. All relevant European Designated Sites are fully described and assessed in the Screening for Appropriate Assessment and Natura Impact Statement reports submitted as part of this planning application.
> The designation features of these sites, as per the NPWS website (www.npws.ie), were consulted and reviewed at the time of preparing this report 13/01/2022.

Where potential pathways for Significant Effect are identified, the site is included within the Likely Zone of Impact and further assessment is required.

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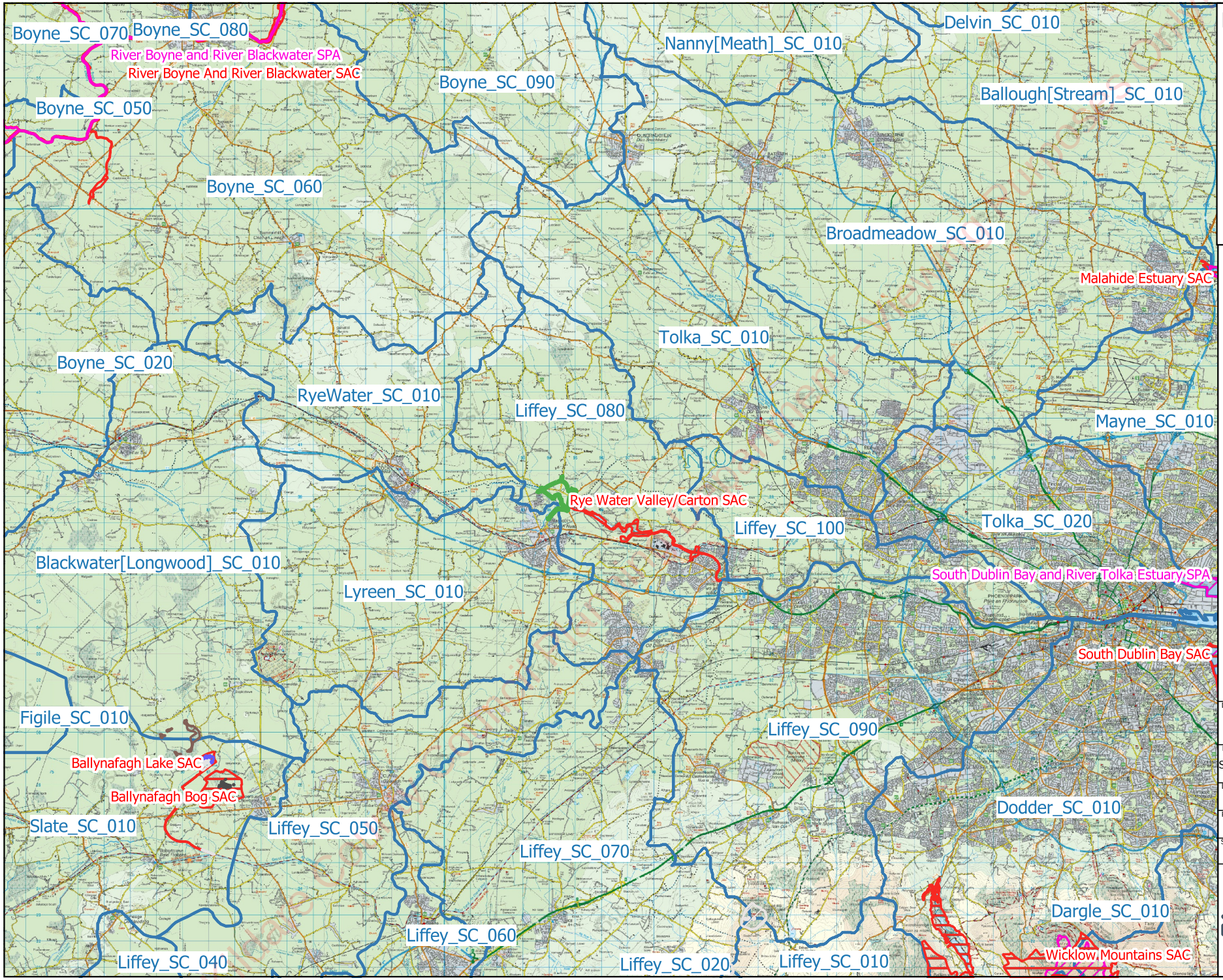

Map Legend

- EIAR Site Boundary
- EPA Hydrological Sub Catchments
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)

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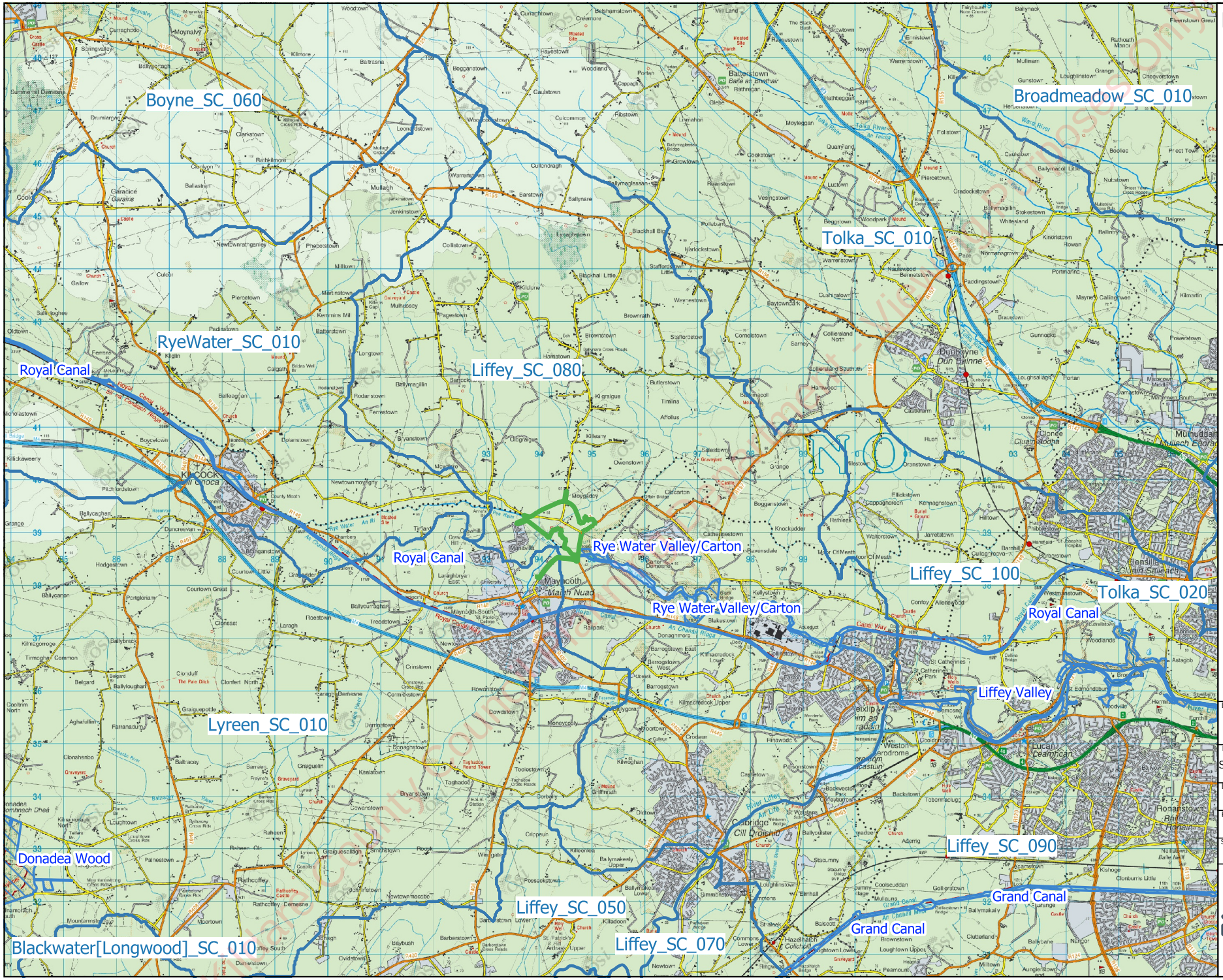
Drawing Title
European Sites within Zone of Impact

Project Title
Sky Castle Ltd – Moygaddy Mixed Use Scheme, Co. Meath & Co. Kildare

Drawn By	Checked By
CM	CM
Project No.	Drawing No.
210414	Figure 6-3
Scale	Date
1:188,700	2022-08-30

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie



Map Legend

- EIAR Site Boundary
- EPA Hydrological Sub Catchments
- National Heritage Areas (NHA)
- Proposed Natioanl Heritage Areas (NHAs)

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Drawing Title
Nationally Designated Sites within Zone of Impact

Project Title
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MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

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Table 6-4 Designated sites in the Zone of Influence

Designated Site	Distance from Proposed Development (km)	Likely Zone of Impact Determination
Special Areas of Conservation (SAC)		
Rye Water Valley/Carton SAC [001398]	**Distance:** 0m (directly adjacent to southern section of development boundary)	This European site is directly adjacent to southern section of development boundary, however it does not overlap. Considering the Proposed Development does not overlap with this European site, there is no potential for direct effects. No potential pathway for effect on any of the following terrestrial Qualifying Interests (QIs) for which the SAC is designated was identified. The River Rye Water flows along southern boundary of the development site. A potential pathway for indirect effects on water dependent Qualifying Interests (QIs) was identified in the form of deterioration of water quality resulting from pollution, associated with the construction and operational phases of the development. The River Rye water flows into this SAC, Pollution of surface water and groundwater may result in adverse impacts on the following downstream aquatic or groundwater influenced QI habitats within the SAC in the absence of mitigation: [7220] Petrifying springs with tufa formation (*Cratoneurion*)* [1014] Narrow-mouthed Whorl Snail (*Vertigo angustior*) [1016] Desmoulin's Whorl Snail (*Vertigo moulinsiana*) **The SAC is in the Likely Zone of Impact and further assessment is required.**
South Dublin Bay SAC [000210]	**Distance:** 25km 31km (Surface water distance)	There will be no direct effects as the project footprint is located entirely outside the designated site. Taking a precautionary approach, a potential pathway for indirect effects on the aquatic Qualifying Interests of this European Site has been identified in the form of deterioration in water quality due to the release of polluting materials during the construction and operational phases of the development via the Rye Water River and the River Liffey. The SAC is located approx. 31km downstream of the Proposed Development site. On an extremely precautionary basis effects on the following aquatic receptors are considered. **The SAC is considered to be within the Likely Zone of Impact and further assessment is required.**

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Designated Site	Distance from Proposed Development (km)	Likely Zone of Impact Determination
North Dublin Bay SAC [000206]	**Distance**: 25km 31km (Surface water distance)	This European Site is located 25km west of the Proposed Development site. Given the distance between the site of Proposed Development and this SAC, direct effects upon the SAC can be excluded. No potential pathway for effect on any of the terrestrial habitats for which the SAC is designated was identified, Embryonic shifting dunes [2110] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] Humid dune slacks [2190] Taking a precautionary approach, a potential pathway for indirect effects on the aquatic Qualifying Interests of this European Site has been identified in the form of deterioration in water quality due to the release of polluting materials during the construction and operational phases of the development via the Rye Water River and the River Liffey. The SAC is located approx. 31km downstream of the Proposed Development site. On an extremely precautionary basis effects on the following aquatic receptors are considered: Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi)* [1410] This SAC is therefore **within the likely zone of impact**, due to the potential for pollutants to be transmitted to it indirectly via surface water.
Special Protection Area (SPA)		
North Bull Island SPA [004006].	**Distance**: 23km 31km (Surface water distance)	This site is 23km west of the Proposed Development site, therefore direct impacts upon this SPA can be excluded. Disturbance to SCI species can be ruled out due to the distance of 23km between the Proposed Development and this SPA. Taking a precautionary approach, a potential pathway for indirect effects on the aquatic Special Conservation Interests of this European Site has been identified in the form of deterioration in water quality due to the release of polluting materials during the construction and operational phases of the development via the Rye Water River and the River Liffey. The SPA is located approx. 31km downstream of the proposed development site. Potential effects on all SCI species are considered under Wetland and waterbirds [A999].

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Designated Site	Distance from Proposed Development (km)	Likely Zone of Impact Determination
		This SPA is **within the likely zone of impact**, due to the potential for pollutants to be transmitted to it indirectly via surface water.
proposed Natural Heritage Areas (pNHA)		
Rye Water Valley/Carton pNHA [001398]	0km from site boundary	Rye Water Valley/Carton pNHA located downstream of the proposed development with hydrological connectivity via the Rye River. **Taking a precautionary approach, this site falls within the likely impact zone of the Proposed Development.**
Royal Canal pNHA [002103]	**Distance:** 0.96km	Royal Canal pNHA located downstream of the proposed development with hydrological connectivity via the Rye River. **Taking a precautionary approach, this site falls within the likely impact zone of the Proposed Development.**
Liffey Valley pNHA [000128]	**Distance:** 6.7km	Impacts on these pNHAs can be ruled out due to the distance and lack of connectivity between the proposed development site and these pNHAs. There is no complete source-pathway-receptor chain for impact. **These sites are not in the zone of likely impact, no further assessment is required.**
Grand Canal pNHA [002104]	**Distance:** 8.6km	
Donadea Wood pNHA [001391]	**Distance:** 10.9km	

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Potential for effects on European sites is summarised in this report and is fully addressed in the Natura Impact Statement submitted as part of the application.

Where a nationally designated site (NHA), overlaps with the boundary of a European designated site, i.e. (SAC/SPA), the potential for impacts has been considered under the European designation.

Surface water connectivity was identified between the proposed development and Rye Water Valley/Carton pNHA and the Royal Canal pNHA. This is further described in Section 6.7.2 of this Chapter.

The AA Screening that accompanies this application identifies the following European Sites as being within the Likely Zone of Impact:

Rye Water Valley/Carton SAC [001398]
South Dublin Bay SAC [000210]
North Dublin Bay SAC [000206]
South Dublin Bay and River Tolka Estuary SPA [004024]
North Bull Island SPA [004006].

6.5.1.2 NPWS Article 17 Reporting

A review of the Irish Reports for Article 17 of the Habitats Directive (92/42/EEC), including the National Juniper Survey, Irish Semi-Natural Grassland Survey, National Survey of Native Woodlands and Ancient and Long-Established Woodland datasets were conducted prior to undertaking the multi-disciplinary walkover survey.

The closest mapped article 17 habitats are Alkaline Fen and Alluvial woodland located 5km and 5.1km east of the development site, as shown in Figure 6-5.

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Drawing Title
NPWS Article 17 mapped habitat in relation to proposed development site

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CM	CM
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MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

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6.5.1.3 New Flora Atlas

A search was made in the New Atlas of the British and Irish Flora (Preston *et al*, 2002) to investigate whether any rare or unusual plant species listed under Annex I of the EU Habitats Directive, The Irish Red Data Book, 1, Vascular Plants (Curtis, 1988) or the Flora (Protection) Order ((FPO)1999, as amended 2015) had been recorded in the relevant 10km squares in which the study site is situated (N93). Each hectad contains 100 whole 1km squares containing terrestrial habitats. Species of conservation concern are given in Table 6-5.

Table 6-5 Species listed designated under the Flora Protection Order or the Irish Red Data Book within Hectad N93

Common Name	Scientific Name	Status
Red Hemp-nettle	*Galeopsis angustifolia*	VU, FPO
Opposite-leaved Pondweed	*Groenlandia densa*	NT, FPO
Hairy St John's-wort	*Hypericum hirsutum*	VU, FPO
Hairy Violet	*Viola hirta*	VU, FPO
Shepherd's-needle	*Scandix pecten-veneris*	RE
Green-winged Orchid	*Orchis morio*	VU
Upright Brome	*Bromopsis erecta*	NT
Greater Knapweed	*Centaurea scabiosa*	NT
Autumn Gentian	*Gentianella amarella*	NT
Corn Marigold	*Chrysanthemum segetum*	NT
Henbane	*Hyoscyamus niger*	NT
Pale Flax	*Linum bienne*	NT

6.5.1.4 National Biodiversity Data Centre (NBDC) Records

A search of the National Biodiversity Data Centre (NBDC) records for the relevant hectad, N93, provided records on a number of fauna species of conservation concern, excluding marine species and bird species. These are provided in Table 6-6. Records on invasive are also provided and outlined in Table 6-7.

Table 6-6 NBDC Records for Species of Conservation Interest in hectad N93
Annex II, Annex IV, Annex V – Of EU Habitats Directive, WA - Wildlife Acts – Irish Wildlife Acts (1976, 2017), LC – Least concern, NT – Near threatened, VU - Vulnerable.

Common Name	Scientific Name	Status	Hectad
Common Frog	*Rana temporaria*	Annex V, WA	N93
Smooth Newt	*Lissotriton vulgaris*	WA	N93
Freshwater White-clawed Crayfish	*Austropotamobius pallipes*	Annex II, Annex V, WA	N93

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Common Name	Scientific Name	Status	Hectad
Desmoulin's Whorl Snail	*Vertigo moulinsiana*	Annex II, WA	N93
Narrow-mouthed Whorl Snail	*Vertigo angustior*	Annex II, WA	N93
Brown Long-eared Bat	*Plecotus auritus*	Annex IV, WA	N93
Daubenton's Bat	*Myotis daubentonii*	Annex IV, WA	N93
Eurasian Badger	*Meles meles*	WA	N93
Eurasian Pygmy Shrew	*Sorex minutus*	WA	N93
Eurasian Red Squirrel	*Sciurus vulgaris*	WA	N93
European Otter	*Lutra lutra*	Annex II, Annex IV, WA	N93
Lesser Noctule	*Nyctalus leisleri*	Annex IV, WA	N93
Natterer's Bat	*Myotis nattereri*	Annex IV, WA	N93
Pine Marten	*Martes martes*	Annex V, WA	N93
Pipistrelle	*Pipistrellus pipistrellus sensu lato*	Annex IV, WA	N93
Red Deer	*Cervus elaphus*	WA	N93
Soprano Pipistrelle	*Pipistrellus pygmaeus*	Annex IV, WA	N93
West European Hedgehog	*Erinaceus europaeus*	WA	N93
Whiskered Bat	*Myotis mystacinus*	Annex IV, WA	N93

Table 6-7 NBDC records for Invasive Species in hectad F92

Common Name	Scientific Name
American mink	*Mustela vison*
Japanese knotweed	*Fallopia japonica*
Giant rhubarb	*Gunnera tinctoria*
Rhododendron	*Rhododendron ponticum*

6.5.1.5 NPWS

National Parks and Wildlife Service (NPWS) online records were searched to see if any rare or protected species of flora or fauna have been recorded from hectad F92. An information request was also sent to the NPWS requesting records from the Rare and Protected Species Database. Table 6-8 lists rare and protected species records obtained from NPWS, as received on the 27th of May 2021, as well as those recorded available through the online NPWS map viewer.

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Table 6-8 National Parks and Wildlife Service Map Viewer Records for hectad N93

Common Name	Scientific Name	Designation	Status
Henbane	*Hyoscyamus niger*	Near Threatened (NT)	N93
Red Hemp-Nettle	*Galeopsis angustifolia*	FPO, Vulnerable (VU)	N93
Hairy Violet	*Viola hirta*	FPO, VU	N93
Green Figwort	*Scrophularia umbrosa*	NT	N93
Corn Chamomile	*Anthemis arvensis*	RL	N93
Opposite-leaved Pondweed	*Groenlandia densa*	Annex II, NT, FPO	N93
Shepherd's-needle	*Scandix pecten-veneris*	Regionally Extinct (RE)	N93
Hairy St John's-wort	*Hypericum hirsutum*	FPO, VU	N93
Green-winged Orchid	*Orchis morio*	Annex II, VU	N93
West European Hedgehog	*Erinaceus europaeus*	WA	N93
Irish Hare	*Lepus timidus subsp. Hibernicus*		N93
Badger	*Meles meles*	WA	N93
Irish Stoat	*Mustela erminea subsp. hibernica*		N93
Common Frog	*Rana temporaria*	Annex V, WA	N93
Freshwater Crayfish	*Austropotamobius pallipes*	Annex II, Annex V, WA	N93
Smooth Newt	*Lissotriton vulgaris*	WA	N93
Narrow-mouther Whorl Snail	*Vertigo angustior*	Annex II, VU	N93
Desmoulin's Whorl Snail	*Vertigo moulinsiana*	Annex II, Endangered (EN)	N93

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6.5.1.6 Inland Fisheries Ireland (IFI) Data

Monitoring of the Rye River catchment is carried out as part of the East River Basin District River Surveys. The most recent IFI surveys were carried out between 14th and 20th of September 2018, with three locations along the River Rye in total being surveyed.

Only one out of the three surveyed sites achieved Good ecological status. The other two surveyed sites have declined in status since 2011, changing from a good to a moderate status. Five fish species were recorded at three sites surveyed on the Rye Water River Catchment in 2018. Minnow was the most abundant species captured. Brown trout were recorded at all three sites fish and ranged in length from 6.8 to 31.5cm. Four age classes of brown trout, 0+, 1+, 2+ and 3+, were present. Lamprey and pike were recorded at one site only (site 3) (Matson et al., 2019).

6.5.1.7 Water Quality

River Basin Management Plans (RBMPs) have been published for all River Basin Districts in Ireland in accordance with the requirements of the Water Framework Directive. The online EPA Envision map viewer provides access to water quality information at individual waterbody status for all the River Basin Districts in Ireland. The EPA Envision map viewer was consulted, most recently, on 23rd of March 2022 regarding the water quality status of the rivers which run adjacent to the Study Area. The WFD River Waterbody Status 2013 – 2018 for the watercourses which flow through the site have been assessed in Table 6-9.

Table 6-9 Watercourses on site with relevant water quality statuses

Name	Location	Status	Risk
Rye Water River	Flows along the southern boundary of the health application site	Moderate	At Risk
Blackhall Little River	Flows along the western of the employment application site	Moderate	At Risk

Status– WFD River Waterbody Status 2010-2015 Risk – WFD River Waterbodies Risk

6.5.2 Conclusions of the Desk Study

The desktop study has provided information about the existing environment in Hectad N93, within which the proposed development site is located. the Proposed Development site is located in the Rye Water_30 river sub basin.

The Rye Water River which flows in an easterly direction outside the southern site boundary. The Rye Water River is designated as part of the Rye Water Valley/Carton SAC. The desktop study has provided information about the existing environment in Hectad N93 within which the Proposed Development site is located.

A number of watercourses that drain the study area, lead to the following downstream EU Designated Sites, and are further considered in the Natura Impact Statement prepared for the Proposed Development:

Rye Water Valley/Carton SAC [001398]
South Dublin Bay SAC [000210]
North Dublin Bay SAC [000206]
South Dublin Bay and River Tolka Estuary SPA [004024]
North Bull Island SPA [004006].

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The desk study identified that a variety of protected faunal species are known to occur within the study area, including bats, otter, red squirrel, pine marten and badger. The mammal species recorded during the desk study informed the survey methodologies undertaken during the site visits.

The desk study also provided useful information to inform the ecological surveys undertaken on site as well as the identification of pathways for potential impact on sensitive ecological receptors.

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6.6 Description of the Existing Environment

6.6.1 Description of Habitats

A dedicated habitat survey of the proposed development site was undertaken on the 6th of July by Julie O'Sullivan and Colin Murphy, with follow up surveys carried out in July 2022. All habitats within the development site were readily identifiable during the site visit. The habitat classifications and codes correspond to those described in '*A Guide to Habitats in Ireland*' (Fossitt, 2000).

The following section describes the habitats found within the 6 separates planning application sites (Site, A, Site B, Site C, MOOR, Kildare bridge and Moyglare Bridge).

A habitat map of the entire proposed development site is shown in figure 6.6.

6.6.1.1 Site A- Strategic Employment Zone

Table 6-10. Habitats recorded in Site A

Habitat (Fossitt)	Code
Improved Agricultural Grassland	*GA1*
Hedgerows	*WL1*
Treeline	*WL2*
Buildings and Artificial Surfaces	*BL3*

Improved Agricultural Grassland (GA1) is the dominant habitat within the development site. This habitat had a low species diversity and a low sward height, and during the survey was being grazed by sheep and horses. Species recorded in this habitat included abundant perennial rye-grass (*Lolium perenne*), clovers (*Trifolium* spp.), broadleaved plantain (*Plantago major*), frequent ribwort plantain (*Plantago lanceolata*). creeping buttercup (*Ranunculus repens*), annual meadow grass (*Poa annua*), daisy (*Bellis perennis*), cock's-foot (*Dactylis glomerata*), crested dogs tail (*Cynosurus cristatus*), meadow foxtail (*Alopecurus pratensis*), Yorkshire fog (*Holcus lanatus*), nettle (*Urtica dioica*), dandelion (*Taraxacum officinale* agg.), broad-leaved dock (*Rumex obtusifolius*), mouse-ear chickweed (*Cerastium fontanum*), creeping thistle (*Cirsium arvense*) and germander speedwell (*Veronica chamaedrys*). See Plate 6.1.

Field boundaries are delineated by mature ***Treelines (WL2)*** and ***Hedgerows (WL1).*** Species recorded in the treelines (WL2) include oak, ash, sycamore, hawthorn and beech and was recorded along the southern boundary of the site. Species recorded in the hedgerows (WL1) and hedgerow understory included elder (*Sambucus nigra)*, hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), bramble (*Rubus fructicosus*), willows (*Salix* spp.), holly (*Ilex aquilifolium*), ash (*Fraxinus excelsior*) and ivy (*Hedera helix*). Species recorded in the field margins and hedgerow understory included common sorrel (*Rumex acetosa*), meadow buttercup (*Ranunculus acris*), herb Robert (*Geranium robertianum*), *harts tongue fern (Asplenium scolopendrium*), dandelion (*Taraxacum officinale* agg.), primrose (*Primula vulgaris*), vetch (*Vicia* spp.), lesser celandine (*Ficaria verna*), lords and ladies (*Arum maculatum*) and creeping cinquefoil (*Potentilla reptans).* See plate 6.2.

Remnant dried up former drainage ditches occur in parts of the site bordering hedgerows and treelines in the north-west of the site. These former drainage ditches had dried up, had no flow and were heavily vegetated with dense bramble and nettles.

The R157 located along the eastern boundary of the proposed development site is categorized as Buildings and Artificial Surfaces (BL3). See Plate 6.3.

There are no Annex I habitats listed under the EU Habitats Directive present within the Proposed development site boundary. No botanical species protected under the Flora (protection) Order (1999, as amended 2015), listed in the EU Habitats Directive (92/43/EEC), or listed in the Irish Red Data

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Books were recorded on the site and no suitable habitat occurs within the site. All species recorded are common in the Irish landscape.

Plate 6-1.Agricultural grassland recorded within development site A.

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Plate 6-2. Hedgerow habitat along the eastern boundary of site A

Plate 6-3. R157 located along the eastern boundary of Site A.

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6.6.1.2 Site B- Healthcare Facilities

Table 6-11. Habitats recorded within development site B.

Habitat (Fossitt)	Code
Improved Agricultural Grassland	*GA1*
Hedgerows	*WL1*
Treeline	WL2
Eroding/upland Rivers	*FL2*
Buildings and Artificial Surfaces	*BL3*

Improved Agricultural Grassland (GA1) is the dominant habitat within the development site. This habitat had a low species diversity and a low sward height, and during the survey was being grazed by sheep and horses. Species recorded in this habitat included abundant perennial rye-grass (*Lolium perenne*), clovers (*Trifolium* spp.), broadleaved plantain (*Plantago major*), frequent ribwort plantain (*Plantago lanceolata*). creeping buttercup (*Ranunculus repens*), annual meadow grass (*Poa annua*), daisy (*Bellis perennis*), cock's-foot (*Dactylis glomerata*), crested dogs tail (*Cynosurus cristatus*), meadow foxtail (*Alopecurus pratensis*), Yorkshire fog (*Holcus lanatus*), nettle (*Urtica dioica*), dandelion (*Taraxacum officinale* agg.), broad-leaved dock (*Rumex obtusifolius*), mouse-ear chickweed (*Cerastium fontanum*), creeping thistle (*Cirsium arvense*) and germander speedwell (*Veronica chamaedrys*). See Plate 6.4.

Field boundaries are delineated by mature ***Treelines (WL2)*** and ***Hedgerows (WL1).*** Species recorded in the treelines (WL2) include oak, ash, sycamore, hawthorn and beech and was recorded along the southern boundary of the site. Species recorded in the hedgerows (WL1) and hedgerow understory included elder (*Sambucus nigra)*, hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), bramble (*Rubus fructicosus*), willows (*Salix* spp.), holly (*Ilex aquilifolium*), ash (*Fraxinus excelsior*) and ivy (*Hedera helix*). Species recorded in the field margins and hedgerow understory included common sorrel (*Rumex acetosa*), meadow buttercup (*Ranunculus acris*), herb Robert (*Geranium robertianum*), *harts tongue fern (Asplenium scolopendrium*), dandelion (*Taraxacum officinale* agg.), primrose (*Primula vulgaris*), vetch (*Vicia* spp.), lesser celandine (*Ficaria verna*), lords and ladies (*Arum maculatum*) and creeping cinquefoil (*Potentilla reptans).* See plate 6.5.

Remnant dried up former drainage ditches occur in parts of the site bordering hedgerows and treelines in the north-west of the site. These former drainage ditches had dried up, had no flow and were heavily vegetated with dense bramble and nettles.

The Rye Water River flows along the southern boundary of the site and is categorised as Eroding/upland River. The river is fringed by a mature treeline on its northern banks, which also forms part of the development boundary. See plate 6.6.

The R157 located along the eastern boundary of the proposed development site is categorized as Buildings and Artificial Surfaces (BL3).

There are no Annex I habitats listed under the EU Habitats Directive present within the Proposed development site boundary. No botanical species protected under the Flora (protection) Order (1999, as amended 2015), listed in the EU Habitats Directive (92/43/EEC), or listed in the Irish Red Data Books were recorded on the site and no suitable habitat occurs within the site. All species recorded are common in the Irish landscape.

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Plate 6-4. Agricultural grassland recorded in site B.

Plate 6-5. Hedgerow recorded in eastern section of site B.

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Plate 6-6. Rye Water River along recorded along the southern boundary of site B.

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6.6.1.3 Site C- Strategic Housing Development

Table 6-12. Habitats recorded on the proposed development site.

Habitat (Fossitt)	Code
Improved Agricultural Grassland	*GA1*
Buildings and Artificial Surfaces	BL3
Mixed broadleaved woodland	*WD1*
Eroding upland River	FW1
Hedgerows	*WL1*
Treeline	*WL2*

Improved Agricultural Grassland (GA1) is the dominant habitat within the site C. This habitat had a low species diversity and a low sward height, and during the survey was being grazed by sheep and horses. Species recorded in this habitat included abundant perennial rye-grass (*Lolium perenne*), clovers (*Trifolium* spp.), broadleaved plantain (*Plantago major*), frequent ribwort plantain (*Plantago lanceolata*). creeping buttercup (*Ranunculus repens*), annual meadow grass (*Poa annua*), daisy (*Bellis perennis*), cock's-foot (*Dactylis glomerata*), crested dogs tail (*Cynosurus cristatus*), meadow foxtail (*Alopecurus pratensis*), Yorkshire fog (*Holcus lanatus*), nettle (*Urtica dioica*), dandelion (*Taraxacum officinale* agg.), broad-leaved dock (*Rumex obtusifolius*), mouse-ear chickweed (*Cerastium fontanum*), creeping thistle (*Cirsium arvense*) and germander speedwell (*Veronica chamaedrys*). See Plate 6.7.

Moygaddy castle in the northern section of the site is classified as ***Buildings and Artificial Surfaces (BL3)***. See plate 6.8.

Field boundaries are delineated by mature ***Treelines (WL2)*** and ***Hedgerows (WL1).*** Species recorded in the treelines (WL2) include oak (*Quercus sp.*), ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus),* hawthorn (*Crataegus monogyna*) and beech (*Fagus sylvatica*) and was recorded along the southern boundary of the site. Species recorded in the hedgerows (WL1) and hedgerow understory included elder (*Sambucus nigra)*, hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), bramble (*Rubus fruticosus*), willows (*Salix* spp.), holly (*Ilex aquilifolium*), ash (*Fraxinus excelsior*) and ivy (*Hedera helix*). Species recorded in the field margins and hedgerow understory included common sorrel (*Rumex acetosa*), meadow buttercup (*Ranunculus acris*), herb Robert (*Geranium robertianum*), *harts tongue fern (Asplenium scolopendrium*), dandelion (*Taraxacum officinale* agg.), primrose (*Primula vulgaris*), vetch (*Vicia* spp.), lesser celandine (*Ficaria verna*), lords and ladies (*Arum maculatum*) and creeping cinquefoil (*Potentilla reptans).* See plate 6.9.

Remnant dried up former drainage ditches occur in parts of the site bordering hedgerows and treelines in the north-west of the site. These former drainage ditches had dried up, had no flow and were heavily vegetated with dense bramble and nettles.

The Blackhall Little River, classified as **Eroding/upland river (FW1)** flows through the site, in a southerly direction ((See plate 6.10), discharging to the Rye Water River which flows in an easterly direction outside the southern site boundary. The Rye Water River is designated as part of the Rye Water Valley/Carton SAC, downstream of the proposed development site.

The Blackhall Little is characterized by a rocky substrate, with some pool, riffle and glide areas. The river is approximately 1-2m in the southern section of the site. At the time of the field survey, the river had a low flow and the water was slightly turbid. The river is fringed by mature treeline/hedgerow on its eastern bank and improved agricultural grassland on is western bank. The western embankment of the river had a low profile and had evidence of cattle poaching in places. Emergent vegetation included watercress (*Nasturtium officinale),* wild angelica (*Angelica sylvestris)*, marsh marigold (*Caltha palustris*), meadow buttercup (*Ranunculus acris*) and fools water cress (*Apium nodiflorum).* Willow (*Salix* spp.) and bramble (*Rubus fructicosus)* occur along the embankment.

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Mixed broadleaved woodland (WD1) occurs on either side of the Blackhall Little River in the centre of the site. This woodland has been planted and is approximately 20-25 years old. The topography of the wooded area, slope down toward the river. See plate 6.11.

The mixed broadleaved woodland (WD1) on the eastern shore of the river, is dominated by mature beech trees, and had a low diversity of species in the ground flora. The woodland on the western shoreline of the watercourse was recently planted with ash, beech and oak, with sycamore also present. The ground flora included abundant nettle, hogweed, herb Robert, ground elder, ivy and wood avens with frequent *poa trivialis*, goosegrass, *ranunculus repens*, foxtail, dock, and cow parsley.

There are no Annex I habitats listed under the EU Habitats Directive present within the Proposed development site boundary. No botanical species protected under the Flora (protection) Order (1999, as amended 2015), listed in the EU Habitats Directive (92/43/EEC), or listed in the Irish Red Data Books were recorded on the site and no suitable habitat occurs within the site. All species recorded are common in the Irish landscape.

Plate 6-7. Improved agricultural grassland in centre of site C.

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Plate 6-8.Moygaddy castle, categorized as Buildings and Artificial surfaces in the north section of site C.

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Plate 6-9.Hedgerow habitat delineating improved agricultural grassland (GA1) in the centre of the site.

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Plate 6-10.Blackhall Little River categorised as eroding upland river in the centre of site C.

Plate 6-11.Mixed Broadleaved woodland planted with Ash, Beech and Sycamore located in the centre of site C.

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6.6.1.4 MOOR (Maynooth Outer Orbital Road) Site

Table 6-13. Habitats recorded within the MOOR application site.

Habitat (Fossitt)	Code
Improved Agricultural Grassland	*GA1*
Buildings and Artificial Surfaces	BL3
Eroding upland River	FW1
Hedgerows	*WL1*
Treeline	*WL2*

Improved Agricultural Grassland (GA1) is the dominant habitat within the MOOR application site boundary. This habitat had a low species diversity and a low sward height, and during the survey was being grazed by sheep and horses. Species recorded in this habitat included abundant perennial rye-grass (*Lolium perenne*), clovers (*Trifolium* spp.), broadleaved plantain (*Plantago major*), frequent ribwort plantain (*Plantago lanceolata*). creeping buttercup (*Ranunculus repens*), annual meadow grass (*Poa annua*), daisy (*Bellis perennis*), cock's-foot (*Dactylis glomerata*), crested dogs tail (*Cynosurus cristatus*), meadow foxtail (*Alopecurus pratensis*), Yorkshire fog (*Holcus lanatus*), nettle (*Urtica dioica*), dandelion (*Taraxacum officinale* agg.), broad-leaved dock (*Rumex obtusifolius*), mouse-ear chickweed (*Cerastium fontanum*), creeping thistle (*Cirsium arvense*) and germander speedwell (*Veronica chamaedrys*). See Plate 6.12.

The R157 located to the east of the site and the L2214 located within the centre of the site are both categorized as **Buildings and Artificial Surfaces (BL3).**

The MOOR application intersects multiple fields that are delineated by mature **Treelines (WL2)** and **Hedgerows (WL1).** Species recorded in the treelines (WL2) include oak (*Quercus sp.*), ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*), hawthorn (*Crataegus monogyna*) and beech (*Fagus sylvatica*) and was recorded along the southern boundary of the site. Species recorded in the hedgerows (WL1) and hedgerow understory included elder (*Sambucus nigra*), hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), bramble (*Rubus fruticosus*), willows (*Salix spp.*), holly (*Ilex aquilifolium*), ash (*Fraxinus excelsior*) and ivy (*Hedera helix*). Species recorded in the field margins and hedgerow understory included common sorrel (*Rumex acetosa*), meadow buttercup (*Ranunculus acris*), herb Robert (*Geranium robertianum*), harts tongue fern (*Asplenium scolopendrium*), dandelion (*Taraxacum officinale agg.*), primrose (*Primula vulgaris*), vetch (*Vicia spp.*), lesser celandine (*Ficaria verna*), lords and ladies (*Arum maculatum)* and creeping cinquefoil (*Potentilla reptans*). See plate 6.13 and 6-14.

The proposed MOOR route intersects the Rye Water River to the east of the route and the Blackhall Little River to the north of the route. Both rivers are categorized as **Eroding Upland River (FW1)**. It should be noted that during the 2022 site survey, the Blackhall Little River had largely dried up and there was no flowing water present. See plate 6.15 & 6.16.

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Plate 6-12. Improved agricultural grassland located within the route of the MOOR application.

Plate 6-13. L2214 categorized as Buildings and Artificial surfaces located within route of the proposed MOOR fringes by mature Treeline habitat

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Plate 6-14. Treeline recorded along the Blackwater Little River within the centre of the MOOR route

Plate 6-15. Blackhall Little River with no flowing water located to the north of the MOOR route

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Plate 6-16. Rye Water River located to the western boundary of the MOOR route

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6.6.1.5 Kildare Bridge

The habitats described below refer to the habitats recorded within the boundary of the Kildare bridge application.

Table 6-14. Habitats recorded within the Kildare bridge application site.

Habitat (Fossitt)	Code
Buildings and Artificial Surfaces	BL3
Treeline	*WL2*
Eroding upland River	*FW1*

The Kildare bridge, R157 and the Dunboyne Road are all categorized as Buildings and artificial (BL3). See plate 6.18.

Plate 6-17. Kildare bridge and R157

The Rye Water River located at the bridge is categorized as Eroding upland River (FW1) and is fringed by riparian Treeline (WL1) with Sycamore (*Acer pseodoplatanus*), Ash (*Fraxinus excelsior*), Willow (*Salix sp.)* and *Leyandii cypress* occurring here. See Plate 6-19.

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Plate 6-18. Rye River (FW1) fringed by riparian Treeline (WL1).

6.6.1.6 Moyglare Bridge

The habitats described below refer to the habitats recorded with the Moyglare Bridge application site.

Table 6-15. Habitats recorded within the Moyglare bridge site

Habitat (Fossitt)	Code
Spoil and Bare ground	*ED2*
Dry Meadows and grassy verges	*GS2*
Eroding upland River	*FW1*

The area to the south of the Rye Water River is dominated by rank grassland categorised as Dry Meadows and grassy verges (GS2). The species diversity here was low and dominated by tussocky vegetation composing of Broad-leaved dock (*Rumex obtusifolius*), Ragwort (*Jacobaea vulgaris*), Creeping thistle (*Cirsium arvense*), Yorkshire fog (*Holcus lanatus*) and Cock's foot (*Dactylis glomerata*). See Plate 6-19. A small section of Spoil and bare ground (ED2) habitat was recorded to the south of the Moyglare Bridge-Kildare application boundary, in the area adjacent to the Moyglare Hall Estate. See Plate 6-20.

The Rye Water River occurs at the northern boundary of the Moyglare Bridge-Kildare application site and is categorised as Eroding upland River (FW1). See Plate 6-21.

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Plate 6-19. Dry meadows and grassy Verges habitat recorded south of the Rye Water River within Moyglare site

Plate 6-20. Spoil and bare ground fringed by dry meadows and grassy verges within Moyglare site

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Plate 6-21. Rye Water River categorised as Eroding upland river within Moyglare site.

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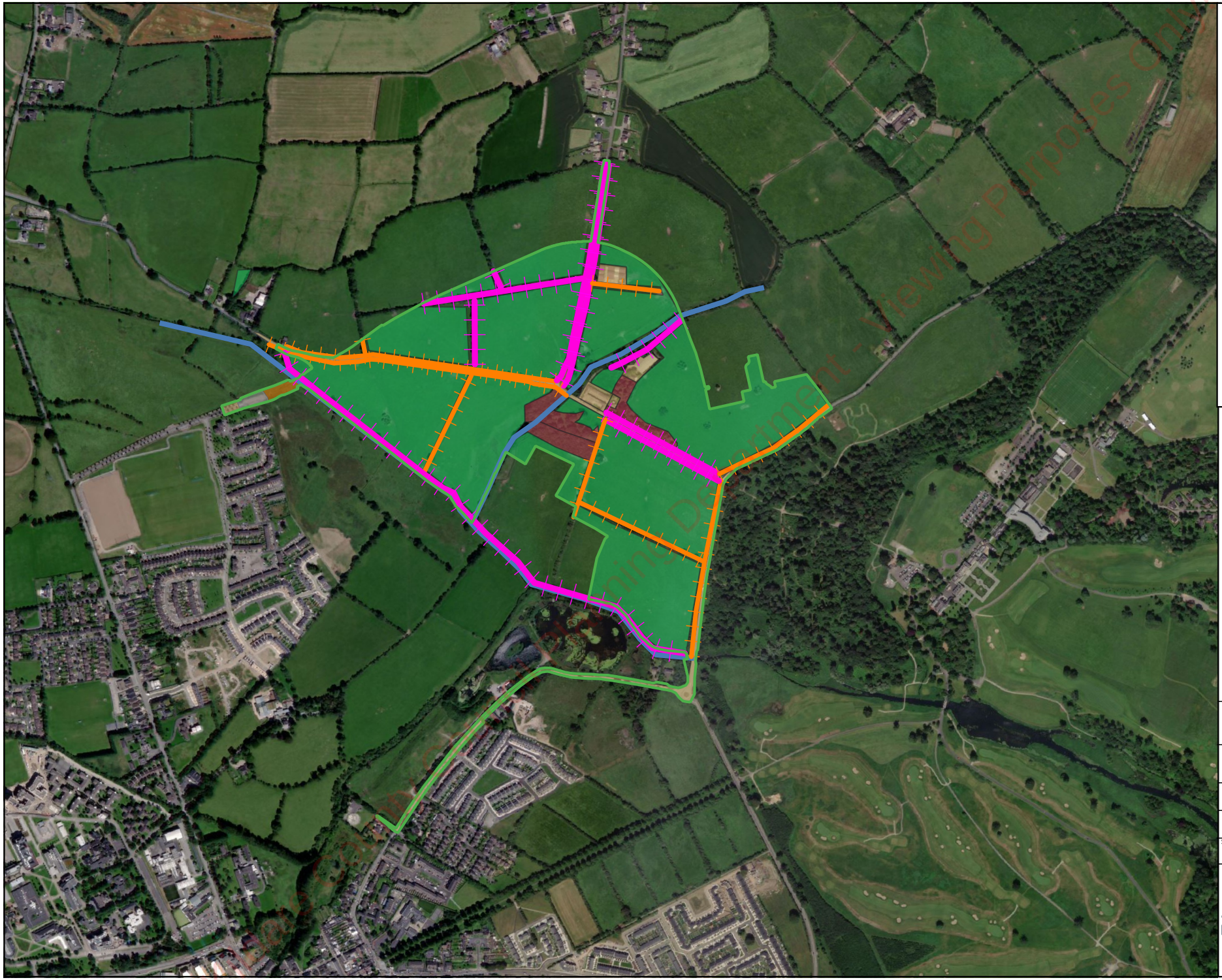

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Map Legend

EIAR Site Boundary

Habitat Map

- Buildings and Artificial Surfaces (BL3)
- Improved Agriculltural Grassland (GA1)
- MIxed Broadleaved Woodland (WD1)
- Spoil and Bare Ground (ED2)
- Dry Meadows and Grassy Verges (GS2)

Linear habitat

- Eroding Upland River (FW2)
- Hedgerow (WL1)
- Treeline (WL2)

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Drawing Title

Habitat Map

Project Title: Sky Castle Ltd – Moygaddy Mixed Use Scheme, Co. Meath & Co. Kildare	
Drawn By: CM	Checked By: CM
Project No.: 210414	Drawing No.: Figure 6-6
Scale: 1:12,170	Date: 2022-08-30

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

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6.6.2 Invasive species

During field surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) was conducted. No species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were recorded during the survey.

6.6.3 Protected Flora

No botanical species listed under the Flora (protection) Order (1999, as amended 2015), listed in the EU Habitats Directive (92/43/EEC), or listed in the Irish Red Data Books were recorded on the site. All species recorded are common in the Irish landscape. No rare and protected plant species recorded in the desk study, including those obtained from NPWS data request (see Table 6-8), were recorded within the study area.

6.6.4 Rye Water Valley/Carton SAC Survey

A survey of the area to the east of Kildare bridge designated as part of Rye Water Valley/Carton House SAC was undertaken on the 21st of July 2022. During the survey, the area was extensively searched for any Petrifying springs with tufa formation (Cratoneurion) [7220], listed as a QI habitat for Rye Water Valley/Carton House SAC. No Petrifying springs with tufa formation (Cratoneurion) were discovered during the survey.

6.6.5 Fauna

6.6.5.1 Birds

Bird species recorded within the site boundaries during the site visit were an assemblage of common birds that are typical of the urban habitats in the wider area. A total of ten bird species were recorded within or flying over the site during the site visits (Table 6-11).

No evidence of Annex I or Special Conservation Interest (SCI) bird species associated with any SPA was recorded within the site boundaries. Given the lack of suitable habitat for rare or protected bird species identified within the site, there is no requirement for further bird surveys at the site.

Table 6-16 Bird species observed during the field visit, and current conservation status.

Common Name	Latin Name	Conservation Status
Robin	*Erithacus rubecula*	Green
Chaffinch	*Fringilla coelebs*	Green
Woodpigeon	*Columba palumbus*	Green
Rook	*Corvus frugilegus*	Green
Magpie	*Pica pica*	Green
Wren	*Troglodytes troglodytes*	Green
Buzzard	*Buteo buteo*	Green
Blackbird	*Turdus merula*	Green
Blue tit	*Parus caeruleus*	Green

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Common Name	Latin Name	Conservation Status
Dunnock	*Prunella modularis*	Green

6.6.5.2 Barn Owl survey results

The nocturnal vantage point survey did not indicate evidence of breeding barn owls and the building was considered 'unoccupied'. An interior inspection of the building was carried out once it was established that the building was unoccupied, to look for evidence indicating barn owl occupancy, including pellets, white-wash and moulted feathers. Particular attention was paid to the area under suitable cavities, both inside and outside of the building.

6.6.5.3 Bat Survey

Bat walkover surveys of the wider study area (Moygaddy Masterplan Area) were carried out during daylight hours on the 8th July, 22nd July and 9th August 2021. The landscape features on the site were visually assessed for potential use as bat roosting habitats and commuting/foraging habitats using a protocol set out in BCT *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn.) (Collins, 2016). Table 4.1 of the 2016 BCT Guidelines identifies a grading protocol for assessing structures, trees and commuting/foraging habitat for bats. The protocol is divided into four Suitability Categories: *High, Moderate, Low* and *Negligible.*

Full details of the bat survey effort and results can be found in the bat report located in Appendix 6-1

Roost Surveys

Moygaddy Castle

A dedicated exterior roost inspection survey was undertaken during daylight hours on 8th of July 2021. The tower castle is two to three stories and approximately 30 feet tall. The tower consists of stone walls and a partially collapsed stone roof. The interior of the structure was accessible through the main door at the ground level and the multiple windows on the first floor. The PRF's consisted of ivy cover over outer walls and a large number of crevices in the stonework. Gaps with potential for roosting bats were present between the stonework. The ivy cover was extensive along the south facing wall. Due to the number of PRF's, the tower was identified as having *"High suitability"* potential for roosting bats, i.e. a structure with one or more potential roost sites that are obviously suitable for use by larger number of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat (Collins, 2016). No evidence of bat use, including droppings, fur oil staining, signs of feeding remain etc., were identified within or surrounding the building. No bats were observed exiting or entering the building during the dusk activity survey.

Kildare Bridge

A dedicated exterior roost inspection survey was undertaken on Kildare bridge (Grid Ref: N 94726 38561) during daylight hours on 18th of August 2022. The bridge did not provide any significant suitable roosting features and no evidence of bats or bat use was found during the inspection. As such, it was classified as "Negligible" to "Low" Suitability for roosting bats.

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Dusk/Dawn Activity

Numerous foraging and commuting bats were recorded during the dusk and dawn bat activity surveys. Overall, bat activity was low with a total of 521 bat passes recorded across all surveys. Activity was dominated by common pipistrelle (Pipistrellus pipistrellus) n=293. This was followed by Leisler's bat (*Nyctalus leisleri*) n=159 and soprano pipistrelle (Pipistrellus pygmaeus) n=67. In addition, very small numbers of brown long-eared bat (*Plecotus auritus*) n=2 were also recorded. Activity levels were concentrated along the treeline edge habitats and field boundary hedgerows bordering the site (Figure 4-1 – 4-3 in bat report in appendix 6-1). Plate 6-4 shows total bat species composition and Table 6-12 presents the results per survey.

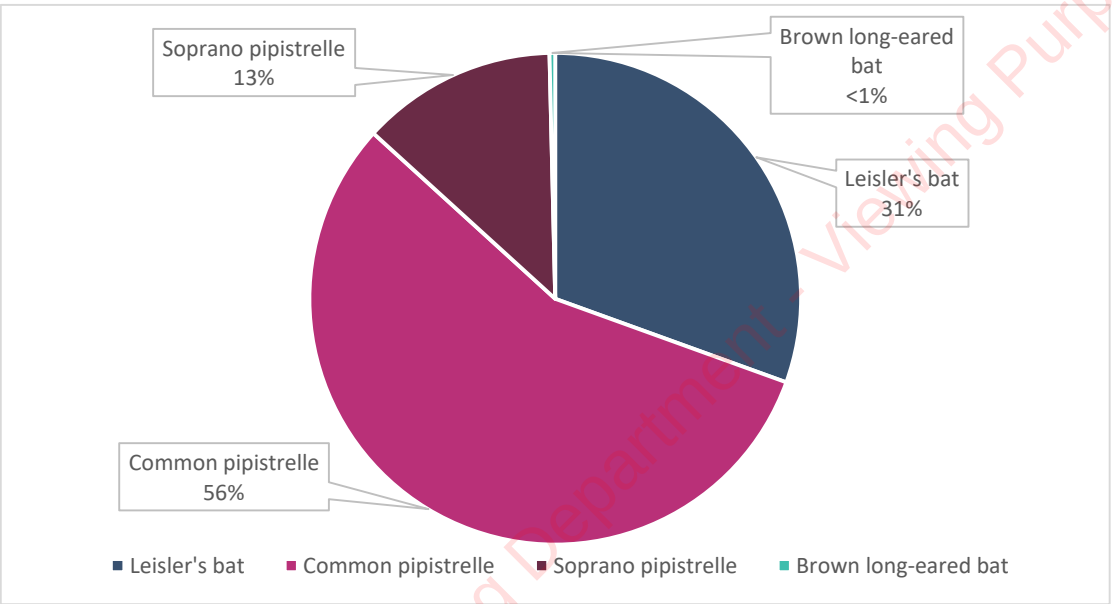

Plate 6-22 Bat Species Composition – Dusk and Dawn surveys

Table 6-17 Manual transect bat pass results per survey.

Species	Dusk 8th July 2021	Dawn 22nd July 2021	Dusk 9th August 2021	Total
Brown long-eared bat	-	-	2	**2**
Leisler's bat	150	6	3	**159**
Common pipistrelle	124	47	122	**293**
Soprano pipistrelle	46	3	18	**67**
Grand Total	**320**	**56**	**145**	**521**

There was an accumulation of bat activity around the small castle tower and surrounding WD1 habitat to the eastern section of Site C. The concentration of activity can be attributed to the surveyors being positioned here for 1.5hours during the emergence survey on the small castle tower. Bats were recorded commuting between the structure and foraging along woodland, hedgerow and treeline boundaries. However, no bats were observed emerging or re-entering the structure. This was followed by walked transects for the remainder of the surveys.

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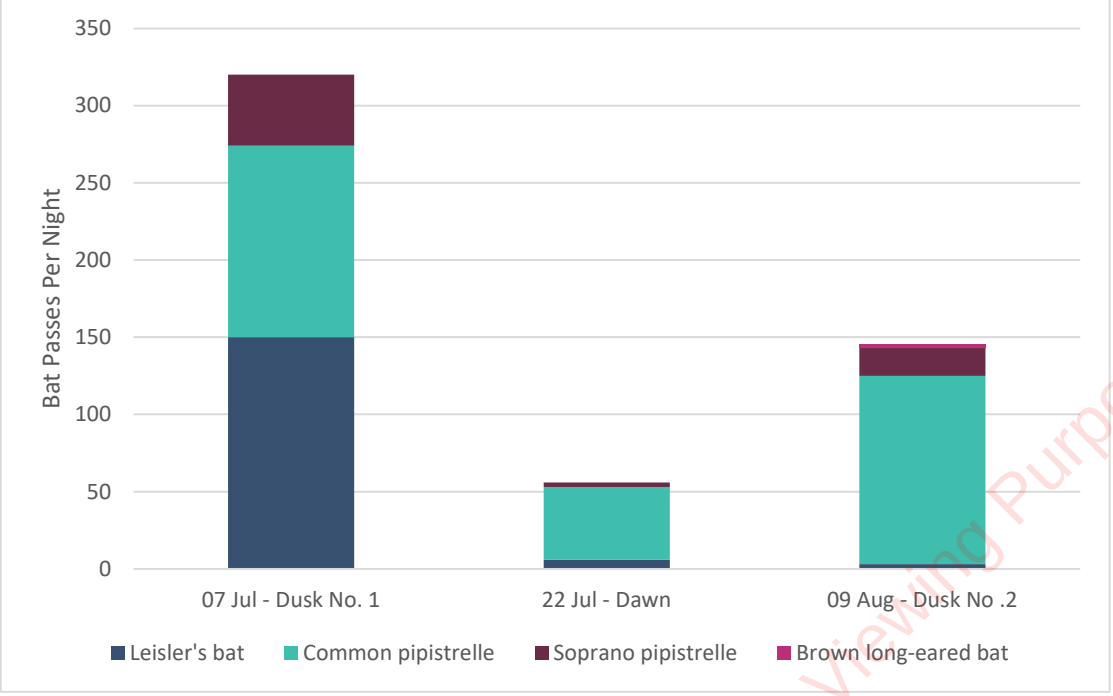

Plate 6-23 Species Composition Per Survey

Static Detector Results

Three static detectors were deployed on the site at six different locations (Figure 3-1 found in the bat report included as Appendix 6-1 of this EIAR), based on likely areas of bat activity, for a total of 33 nights in July/August 2021. These detectors allowed a specified look into species composition, commuting and foraging activities within the site.

All recordings were later analysed using bat call analysis software Kaleidoscope Pro v.5.4.2 (Wildlife Acoustics, MA, USA). Bat species were identified using established call parameters, to create site-specific custom classifiers. All identified calls were also manually verified. In total, 20,160 bat passes were recorded.

Analysis of the detector recordings positively identified five bats to species level with Myotis genus also present. Bat species included: common pipistrelle (*Pipistrellus pipistrellus*) n=10,061, Leisler's bat (*Nyctalus leisleri*) n=6,062 and soprano pipistrelle (*Pipistrellus pygmaeus*) n=3,596. Myotis spp. n=276, brown long-eared bat (*Plecotus auritus*) n=97 and nathusius' pipistrelle (*Pipistrellus nathusii*) were rarely encountered, with 1% or less compared to the total bats recorded Plate 6-6.

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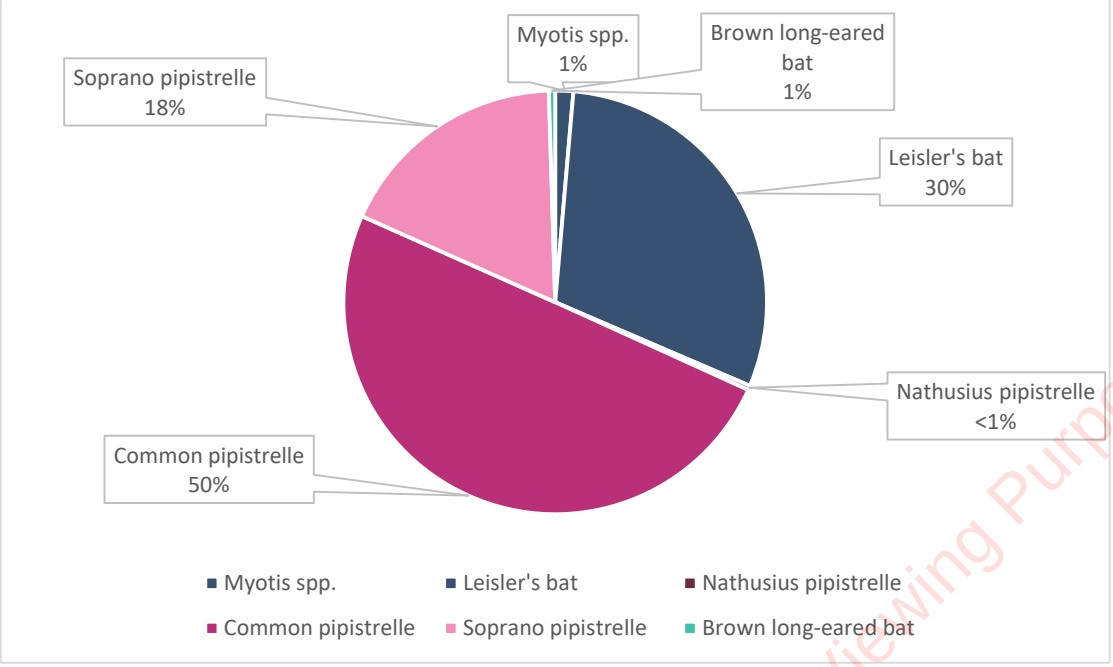

Plate 6-24 Species composition

Plate 6-9 shows total bat passes per detector. Detectors D01, D02 and D03 are associated with the first two-week deployment from 8th July to 22nd July 2021. Detector D01 was located to the northeast of Site C along a birch treeline habitat next to and open grassland. Detector D02 was located to the southeast of Site C along a treeline edge habitat, adjacent to the stream running north to south through the Study Area. Detector D03 was located along the hedgerow in the northwest of the Maynooth Outer Orbital Road (MOOR) Site. This area has a strong linear feature, that could provide suitable commuting and foraging opportunities for bats.

Detectors D04, D05 and D06 are associated with the second two-week deployment from 22nd July to 9th August 2021. Detector D04 was located north of Site A and east of the MOOR Site where two hedgerows converge. This area had high quality linear features suitable for foraging and commuting bats. Detector D05 was located along a hedgerow next to the Rye Water River along the southern boundary of Site C. Detector D06 was located to the northwest of Site C and the MOOR Site. Figure 3-1 shows all static detector locations.

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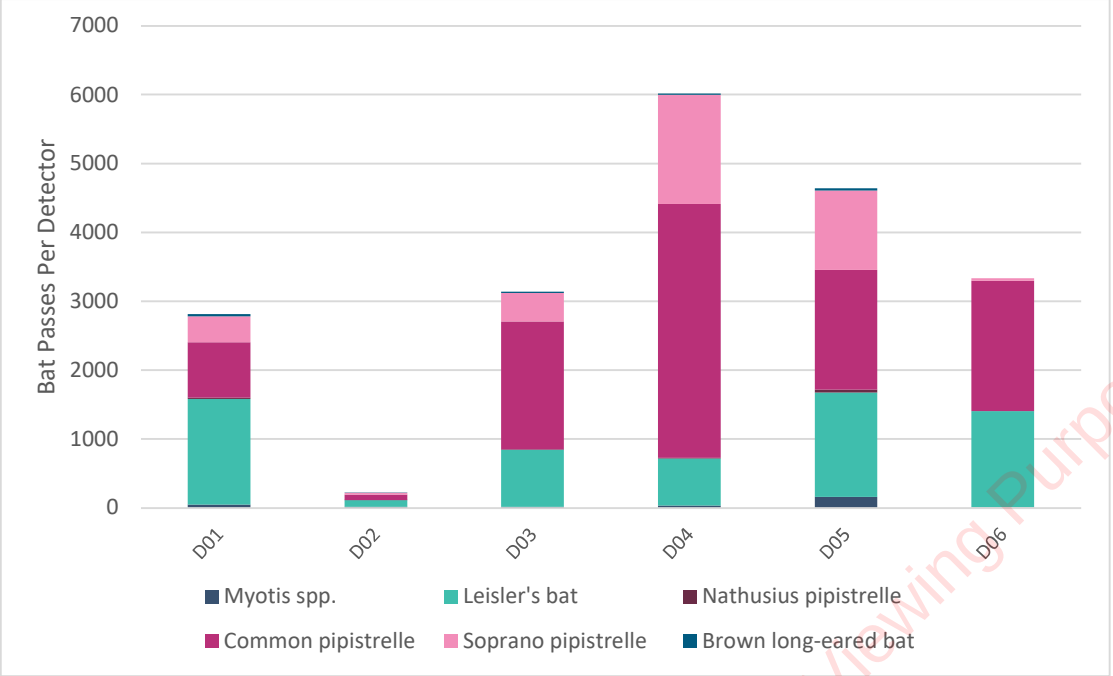

Plate 6-25. Bat Passes Per Detector

Analysis of the detector recordings also highlighted the total bat passes per night. Species composition per night is shown in Plate 6-26. Nights from 1 to 16 are associated with the first deployment locations (D1, D2 and D3). Nights from 17 to 33 include bat passes from the second deployment locations D4, D5 and D6. Activity varied across each deployment and each night. The graph demonstrates that common pipistrelle, Leisler's bat and soprano pipistrelle species were most commonly recorded during the survey periods. These species are common and widespread across Ireland.

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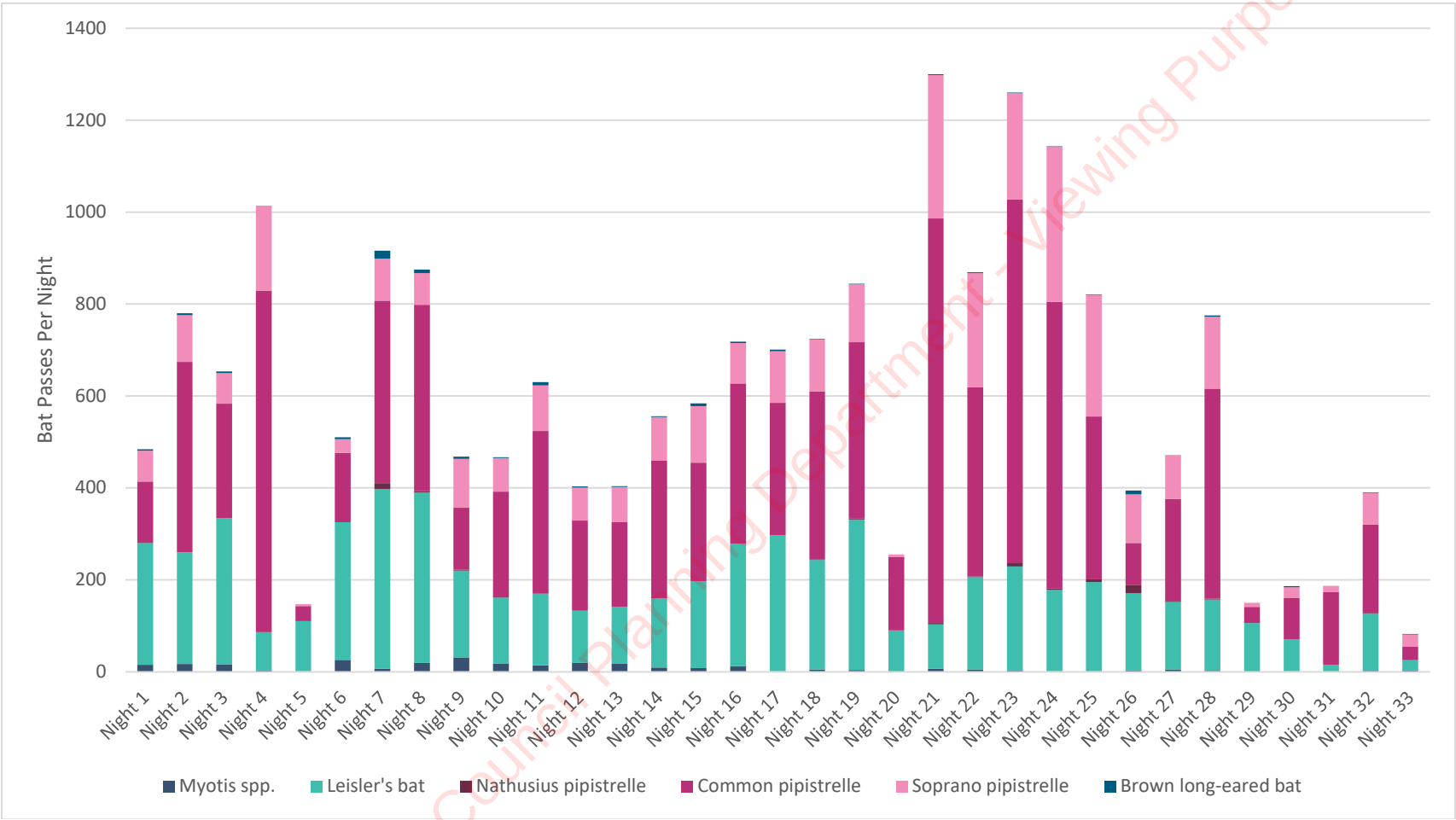

Plate 6-26 Bat Passes per night.

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6.6.5.4 Badger

Two potential badger setts were recorded within and along the hedgerow in the centre and along the hedgerow adjacent to the Blackhall Little River in the east section of the of site C (SHD application site). Camera traps were deployed at these burrows on the 6th July-16th August to monitor activity and determine whether any of the setts were being utilised by badgers. The potential badger sett along the hedgerow in the centre of the SHD site did not show signs of recent activity (i.e spoils heaps, fresh bedding, latrines) and looked inactive (See plate 6-24). A camera trap was deployed at this location for two weeks and no badgers were recorded using this sett. as such, it can be determined this is not an active sett but may be used as an outlier sett on occasion.

The potential badger sett observed along the Blackhall Little River showed some signs of activity, with fresh bedding and spoil heaps recorded outside one of the entrances (see plate 6-25). Five potential entrances were recorded at this location. Camera trap footage from this sett also recorded badger activity outside of the entrance of the sett (see plate 6-26). Although no footage was recorded of badgers entering and exiting the sett, it can be assumed this is an active sett due to the signs of activity and the badger recorded on the camera trap. The location of the setts are located in Figure 6-7 found in confidential appendix 6-2.

An additional badger survey was carried out on the 21st of July 2022. Fresh signs of badger activity were recorded at the main badger sett along the Blackhall Little River (i.e bedding outside sett entrance and spoil heaps), confirming this is a main sett in continuous use. No signs of badger activity were recorded on the sett in the centre of the SHD site during the 2022 survey.

No other badgers setts were recorded within the footprint of Site A, Site B, the MOOR, the Moyglare bridge or the Kildare bridge site.

Plate 6-27. Inactive outlier badger sett recorded within the centre of the SHD application site.

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Plate 6-28. Active main badger sett recorded along the Blackhall little River to the east of the SHD application site.

Plate 6-29. Badger recorded passing main sett.

6.6.5.5 Otter

The otter survey was focused on the Rye Water River located along the southern boundary of the proposed development site. A potential otter holt was recorded outside the boundary of the proposed development boundary (see plate 6-29) However, the entrance showed no recent signs of activity and looked inactive. The potential otter holt is located outside the footprint of the development and will not be impacted by construction works. The location of the holt is shown in Figure 6-8.

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Plate 6-30 Potential otter holt located along southern boundary of the proposed development site

6.6.5.6 Other species

A pine marten, listed as an EU Habitats directive species, was recorded passing the camera trap location along the Blackhall Little River in the centre of the site. See plate 6-30. No pine marten dens or resting sites were recorded within the development site during the survey.

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Plate 6-31. Pine marten recorded passing the camera trap

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6.6.6 Importance of Ecological Receptors

Table 6-18 lists all identified receptors and assigns them an ecological importance in accordance with the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009). This table also provides the rationale for this determination and identifies the habitats that are Key Ecological Receptors. These ecological receptors are considered in Section 6.7 of this report and mitigation/ measures will be incorporated into the proposed development where required, to avoid potential significant impacts on the features.

Table 6-18 Ecological Receptors identified during the assessment

Habitat and Geographic Importance	KER Y/N	Rationale
Habitats		
Local Importance (higher value) habitats: Treeline (WL2) Hedgerow (WL1) Eroding Upland River (FW1)	Yes	These habitats are classified as of *Local Importance (Higher value)* as they help maintain links and act as commuting and foraging corridors for wildlife and are essential in maintaining connectivity to the wider landscape and to features of higher ecological value. **These habitats are considered as KERs.**
Local Importance (Lower value) habitats: Improved Agricultural Grassland (GA1) Spoil and Bare Ground (ED2) Dry Meadows and Grassy Verges (GS2)	No	This habitat is classified as of Local Importance (Lower value) as it has low biodiversity value and is common and widespread in a local, national and international context. This habitat is highly modified, managed habitats with a low biodiversity value. **This habitat is not considered as a KER**
Water Quality		
Watercourses- Rye Water River and Blackhall Little River **(Local importance-higher value)**	*Yes*	The Rye Water River is located at the southern boundary of the site and the Blackhall Little River is located in the centre of the site. Following a precautionary principal, a potential pathway for indirect effects was identified in the form of deterioration of water quality resulting from pollution, associated with the construction and operational phases of the development. The Rye Water River is classified as international importance as it is designated as part of the Rye Water Valley/Carton SAC. **Water quality is considered a KER.**
		Aquatic and Fisheries Species The aquatic species that are associated with the rivers and streams located within and surrounding the site are assigned Local Importance (Higher Value) in that they have a high biodiversity value in the local context. There is potential for indirect effect on these receptors in the form of water pollution. These species include salmonid and coarse fish, lamprey species, white clawed crayfish (*Austropotamobius pallipes*), European eel (*Anguila*

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		anguila), Otter (*Lutra lutra*) aquatic invertebrates and other aquatic species.
Fauna		
Bats *Local Importance (Higher value)*	Yes	Based on the information identified within the desk study, and the results of the initial bat survey, bat species have been identified as of Local Importance (Higher Value). The treelines and hedgerow edge habitat within the site may be used by commuting and foraging bats as they provide connectivity with the wider landscape. A pathway for impact was identified in the form of habitat loss and lighting disturbance. **Therefore, bat species are considered as KERs.**
Birds *Local Importance (Lower value)*	Yes	Bird species recorded using the habitats within the site were an assemblage of common birds that are typical of the grassland habitats in the wider area. Hedgerow and treeline habitats within the site may potentially be used by nesting birds. **Bird species are therefore considered as a KER.**
Badger *Local Importance (Higher value)*	Yes	Two badger setts were recorded within **Site C** during the ecological survey. In the absence of mitigation, the proposed development construction works have the potential to cause disturbance/displacement to badger locally. **As such, badgers are considered as a KER.**
Otter *Local Importance (Higher value)*	Yes	A potential otter holt was recorded outside the proposed site boundary. Although no otter holt was recorded within the site boundary, the Rye Water River has the potential to provide good feeding and resting habitat for otter. The construction of an outfall on the Blackhall Little stream and the Rye Water River has the potential to cause disturbance during construction and it is therefore included as a KER and requires further assessment.
Designated Sites		
Rye Water Valley/Carton SAC *International importance*	*Yes*	The River Rye Water flows along southern boundary of the development site. A potential pathway for indirect effects on water dependent Qualifying Interests (QIs) was identified in the form of deterioration of surface water and groundwater quality resulting from pollution, associated with the construction and operational phases of the development. The River Rye water flows into this SAC, Pollution of surface water and groundwater may result in adverse impacts on the following downstream aquatic or groundwater influenced QI habitats within the SAC in the absence of mitigation: **This European Site is therefore included as a KER.**

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South Dublin Bay SAC *International importance*	*Yes*	Taking a precautionary approach, a potential pathway for indirect effects on the aquatic Qualifying Interests of this European Site has been identified in the form of deterioration in water quality due to the release of polluting materials during the construction and operational phases of the development via the Rye Water River and the River Liffey. The SAC is located approx. 31.8km downstream of the proposed development site. **This European Site is therefore included as a KER.**
North Dublin Bay SAC *International importance*	*Yes*	Taking a precautionary approach, a potential pathway for indirect effects on the aquatic Qualifying Interests of this European Site has been identified in the form of deterioration in water quality due to the release of polluting materials during the construction and operational phases of the development via the Rye Water River and the River Liffey. The SAC is located approx. 31.8km downstream of the proposed development site. **This European Site is therefore included as a KER.**
South Dublin Bay and River Tolka Estuary SPA *International importance*	*Yes*	Taking a precautionary approach, a potential pathway for indirect effects on the aquatic Special Conservation Interests of this European Site has been identified in the form of deterioration in water quality due to the release of polluting materials during the construction and operational phases of the development via the Rye Water River and the River Liffey. The SPA is located approx. 31.8km downstream of the proposed development site. Potential effects on all SCI species are considered under Wetland and waterbirds [A999]. **This European Site is therefore included as a KER.**
North Bull Island SPA *International importance*	*Yes*	Taking a precautionary approach, a potential pathway for indirect effects on the aquatic Special Conservation Interests of this European Site has been identified in the form of deterioration in water quality due to the release of polluting materials during the construction and operational phases of the development via the Rye Water River and the River Liffey. The SPA is located approx. 31.8km downstream of the proposed development site. Potential effects on all SCI species are considered under Wetland and waterbirds [A999]. **This European Site is therefore included as a KER.**
Rye Water Valley/Carton NHA **Liffey Valley pNHA** *National Importance*	*Yes*	Rye Water Valley/Carton NHA are Liffey Valley pNHA are located downstream of the proposed development with hydrological connectivity via the Rye River and River Liffey. Taking a precautionary approach, this site falls within the likely impact zone of the proposed development. **These national sites are therefore included as KERs**

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6.7 Ecological Impact Assessment

The potential ecological impacts of each of the planning application sites is assessed separately below. The individual impacts of the separate planning applications are cumulatively assessed in section 6.7.7.

6.7.1 Site A- Strategic Employment Zone

6.7.1.1 Do Nothing Impact

If the proposed development were not to go ahead, it is likely that the development site would remain as it is in its current agricultural use. The development site may be subject to other development proposals.

6.7.1.2 *Impacts during Construction phase*

Habitat Loss

Habitats Local Importance (Lower Value)

Table 6-19.Habitats of Local Importance (Lower value) recorded in site A

Habitat	Area lost / Length lost
Improved Agricultural Grassland (GA1)	4.8ha

The development footprint will result in the permanent loss of Improved Agricultural Grassland

The effect is assessed a permanent non-significant negative impact on a receptor of *Local Importance Lower Value*. Loss of this habitat to the footprint of the proposal is not considered to be significant at any geographic scale. This habitat is common and widespread in the locality and have a low biodiversity value. The loss of this habitat is considered not significant and therefore no mitigation is required.

Habitats Local Importance (Higher Value)

The habitats of local importance (higher value) that will be lost to the development and the area/length of each habitat lost are listed in Table 6.20.

Table 6-20. Habitat of Local Importance (Higher Value) recorded in site A

Habitat	Area/length lost
Treeline (WL2)	Approx.117m
Hedgerow (WL1)	Approx. 321m

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Assessment of the potential effects on the loss of Hedgerow (WL1) and Treeline (WL2) habitat

Table 6-21. Loss of Treeline and Hedgerow habitat associated within site A

Description of Effect	The hedgerow habitat along the eastern boundary along the R157 be removed to facilitate the development. This will result in the removal of 321m of hedgerow habitat. This represents 77% of hedgerow habitat within the development site. The treeline habitat along the L2214 and a small section adjacent to the Blackhall Little Stream will be removed to facilitate the development. This will result in the removal of 117m of treeline habitat. This represents 76% of the treeline habitat within the proposed development site.
Characterisation of unmitigated effect	The loss of 321m of hedgerow would constitute a permanent negative effect within the site. This would not be reversible as it is within the construction footprint. The magnitude of this impact is Moderate at the local scale given the small area affected. The loss of 177m of treeline would constitute a permanent negative effect within the site. This would not be reversible as it is within the construction footprint. The magnitude of this impact is Moderate at the local scale given the small area affected.
Assessment of Significance prior to mitigation	This is not significant at a county, national or international scale as it will not affect the conservation status of this habitat, which is widespread and common in the wider area outside the site.
Mitigation	**Mitigation** A landscaping plan has been prepared for both application sites and is available in **Appendix 4-7.** › Hedgerow habitat along the northern boundary will be retained, ensuring ecological connectivity to the wider landscape is maintained. › 157 semi mature trees will be planted within the development site. New treeline habitat will be created along the western and southern boundaries. › An additional 165 whip trees are proposed. › This will significantly increase the tree coverage throughout the entire site, improving connectivity to the wider landscape and providing new nesting, foraging and commuting habitat for local biodiversity › Native species to be used for planting include Alder (*Alnus glutinosa),* Pedunculate oak (*Quercus robur*), Scots Pine (*Pinus sylvestris*), Silver Birch (*betula pendula*) and Rowan (*Sorbus aucuparia*). › The plan includes for the planting of a new native hedgerow along the eastern boundary of Site A, mainly along the R157. The planting of new native hedgerows will ameliorate any hedgerow loss and to maintain connectivity to the wider area. › Native hedgerow species to be planted include such as Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) and Holly (*Ilex aquifolium*). › Large sections of grasslands throughout the site will be management as Wildflower meadows and planted with native wildflowers, including Common knapweed (*Centaura nigra*), Ribwort Plantain (Plantago lanceolata), Red clover (Trifolium pratense) and Birds foot trefoil (*Lotus comiculatus*). › The creation of swales will also add new wetland habitat to the landscape, provide new habitat for various invertebrates and amphibians. › The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site. › A tree protection plan is included in this application and is available in appendix 4-7. This will ensure that any trees or tree lines that are to be retained within the site are

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	fully protected in accordance with the British Standard BS 5837: Trees in Relation to Construction.
Residual Effect following Mitigation	Following the implementation of the mitigation and compensation as described above, there will be no net loss of hedgerow or treeline habitat on the site. The residual impact on hedgerow and treeline will be a short term slight negative effect until the newly planted hedges and trees develop and mature. Ultimately, there will be no residual significant effect on the hedgerow or treeline habitat as a result of the development.
Potential for Cumulative Effect	The proposed development will not result in any permanent or long-term loss of linear landscape features. It therefore cannot contribute to any significant cumulative effect in this regard

Assessment of potential effects on water quality and aquatic faunal species and habitats during construction

Table 6-22. Potential impacts on water during construction associated with site A

Description of Effect	The construction phase of the development will involve earth moving and levelling operations which create the potential for pollution in various forms, i.e. the generation of suspended solids and the potential for spillage of fuels associated with the refuelling of excavation machinery. The construction of the surface water outfall pipe within the River Rye Water has the potential to result in the deterioration of water quality. The Rye Water River is located along the southern boundary of Site B. The Rye Water River flows into the River Rye/Carton Valley SAC, located east of the proposed development site boundary. The South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA and North Bull Island SPA are also hydrologically connected to the proposed development site via the Rye Water River & River Liffey. Taking a precautionary approach, the proposed development has the potential, in the absence of mitigation, to impact on surface water quality through pollutants including hydrocarbons, fuel and cement during the construction phase. This section assesses the potential for likely significant effects on aquatic receptors including aquatic habitats (i.e. watercourses) salmonids, lamprey, coarse fish, European eel, aquatic invertebrates, molluscs and other aquatic species identified during the desk study as likely to occur downstream of the site.
Characterisation of unmitigated effect	In the absence of best practice design and mitigation the potential impact on water quality and aquatic species is considered to be a moderate negative effect.
Assessment of Significance prior to mitigation	Significant effects on water quality could occur at a local level as a result of the construction works, should mitigation measures not be installed.
Mitigation	Mitigation measures outlined to protect water quality during the construction of site Ahave been fully described in section 8.6.3.2 of Chapter 8 of this EIAR and also described in the CEMP located in volume 3a, appendix 4-3. The mitigation measures are summarised below: The following best practice construction measures will be followed to ensure that there are no significant effects on the Rye Water River as a result of construction works: › Silt fencing will be constructed around the construction footprint, where there is a surface water receptor, in order to create a defined perimeter for the proposed works,

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leaving a natural vegetation buffer between the construction footprint (other than operational surface water outfall installations which are described below) and surface water receptors and associated riparian habitats.

- A silt fence will also be attached to solid boundary fencing where it is in place and where there is a surface water receptor. This will protect the stream from any potential sediment laden surface water run-off generated during construction activities.
- The silt fence will comprise a geotextile membrane that will buried beneath the ground to filter any run-off that may occur as a result of the proposed works. The silt fence will be monitored throughout the proposed works and will remain in place after the works are completed and until the exposed earth has re-vegetated.
- As construction advances there may be a requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground;
- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing;
- A suitably sized detention basin or settlement area will be installed at the lowest point before discharge to ground where excess run- off must leave the site. Silt curtains or earth berms will be used to channel run-off to locations where it can be controlled. These may take the form of an open detention area or, where the need arises, a portable skip/s, or similar, where inflow passes through straw bales, gravel etc.
- Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present;
- Daily monitoring and inspections of site drainage during construction will be completed;

The following construction measures will be followed to ensure that there are no significant effects on the Rye Water River as a result of the in-stream construction works related to the outfall pipe.

- Prior to the outset of these works, small defined works areas will be fenced off at the location of the storm water outfall (between the main construction site and both water courses). Silt fences will be attached to these fences. The silt fence will provide a solid barrier between the proposed pipelaying works and the Rye Water River
- The necessary pipelaying works will be undertaken within this defined area.
- Following the installation of the pipework and reinstatement of the ground, the small section of the silt fence that protects the Rye Water River will be removed to facilitate the construction of the outfall.
- No instream works will take place outside the period July 1st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- Cofferdams will be constructed using one tonne sandbags at the edge of the Rye Water River at the outfall point to create dry working areas.
- A submersible pump will be used to dewater inside the cofferdammed area and will discharge any waters to land at a location of over 30m from the rivers. The pumped waters will discharge through a silt bag.
- The bankside will be excavated and a small pre-cast concrete headwall installed (with outfall pipe included).
- The banks and channel bed will be reinstated to avoid erosion or run off of silt. Following this the dams will be removed.
- The surface water discharge point is likely to take less than one day to install.
- Sondes will be put in place in the Rye Water River upstream and downstream of the works area. These will continuously measure turbidity throughout the construction period. If there is a 10% or greater difference between upstream and downstream turbidity, an alarm will sound and a message will be sent to the site foreman and the ECoW. Works will be ceased until the cause of the difference is identified and (if it is associated with the works) rectified.

As part of the application process, Inland Fisheries Ireland were consulted regarding the proximity of the works to the River Rye Water.

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	Prior to the commencement of any construction work associated with the development, the following pre-construction survey work will be undertaken to satisfy the recommendations outlined by IFI during consultation stage: › Biotic and abiotic baseline data will be gathered on the Rye Water River both close to the development site and at a distance away from the site. Gathering this data will allow for a comparison between the current situation and that which may develop during the construction or operational phase.
Residual Effect following Mitigation	With the implementation of the prescribed mitigation measures, no significant effects are predicted.
Potential for Cumulative Effect	The proposed development will not result in any significant effects to water quality. It therefore cannot contribute to any significant cumulative effect in this regard.

Fauna- Disturbance/Habitat loss

Non volant mammals

The construction phase of the proposal has the potential for some localised disturbance to local faunal species. However, no significant faunal species or signs of significant mammal activity were recorded within or immediately adjacent to the proposal during the site visit.

The proposed development site is located in close proximity to the busy roads and existing residential housing developments. Local faunal species are therefore likely to be habituated to anthropogenic activity in the wider area. Impacts on fauna as a result of disturbance during the construction phase are not considered to be significant at any geographic scale.

Best practice measures

- All works will be completed during daylight hours and there will be no requirement for artificial lighting at any stage of the proposed construction works. This will avoid any potential impacts on crespular or nocturnal species, including bat species.
- Hoarding will be placed around the construction site. This will screen the site and minimise any disturbance impacts on fauna in the wider surroundings.
- All plant and equipment for use will comply with Statutory Instrument No 359 of 1996 "European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1996".
- Plant machinery will be turned off when not in use.
- Operating machinery will be restricted to the proposed works site area.

Residual Effect

No significant effect

Assessment on the potential impacts on bats during construction

Table 6-23. Assessment of the potential impacts on bats associated with site A

Description of Effect	**Habitat Loss** Trees within the development boundary, which are proposed to be felled, were inspected to determine their suitability for roosting bats. No signs of bats were observed. However, two individual ash trees in the eastern boundary contained ivy cover and/or small cavities and crevices and were considered to be of 'Low to Moderate' suitability for bats given their roosting potential. Following the precautionary principle, the construction phase has the potential to result in some habitat loss to local bat species.

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	Habitat Fragmentation There will be some loss of linear habitat features to facilitate the proposed development. Approximately 531 metres of hedgerow and 16 trees are proposed for removal. However, significant additional planting is proposed. Following the precautionary principle, the construction phase has the potential to result in some habitat loss to local bat species. Potential effects on bats may include: Removal of potential commuting or foraging habitat through the felling of trees.
	Disturbance Construction of the proposed development will result in increased human activity, noise and lighting within the proposed development site. Therefore, the potential for disturbance to bats requires consideration. However, the proposed development is bordered by existing residential and commercial developments to south, as well as busy local road and adjacent amenity areas. It is likely that bat species in the area are accustomed to some levels of disturbance. In the absence of appropriate design, the development has the potential to disturb bats by illumination of commuting and foraging areas.
Characterisation of unmitigated effect	The construction of the proposed development has the potential to result in a Long-Term Slight Negative effect on the local bat populations in the form of habitat loss, disturbance or direct mortality.
Assessment of Significance prior to mitigation	Significant effects on bats are not anticipated at any geographic scale during the construction of the proposed development.

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Mitigation	**Habitat Loss** Following the precautionary principle, a pre-construction survey will be undertaken on the two ash trees in the east of the site with 'Low to Moderate' suitability for bats to be felled, by a qualified ecologist prior to any works, to ensure there are no roosting bats. The requirement for a pre-construction survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of this survey will be to assess any changes in baseline environment since the time of undertaking the bat survey in July 2021.If bats are found to be roosting in any of the trees, a bat derogation licence must be obtained, and further mitigation prescribed by a licenced ecologist. Tree felling will follow guidelines set out in National Roads Authority, Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes. 2006.Tree felling will follow guidelines set out in National Roads Authority, Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes. 2006.
	Fragmentation **Mitigation** A landscaping plan has been prepared for both application sites and is available in **Appendix 4-7.** › Hedgerow habitat along the northern boundary will be retained, ensuring ecological connectivity to the wider landscape is maintained. › 157 semi mature trees will be planted within the development site. New treeline habitat will be created along the western and southern boundaries. › An additional 165 whip trees are proposed. › This will significantly increase the tree coverage throughout the entire site, improving connectivity to the wider landscape and providing new nesting, foraging and commuting habitat for local biodiversity › Native species to be used for planting include Alder (*Alnus glutinosa),* Pedunculate oak (*Quercus robur*), Scots Pine (*Pinus sylvestris*), Silver Birch (*betula pendula*) and Rowan (*Sorbus aucuparia*). › The plan includes for the planting of a new native hedgerow along the eastern boundary of Site A, mainly along the R157. The planting of new native hedgerows will ameliorate any hedgerow loss and to maintain connectivity to the wider area. › Native hedgerow species to be planted include such as Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) and Holly (*Ilex aquifolium*). › Large sections of grasslands throughout the site will be management as Wildflower meadows and planted with native wildflowers, including Common knapweed (*Centaura nigra*), Ribwort Plantain (Plantago lanceolata), Red clover (Trifolium pratense) and Birds foot trefoil (*Lotus comiculatus*). › The creation of swales will also add new wetland habitat to the landscape, provide new habitat for various invertebrates and amphibians. › The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site. › A tree protection plan is included in this application and is available in appendix 4-7. This will ensure that any trees or tree lines that are to be retained within the site are fully protected in accordance with the British Standard BS 5837: Trees in Relation to Construction.
	Disturbance

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	The majority of works, during the construction phase, will occur during daylight hours. Therefore, there will be no requirement for exterior lighting within the site. Where lighting is unavoidable (i.e. health and safety), low-intensity lighting and motion sensors will be used to limit illumination. Exterior lighting, during construction, shall be designed to minimize light spillage, thus reducing the effect on areas outside the proposed development, and consequently on bats i.e. Lighting will be directed away from mature trees/hedgerows/treelines around the periphery of the site boundary to minimize disturbance to bats.
Residual Effect following Mitigation	With the implementation of the prescribed mitigation measures, no significant effects are predicted.
Potential for Cumulative Effect	The proposed development will not result in any significant effect in regard to habitat loss for bats. It therefore cannot contribute to any cumulative effect in this regard.

Assessment on the potential impacts on birds during construction

Table 6-24. Potential impacts on birds during the construction phase of site A

Description of Effect	**Habitat Loss/Degradation** The footprint of the proposal will result in the loss of approximately 531 metres of hedgerow and 16 trees individual in Site A are also proposed for removal. This provide good nesting habitat for a range of common bird species.
	Disturbance The loss of 531 metres of hedgerow and 16 trees throughout the site has the potential to result in disturbance to birds and potentially to cause mortality to juvenile birds in the nest
Characterisation of unmitigated effect	**Habitat Loss** In the absence of mitigation, the loss 531 metres of hedgerow and 16 trees has the potential to result in a permanent negative effect in respect of bird nesting habitat. This is considered to be Moderate on this receptor of local importance due to the presence of large areas of suitable habitat in the wider area.
	Disturbance In the absence of mitigation, the loss of 531 metres of hedgerow and 16 trees has the potential to result in a short-term negative effect on nesting bird species. The magnitude of this impact has the potential to be moderate if the works result in mortality of young birds in the nest.
Assessment of Significance	**Habitat Loss** There is no potential for significant effects on this species as a result of habitat loss at any scale.

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prior to mitigation	**Disturbance** Whilst there will be no significant effect on birds at an international or national scale, following the precautionary principal, there is the potential for a significant negative effect of disturbance to birds at a local scale during the construction phase of the proposed development prior to mitigation.
Mitigation	**Habitat Loss** **Mitigation** A landscaping plan has been prepared for both application sites and is available in **Appendix 4-7.** › Hedgerow habitat along the northern boundary will be retained, ensuring ecological connectivity to the wider landscape is maintained. › 157 semi mature trees will be planted within the development site. New treeline habitat will be created along the western and southern boundaries. › An additional 165 whip trees are proposed. › This will significantly increase the tree coverage throughout the entire site, improving connectivity to the wider landscape and providing new nesting, foraging and commuting habitat for local biodiversity › Native species to be used for planting include Alder (*Alnus glutinosa),* Pedunculate oak (*Quercus robur*), Scots Pine (*Pinus sylvestris*), Silver Birch (*betula pendula*) and Rowan (*Sorbus aucuparia*). › The plan includes for the planting of a new native hedgerow along the eastern boundary of Site A, mainly along the R157. The planting of new native hedgerows will ameliorate any hedgerow loss and to maintain connectivity to the wider area. › Native hedgerow species to be planted include such as Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) and Holly (*Ilex aquifolium*). › Large sections of grasslands throughout the site will be management as Wildflower meadows and planted with native wildflowers, including Common knapweed (*Centaura nigra*), Ribwort Plantain (Plantago lanceolata), Red clover (Trifolium pratense) and Birds foot trefoil (*Lotus comiculatus*). › The creation of swales will also add new wetland habitat to the landscape, provide new habitat for various invertebrates and amphibians. › The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site. › A tree protection plan is included in this application and is available in appendix 4-7. This will ensure that any trees or tree lines that are to be retained within the site are fully protected in accordance with the British Standard BS 5837: Trees in Relation to Construction.
	Disturbance Where possible, all cutting of trees, scrub and tall vegetation will be undertaken outside the bird nesting season which runs from the 1st March to the 31st August. Any cutting of vegetation that may be required outside the season described above will be supervised by a suitably qualified ecologist to ensure that no birds nests are present. Should nesting birds be encountered, the trees will be left until nesting activity has concluded.
Residual Effect following Mitigation	**Habitat Loss** – No significant effect
	Disturbance – No significant effect.

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Potential for Cumulative Effect	**Habitat Loss** The proposed development will not result in any significant effect in regard to habitat loss for birds. It therefore cannot contribute to any cumulative effect in this regard.

6.7.1.3 Impacts during operational phase

Disturbance to Fauna

The surveys undertaken have identified that the site of the proposed development and the surrounding is used by a range of common bird species, small mammal and invertebrate species and provides biodiversity in the local context. Direct disturbance resulting from the operation of the proposed development has been assessed and the potential for effect is the same as for construction disturbance and thus the finding of the assessment is provided in section 6.7.1.2. This assessment is not repeated here but the conclusion that, following the mitigation described, there will be no significant residual impacts on faunal species are anticipated as a result of disturbance.

Local faunal species are likely to be habituated to anthropogenic activity in the area, given the developments close proximity to busy local roads and nearby residential housing. Impacts on fauna as a result of disturbance during the operational phase are not considered to be significant at any geographic scale.

Assessment of potential impacts on bats during the operational phase associated with site A

Table 6-25. Assessment of potential impacts on bats during the operational phase associated with site A

Description of Effect	Construction and operation of the proposed development will result in increased human activity, noise and lighting within the proposed site. Therefore, the potential for disturbance to bats requires consideration. However, the proposed development is in close proximity to existing residential areas to south as well as busy local roads. It is likely that bat species in the area are accustomed to some levels of disturbance.
Characterisation of unmitigated effect	In the absence of mitigation, the operational phase of the proposed development has the potential to result in Long-Term Slight Negative effect on the local bat populations in the form of disturbance as a result of lighting.
Assessment of Significance prior to mitigation	Whilst there will be no significant effect on bats at an international or national scale, following the precautionary principal, there is the potential for a significant negative effect on bats at a local scale during the operational phase of the proposed development prior to mitigation.
Mitigation	**Mitigation** › The lighting plan for the operational phase of the proposed development, has been designed with consideration of the following guidelines: Bat Conservation Ireland (Bats and Lighting: Guidance Notes for Planners, Engineers, Architects and Developers, BCI, 2010) and the Bat Conservation Trust (Guidance Note 08/18 Bats and Artificial Lighting in the UK (BCT, 2018), Dark Sky Ireland, to minimise light spillage, thus reducing any potential disturbance to bats.

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	› The proposed lamps have limited backward light properties thus assisting in reducing backward light spill. Lamps have also been specified with 0 Degree tilt (where possible) to ensure limited unwanted light spill. › The lighting plan has been designed to maintain a dark corridor along the hedgerow on the northern boundary of the site. This will ensure commuting and foraging habitat is maintained to habitats west of the site. › All luminaires are fitted with photocells which automatically switch luminaires on during night time and off during daytime. Additionally, all luminaires are to automatically dim by 75% 00:00 – 06:00 (U14 profile). If required and with agreement of the local authority additional dimming is available. › The proposed lighting design uses warmest available LEDs for chosen luminaires (colour temperature set by worst case luminaires, all luminaires same colour temperature for consistency), the peak wave length is 600nm.
Residual Effect following Mitigation	With the implementation of the prescribed mitigation measures, no significant residual effects are predicted.

Impacts on water quality during the operational phase

The operational phase of the proposed project will result in the production of foul sewage and surface water runoff.

The proposed surface water drainage system incorporates a number of SUDs measures into its design to block potential pathways for impact on water quality, which are fully described in Chapter 4 of this EIAR.

Wastewater from the development will discharge to the proposed onsite wastewater pumping station, which will ultimately link up to the existing Maynooth town wastewater network prior to discharging to Leixlip Wastewater Treatment Plant. The wastewater treatment plant is regulated and operates under an EPA licence which controls emissions to acceptable levels.

Confirmation of Feasibility letters Site A have been received from Irish Water and are included in volume 3b appendix 4-9 of this EIAR.

Mitigation

The risk of uncontrolled emissions is minimized by the collection, treatment and discharge of storm water to the Rye Water River via, attenuation tanks, filter drains and petrol/oil interceptors as described above. It is also proposed to retain the existing riparian zone which will act as a buffer between the development and the Rye Water River..

Wastewater from the Proposed Development will be directed to an EPA regulated wastewater treatment plant via a proposed onsite pumping station

Residual effect

The potential source of pollution can be readily controlled, and standard procedures will ensure no significant releases will occur. Mitigation measures, in particular the attenuation tank, filter drains, and petrol/oil interceptor will break the pathway from the proposed works areas to the watercourse. The residual impacts are indirect, neutral, imperceptible, long term, unlikely impact.

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Foul water discharges will be directed to the municipal sewer and regulated wastewater treatment plant and so the residual impacts are neutral, indirect, imperceptible, long term, unlikely impact. Therefore, significant effects on surface water or ground water quality will not occur

6.7.1.4 Impacts on European Designated Sites

The potential for impact on European sites has been fully assessed in the Appropriate Assessment NIS that has been prepared in support of the current application.

Following the precautionary principle, the AASR identified a potential pathway for impact on Rye Water Valley/Carton SAC, South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka SPA and North Bull Island SPA in the form of deterioration of surface and groundwater water quality resulting from pollution associated with the construction and operational phases of the development.

Potential Impacts on Rye Water Valley/Carton SAC

Site A drains into the Rye Water River to the south. The Rye Water Valley/Carton SAC is downstream of Site A, to the southeast, directly adjacent to the site boundary on the opposite side of the R157 Regional Road.

The qualifying interests of the SAC is linked to groundwater flows (calcareous tufa springs) There is no connection between groundwater at the development site, and that discharging to any known tufa springs within the SAC (including the mapped spring located approximately 5km from Site A at Louisa Bridge).

Groundwater below Site A will flow to the south and discharge as baseflow to the Rye Water River and/or the Blackhall Little stream to the north. Groundwater flow from the site will, therefore, have no impact on the Louisa Bridge (spring) groundwater flow (Rye Water Valley/Carton SAC) as previous site investigations and hydrological assessments (c.f. Section 2.4, (Hydro-G, 2008)) have shown that the flow to these springs is not derived from the Rye Water River and are in fact fed from a source further east of Louisa Bridge.

Two of the qualifying interests of the SAC are two species of vertigo snail (*Vertigo angustior* and *Vertigo moulinsiana*), with both species' dependant on the calcareous march habitat which is provided by the tufa formation. The known range of both species within the SAC is also restricted to Louisa Bridge (spring). While there are no known petrifying springs or qualifying interests of the Rye Water Valley/Carton SAC within proximity of Site A i.e. Louisa Bridge. An ecological walkover survey of the SAC by MKO to identify any additional tufa springs or potential habitat for vertigo snails downstream of the Proposed Development site has not identified petrifying springs nor their associated qualifying interests in this area of the SAC. Irrespective of this the potential for the occurrence of unmapped petrifying springs within the SAC has also been considered below.

Although there is no potential for effects on the known QI of the SAC the following mitigation will ensure no impact on the SAC generally. Standard mitigation and SuDS drainage controls are proposed during the construction and operational phase of Site A (e.g., silt traps/road gullies, hydrocarbon interceptors, attenuation storage and infiltration, and hydro-brake flow limiters) which have been proven through widespread use in housing and commercial developments across the country. The proposed SuDs drainage system incorporated into the engineering design of the site are common drainage systems that are used in development sites. They are proposed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS, 2005) and the objectives outlined in the Meath County Development Plan 2021-2027.

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These standard drainage design controls and construction phase mitigation measures will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the proposed development.

The project design ensures that there will be no dewatering of the bedrock aquifer during the construction phase and so there will be no obstruction or alteration of existing groundwater flows.

There will be no significant alteration to groundwater recharge. The majority of rainfall will continue to percolate to shallow subsurface and discharge to the surface water systems locally with low levels of recharge to ground, in particular for Site A with is underlain with low permeability subsoils. During the construction phase, the recharge rates won't change materially.

With the implementation of the project as designed and the standard drainage control measures outlined above the potential for Site A to cause any groundwater drawdown or groundwater quality impacts in the SAC is imperceptible.

Groundwater flowpaths will be maintained during the construction phase as any excavation proposed will be shallow. The SI data shows that dewatering of groundwater from the bedrock aquifer will not occur and so there is no potential for significant effects on the calcareous tufa springs and associated species.

Following an extremely precautionary principle, the potential for other downstream designated sites (South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka SPA and North Bull Island SPA) to be impacted by the proposed works was also considered. On the basis of the Proposed Development design and the mitigation measures proposed to protect the immediate water receptors there will be no impacts on designated sites.

Pathway: Site drainage network and groundwater flowpaths.

Receptor: Rye Water Valley/Carton SAC and any associated Tufa Springs and vertigo snail populations (including the known spring 5km downstream at Louisa Bridge).

Pre-Mitigation Impact

Indirect, negative, slight, short term, likely impact to water quality and hydrology regime.

Proposed Mitigation Measures

The proposed mitigation measures for protection of surface water and groundwater quality which will include on site drainage control measures (i.e., silt fences, silt bags etc.) will ensure that the quality of runoff from Proposed Development areas will be good. All mitigation measures outlined throughout Section 8.6.3 above provides controls which will be put in place to manage risks associated with sediment, hydrocarbons/chemicals and cement-based products used during construction phase.

The standard drainage design controls will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the Proposed Development.

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Residual Impact

With the application of the best practice mitigation outlined above, the residual effect will be – Imperceptible, direct, negative, short-term, high probability impact on surface and ground water receptors.

Significance of Effects

For the reasons outlined above, no significant effects will occur on any designated site.

The NIS report concludes that:

"Where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures ensure that the construction, operation of the proposed development does not adversely affect the integrity of European sites.

Taking into consideration the reported residual impacts from other plans and projects in the area and the predicted impacts with the current proposal, no residual cumulative impacts have been identified with regard to any European Site."

Therefore, it can be objectively concluded that the proposed development, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site".

Impacts on Nationally Designated Sites

Impacts on nationally designated sites including NHAs and pNHAs are considered in this section of the report. Those nationally designated sites that were also designated as SACs/SPAs were considered and the potential for significant or adverse effects to occur were discounted on the same basis as described above in relation to the corresponding European Sites. Where there are pathways for effect on Nationally designated sites that are not also designated as European Sites, a full ecological impact assessment is provided below.

The proposed development site is located directly adjacent to the Rye Water Valley/Carton NHA, which is also designated as Rye Water Valley/Carton SAC.

Liffey Valley pNHA located downstream of the proposed development with hydrological connectivity via the Rye Water River and River Liffey.

Standard best practice environmental control measures have been incorporated in the design of the development and are outlined in Chapter 4 and section 8.6 of Chapter 8 of this EIAR. All identified potential pathways for impact on water quality are robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within Chapter 4 and section 8.6 of Chapter 8 of this EIAR.

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6.7.2 Site B- Healthcare Facilities

6.7.2.1 Do Nothing Impact

If the proposed development were not to go ahead, it is likely that the development site would remain as it is in its current agricultural use. The development site may be subject to other development proposals.

6.7.2.2 *Impacts during Construction phase*

Habitat Loss

Habitats Local Importance (Lower Value)

Table 6-26.Habitats of Local Importance (Lower value)

Habitat	Area lost / Length lost
Improved Agricultural Grassland (GA1)	Approx. 2.5ha

The development footprint will result in the permanent loss of Improved Agricultural Grassland

The effect is assessed a permanent non-significant negative impact on a receptor of *Local Importance Lower Value*. Loss of this habitat to the footprint of the proposal is not considered to be significant at any geographic scale. This habitat is common and widespread in the locality and have a low biodiversity value. The loss of this habitat is considered not significant and therefore no mitigation is required.

Habitats Local Importance (Higher Value)

The habitats of local importance (higher value) that will be lost to the development and the area/length of each habitat lost are listed in Table 6.27.

Table 6-27. Habitat of Local Importance (Higher Value)

Habitat	Area/length lost
Hedgerow (WL1) (including 4 trees)	263m

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Assessment of the potential effects on the loss of Hedgerow (WL1) and Treeline (WL2) habitat

Table 6-28. Loss of Treeline and Hedgerow habitat associated with site B

Description of Effect	Approximately 263m of hedgerow will be lost to facilitates new entrances along the eastern boundary of the site. This represents 33% of the total hedgerow habitat. The landscaping plan has been designed to retain the majority of the trees located within the development site. A total of 27 trees were identified within the development site and only 4 trees located to the east of the site proposed for removal. This represents 14% of the total trees within the site. The landscaping plan has also been designed to retain the mature treeline along the southern boundary of the site and hedgerow habitat at the northern boundary.
Characterisation of unmitigated effect	The loss of 263m of hedgerow and 4 trees would constitute a permanent negative effect within the site. This would not be reversible as it is within the construction footprint. The magnitude of this impact is Moderate at the local scale given the small area affected.
Assessment of Significance prior to mitigation	This is not significant at a county, national or international scale as it will not affect the conservation status of this habitat, which is widespread and common in the wider area outside the site.
Mitigation	The landscaping plan has also been designed to retain the mature treeline along the southern boundary of the site and hedgerow habitat at the northern boundary. **Mitigation** A landscaping plan has been prepared for both application sites and is available in **Appendix 4-7.** › 100 new trees will be planted within the application site. › This will significantly increase the tree coverage throughout the entire site, improving connectivity to the wider landscape and providing new nesting, foraging and commuting habitat for local biodiversity. › Native species to be used for planting include Alder (*Alnus glutinosa),* Pedunculate oak (*Quercus robur*), Scots Pine (*Pinus sylvestris*), Silver Birch (*betula pendula*) and Rowan (*Sorbus aucuparia*). › The plan includes for the additional planting of new native hedgerow throughout the site. This will be located along the eastern boundary where the existing hedgerow will be removed. Additional hedgerow s will also be planting throughout the centre of the development. The planting of new native hedgerows will greatly increase the hedgerow habitat coverage within the area and increase ecological connectivity to the wider landscape. › Native hedgerows will be planting with Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) and Holly (*Ilex aquifolium*). › Native hedgerows will be maintained and managed for wildlife, this includes allowing hedgerows to grow wide and dense at the base, with a wide, uncultivated grassy margin. Hedgerows should be allowed to mature before the first cut and future cutting should happen on a 3/5-year rotation. Hedgerows should be kept as dark spaces to allow commuting and foraging habitat for local wildlife. › The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site. › A tree protection plan is included in this application. This will ensure that any trees or tree lines that are to be retained within the site are fully protected in accordance with the British Standard BS 5837: Trees in Relation to Construction.

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Residual Effect following Mitigation	Following the implementation of the mitigation and compensation as described above, there will be no net loss of hedgerow or treeline habitat on the site. The residual impact on hedgerow will be a short term slight negative effect until the newly planted hedges develop and mature. Ultimately, there will be no residual significant effect on the hedgerow habitat as a result of the development.
Potential for Cumulative Effect	The proposed development will not result in any permanent or long-term loss of linear landscape features. It therefore cannot contribute to any significant cumulative effect in this regard.

Assessment of potential effects on water quality and aquatic faunal species and habitats during construction

Table 6-29. Potential impacts on water during construction

Description of Effect	The construction phase of the development will involve earth moving and levelling operations which create the potential for pollution in various forms, i.e. the generation of suspended solids and the potential for spillage of fuels associated with the refuelling of excavation machinery. The construction of the surface water outfall pipe within the River Rye Water has the potential to result in the deterioration of water quality. The Rye Water River is located along the southern boundary of the site. The Rye Water River flows into the River Rye/Carton Valley SAC, located east of the proposed development site boundary. The South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA and North Bull Island SPA are also hydrologically connected to the proposed development site via the Rye Water River & River Liffey. Taking a precautionary approach, the proposed development has the potential, in the absence of mitigation, to impact on surface water quality through pollutants including hydrocarbons, fuel and cement during the construction phase. This section assesses the potential for likely significant effects on aquatic receptors including aquatic habitats (i.e. watercourses) salmonids, lamprey, coarse fish, European eel, aquatic invertebrates, molluscs and other aquatic species identified during the desk study as likely to occur downstream of the site.
Characterisation of unmitigated effect	In the absence of best practice design and mitigation the potential impact on water quality and aquatic species is considered to be a moderate negative effect.
Assessment of Significance prior to mitigation	Significant effects on water quality are anticipated could occur at a local level as a result of the construction works, prior to should mitigation measures not be installed.
Mitigation	Mitigation measures outlined to protect water quality during the construction of the main development areas have been outlined in section 8.6.3.5 of Chapter 8 of this EIAR and are fully described in the CEMP located in Volume 3.b, Appendix 4-3. The mitigation measures are summarised below. The following best practice construction measures will be followed to ensure that there are no significant effects on the Rye Water River as a result of construction works: › Silt fencing will be constructed around the construction footprint, where there is a surface water receptor, in order to create a defined perimeter for the proposed works, leaving a natural vegetation buffer between the construction footprint (other than operational surface water outfall installations which are described below) and surface water receptors and associated riparian habitats.

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- A silt fence will also be attached to solid boundary fencing where it is in place and where there is a surface water receptor. This will protect the stream from any potential sediment laden surface water run-off generated during construction activities.
- The silt fence will comprise a geotextile membrane that will buried beneath the ground to filter any run-off that may occur as a result of the proposed works. The silt fence will be monitored throughout the proposed works and will remain in place after the works are completed and until the exposed earth has re-vegetated.
- As construction advances there may be a requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground;
- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing;
- A suitably sized detention basin or settlement area will be installed at the lowest point before discharge to ground where excess run- off must leave the site. Silt curtains or earth berms will be used to channel run-off to locations where it can be controlled. These may take the form of an open detention area or, where the need arises, a portable skip/s, or similar, where inflow passes through straw bales, gravel etc.
- Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present;
- Daily monitoring and inspections of site drainage during construction will be completed;

The following construction measures will be followed to ensure that there are no significant effects on the Rye Water River as a result of the in-stream construction works related to the outfall pipe.

- Prior to the outset of these works, small defined works areas will be fenced off at the location of the storm water outfall (between the main construction site and both water courses). Silt fences will be attached to these fences. The silt fence will provide a solid barrier between the proposed pipelaying works and the Rye Water River
- The necessary pipelaying works will be undertaken within this defined area.
- Following the installation of the pipework and reinstatement of the ground, the small section of the silt fence that protects the Rye Water River will be removed to facilitate the construction of the outfall.
- No instream works will take place outside the period July 1st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- Cofferdams will be constructed using one tonne sandbags at the edge of the Rye Water River at the outfall point to create dry working areas.
- A submersible pump will be used to dewater inside the cofferdammed area and will discharge any waters to land at a location of over 30m from the rivers. The pumped waters will discharge through a silt bag.
- The bankside will be excavated and a small pre-cast concrete headwall installed (with outfall pipe included).
- The banks and channel bed will be reinstated to avoid erosion or run off of silt. Following this the dams will be removed.
- The surface water discharge point is likely to take less than one day to install.

Sondes will be put in place in the Rye Water River upstream and downstream of the works area. These will continuously measure turbidity throughout the construction period. If there is a 10% or greater difference between upstream and downstream turbidity, an alarm will sound and a message will be sent to the site foreman and the ECoW. Works will be ceased until the cause of the difference is identified and (if it is associated with the works) rectified.

As part of the application process, Inland Fisheries Ireland were consulted regarding the proximity of the works to the River Rye Water.

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	Prior to the commencement of any construction work associated with the development, the following pre-construction survey work will be undertaken to satisfy the recommendations outlined by IFI during consultation stage: Biotic and abiotic baseline data will be gathered on the Rye Water River both close to the development site and at a distance away from the site. Gathering this data will allow for a comparison between the current situation and that which may develop during the construction or operational phase.
Residual Effect following Mitigation	With the implementation of the prescribed mitigation measures, no significant effects are predicted.
Potential for Cumulative Effect	The proposed development will not result in any significant effects to water quality. It therefore cannot contribute to any significant cumulative effect in this regard.

Fauna- Disturbance/Habitat loss

Non volant mammals

The construction phase of the proposal has the potential for some localised disturbance to local faunal species. However, no significant faunal species or signs of significant mammal activity were recorded within or immediately adjacent to the proposal during the site visit.

The proposed development site is located in close proximity to the busy roads and existing residential housing developments. Local faunal species are therefore likely to be habituated to anthropogenic activity in the wider area. Impacts on fauna as a result of disturbance during the construction phase are not considered to be significant at any geographic scale.

Best practice measures

- All works will be completed during daylight hours and there will be no requirement for artificial lighting at any stage of the proposed construction works. This will avoid any potential impacts on crespular or nocturnal species, including bat species.
- Hoarding will be placed around the construction site. This will screen the site and minimise any disturbance impacts on fauna in the wider surroundings.
- All plant and equipment for use will comply with Statutory Instrument No 359 of 1996 "European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1996".
- Plant machinery will be turned off when not in use.
- Operating machinery will be restricted to the proposed works site area.

Residual Effect

No significant effect

Assessment on the potential impacts on bats during construction

Table 6-30. Assessment of the potential impacts on bats associated with site B

Description of Effect	**Habitat Loss** Trees within the development boundary, which are proposed to be felled, were inspected to determine their suitability for roosting bats. No signs of bats were observed. However, two individual ash trees in the western boundary contained ivy cover and/or small cavities and crevices and were considered to be of 'Low to Moderate' suitability for bats given their roosting potential.

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	Following the precautionary principle, the construction phase has the potential to result in some habitat loss to local bat species.
	Habitat Fragmentation There will be some loss of linear habitat features to facilitate the proposed development. Approximately 263m of hedgerow are proposed for removal. However, significant additional planting is proposed. Following the precautionary principle, the construction phase has the potential to result in some habitat loss to local bat species. Potential effects on bats may include: Removal of potential commuting or foraging habitat through the felling of trees.
	Disturbance Construction of the proposed development will result in increased human activity, noise and lighting within the proposed development site. Therefore, the potential for disturbance to bats requires consideration. However, the proposed development is bordered by existing residential and commercial developments to south, as well as busy local road and adjacent amenity areas. It is likely that bat species in the area are accustomed to some levels of disturbance. In the absence of appropriate design, the development has the potential to disturb bats by illumination of commuting and foraging areas.
Characterisation of unmitigated effect	The construction of the proposed development has the potential to result in a Long-Term Slight Negative effect on the local bat populations in the form of habitat loss, disturbance or direct mortality.
Assessment of Significance prior to mitigation	Significant effects on bats are not anticipated at any geographic scale during the construction of the proposed development.
Mitigation	**Habitat Loss** Following the precautionary principle, a pre-construction survey will be undertaken on the two ash trees in the east of the site with 'Low to Moderate' suitability for bats to be felled, by a qualified ecologist prior to any works, to ensure there are no roosting bats. The requirement for a pre-construction survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of this survey will be to assess any changes in baseline environment since the time of undertaking the bat survey in July 2021. If bats are found to be roosting in any of the trees, a bat derogation licence must be obtained, and further mitigation prescribed by a licenced ecologist. Tree felling will follow guidelines set out in National Roads Authority, Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes. 2006. Tree felling will follow guidelines set out in National Roads Authority, *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes.* 2006.

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	Fragmentation **Mitigation** A landscaping plan has been prepared for both application sites and is available in **Appendix 4-7.** › 100 new trees will be planted within the application site. › This will significantly increase the tree coverage throughout the entire site, improving connectivity to the wider landscape and providing new nesting, foraging and commuting habitat for local biodiversity. › Native species to be used for planting include Alder (*Alnus glutinosa),* Pedunculate oak (*Quercus robur*), Scots Pine (*Pinus sylvestris*), Silver Birch (*betula pendula*) and Rowan (*Sorbus aucuparia*). › The plan includes for the additional planting of new native hedgerow throughout the site. This will be located along the eastern boundary where the existing hedgerow will be removed. Additional hedgerow s will also be planting throughout the centre of the development. The planting of new native hedgerows will greatly increase the hedgerow habitat coverage within the area and increase ecological connectivity to the wider landscape. › Native hedgerows will be planting with Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) and Holly (*Ilex aquifolium*). › Native hedgerows will be maintained and managed for wildlife, this includes allowing hedgerows to grow wide and dense at the base, with a wide, uncultivated grassy margin. Hedgerows should be allowed to mature before the first cut and future cutting should happen on a 3/5-year rotation. Hedgerows should be kept as dark spaces to allow commuting and foraging habitat for local wildlife. › The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site. A tree protection plan is included in this application. This will ensure that any trees or tree lines that are to be retained within the site are fully protected in accordance with the British Standard BS 5837: Trees in Relation to Construction.
	Disturbance The majority of works, during the construction phase, will occur during daylight hours. Therefore, there will be no requirement for exterior lighting within the site. Where lighting is unavoidable (i.e. health and safety), low-intensity lighting and motion sensors will be used to limit illumination. Exterior lighting, during construction, shall be designed to minimize light spillage, thus reducing the effect on areas outside the proposed development, and consequently on bats i.e. Lighting will be directed away from mature trees/hedgerows/treelines around the periphery of the site boundary to minimize disturbance to bats.
Residual Effect following Mitigation	With the implementation of the prescribed mitigation measures, no significant effects are predicted.
Potential for Cumulative Effect	The proposed development will not result in any significant effect in regard to habitat loss for bats. It therefore cannot contribute to any cumulative effect in this regard.

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Assessment on the potential impacts on birds during construction

Table 6-31. Potential impacts on birds during the construction phase of site B

Description of Effect	**Habitat Loss/Degradation** The footprint of the proposal will result in the loss of approximately 263m of hedgerow. 4 individual trees in Site A are also proposed for removal. This provides good nesting habitat for a range of common bird species.
	Disturbance The loss of the hedgerow habitat and 4 trees throughout the site has the potential to result in disturbance to birds and potentially to cause mortality to juvenile birds in the nest
Characterisation of unmitigated effect	**Habitat Loss** In the absence of mitigation, the loss of 263m of hedgerow and 4 trees has the potential to result in a permanent negative effect in respect of bird nesting habitat. This is considered to be a slight effect on this receptor of local importance due to the presence of large areas of suitable habitat in the wider area.
	Disturbance In the absence of mitigation, the loss of linear features and 4 trees has the potential to result in a short-term negative effect on nesting bird species. The magnitude of this impact has the potential to be moderate if the works result in mortality of young birds in the nest.
Assessment of Significance prior to mitigation	**Habitat Loss** There is no potential for significant effects on this species as a result of habitat loss at any scale.
	Disturbance Whilst there will be no significant effect on birds at an international or national scale, following the precautionary principal, there is the potential for a significant negative effect of disturbance to birds at a local scale during the construction phase of the proposed development prior to mitigation.
Mitigation	**Habitat Loss** › 100 new trees will be planted within the application site. › This will significantly increase the tree coverage throughout the entire site, improving connectivity to the wider landscape and providing new nesting, foraging and commuting habitat for local biodiversity. › Native species to be used for planting include Alder (*Alnus glutinosa),* Pedunculate oak (*Quercus robur*), Scots Pine (*Pinus sylvestris*), Silver Birch (*betula pendula*) and Rowan (*Sorbus aucuparia*). › The plan includes for the additional planting of new native hedgerow throughout the site. This will be located along the eastern boundary where the existing hedgerow will be removed. Additional hedgerow s will also be planting throughout the centre of the development. The planting of new native hedgerows will greatly increase the hedgerow habitat coverage within the area and increase ecological connectivity to the wider landscape. › Native hedgerows will be planting with Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) and Holly (*Ilex aquifolium*). › Native hedgerows will be maintained and managed for wildlife, this includes allowing hedgerows to grow wide and dense at the base, with a wide, uncultivated grassy margin. Hedgerows should be allowed to mature before the first cut and future cutting should happen on a 3/5-year rotation. Hedgerows should be kept as dark spaces to allow commuting and foraging habitat for local wildlife.

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	› The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site. A tree protection plan is included in this application. This will ensure that any trees or tree lines that are to be retained within the site are fully protected in accordance with the British Standard BS 5837: Trees in Relation to Construction.
	Disturbance Where possible, all cutting of trees, scrub and tall vegetation will be undertaken outside the bird nesting season which runs from the 1st March to the 31st August. Any cutting of vegetation that may be required outside the season described above will be supervised by a suitably qualified ecologist to ensure that no birds nests are present. Should nesting birds be encountered, the trees will be left until nesting activity has concluded.
Residual Effect following Mitigation	**Habitat Loss** – No significant effect
	Disturbance – No significant effect.
Potential for Cumulative Effect	**Habitat Loss** The proposed development will not result in any significant effect in regard to habitat loss for birds. It therefore cannot contribute to any cumulative effect in this regard.

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6.7.2.3 Impacts during operational phase

Disturbance to Fauna

The surveys undertaken have identified that the site of the proposed development and the surrounding is used by a range of common bird species, small mammal and invertebrate species and provides biodiversity in the local context. Direct disturbance resulting from the operation of the proposed development has been assessed and the potential for effect is the same as for construction disturbance and thus the finding of the assessment is provided in section 6.7.2.2. This assessment is not repeated here but the conclusion that, following the mitigation described, there will be no significant residual impacts on faunal species are anticipated as a result of disturbance.

Local faunal species are likely to be habituated to anthropogenic activity in the area, given the developments close proximity to busy local roads and nearby residential housing. Impacts on fauna as a result of disturbance during the operational phase are not considered to be significant at any geographic scale.

Assessment on the potential impacts on bats during the operational phase Bats

Table 6-32. Assessment of potential impacts on bats during the operational phase of site B

Description of Effect	Construction and operation of the proposed development will result in increased human activity, noise and lighting within the proposed site. Therefore, the potential for disturbance to bats requires consideration. However, the proposed development is in close proximity to existing residential areas to south as well as busy local roads. It is likely that bat species in the area are accustomed to some levels of disturbance.
Characterisation of unmitigated effect	In the absence of mitigation, the operational phase of the proposed development has the potential to result in Long-Term Slight Negative effect on the local bat populations in the form of disturbance as a result of lighting.
Assessment of Significance prior to mitigation	Whilst there will be no significant effect on bats at an international or national scale, following the precautionary principal, there is the potential for a significant negative effect on bats at a local scale during the operational phase of the proposed development prior to mitigation.
Mitigation	A lighting plan has been prepared as part of this application. › The lighting plan for the operational phase of the proposed development, has been designed with consideration of the following guidelines: Bat Conservation Ireland (Bats and Lighting: Guidance Notes for Planners, Engineers, Architects and Developers, BCI, 2010) and the Bat Conservation Trust (Guidance Note 08/18 Bats and Artificial Lighting in the UK (BCT, 2018), Dark Sky Ireland, to minimise light spillage, thus reducing any potential disturbance to bats. › Bat surveys carried out in 2021 indicate the Treeline along the southern boundary of the site is the most important commuting habitat for bats. This linear feature will remain in darkness and not have any artificial lighting. › The lighting plan has been designed to maintain a dark corridor along the hedgerow on the northern boundary of the site. This will ensure commuting and foraging habitat is maintained to habitats west of the site. › The proposed lamps have limited backward light properties thus assisting in reducing backward light spill. Lamps have also been specified with 0 Degree tilt (where possible) to ensure limited unwanted light spill.

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	› The lighting plan has been designed to maintain a dark corridor along the hedgerow on the northern boundary of the site. This will ensure commuting and foraging habitat is maintained to habitats west of the site. › All luminaires are fitted with photocells which automatically switch luminaires on during night time and off during daytime. Additionally, all luminaires are to automatically dim by 75% 00:00 – 06:00 (U14 profile). If required and with agreement of the local authority additional dimming is available. › The proposed lighting design uses warmest available LEDs for chosen luminaires (colour temperature set by worst case luminaires, all luminaires same colour temperature for consistency), the peak wave length is 600nm.
Residual Effect following Mitigation	With the implementation of the prescribed mitigation measures, no significant residual effects are predicted.

Impacts on water quality during operation

The operational phase of the proposed project will result in the production of foul sewage and surface water runoff.

The proposed surface water drainage system incorporates a number of SUDs measures into its design to block potential pathways for impact on water quality, which are fully described in Chapter 4 of this EIAR.

Wastewater from the development will discharge to the proposed onsite wastewater pumping station, which will ultimately link up to the existing Maynooth town wastewater network prior to discharging to Leixlip Wastewater Treatment Plant. The wastewater treatment plant is regulated and operates under an EPA licence which controls emissions to acceptable levels.

Confirmation of Feasibility letters for Site B have been received from Irish Water and are included in volume 3b appendix 4-9 of this EIAR.

Mitigation

The risk of uncontrolled emissions is minimized by the collection, treatment and discharge of storm water to the Rye Water River via, attenuation tanks, filter drains and petrol/oil interceptors as described above. It is also proposed to retain the existing riparian zone which will act as a buffer between the development and the Rye Water.

Wastewater from the Proposed Development will be directed to an EPA regulated wastewater treatment plant via a proposed onsite pumping station

Residual effect

The potential source of pollution can be readily controlled, and standard procedures will ensure no significant releases will occur. Mitigation measures, in particular the attenuation tank, filter drains, and petrol/oil interceptor will break the pathway from the proposed works areas to the watercourse. The residual impacts are indirect, neutral, imperceptible, long term, unlikely impact.

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Foul water discharges will be directed to the municipal sewer and regulated wastewater treatment plant and so the residual impacts are neutral, indirect, imperceptible, long term, unlikely impact. Therefore, significant effects on surface water or ground water quality will not occur

6.7.2.4 Impacts on European Designated Sites

The potential for impact on European sites has been fully assessed in the Appropriate Assessment NIS that has been prepared in support of the current application.

Following the precautionary principle, the AASR identified a potential pathway for impact on Rye Water Valley/Carton SAC, South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka SPA and North Bull Island SPA in the form of deterioration of surface and groundwater water quality resulting from pollution associated with the construction and operational phases of the development.

Potential Impacts on Rye Water Valley/Carton SAC

Site B drains into the Rye Water River to the south. The Rye Water Valley/Carton SAC is downstream of Site B, to the east, directly adjacent to the site boundary on the opposite side of the R157 Regional Road.

The qualifying interests of the SAC is linked to groundwater flows (calcareous tufa springs) There is no connection between groundwater at the development site, and that discharging to any known tufa springs within the SAC (including the mapped spring located approximately 5km from Site B at Louisa Bridge).

Groundwater below Site B will flow to the south and discharge as baseflow to the Rye Water River and/or the Blackhall Little stream to the west. Groundwater flow from the site will, therefore, have no impact on the Louisa Bridge (spring) groundwater flow (Rye Water Valley/Carton SAC) as previous site investigations and hydrological assessments (c.f. Section 2.4, (Hydro-G, 2008)) have shown that the flow to these springs is not derived from the Rye Water River and are in fact fed from a source further east of Louisa Bridge.

Two of the qualifying interests of the SAC are two species of vertigo snail (Vertigo angustior and Vertigo moulinsiana), with both species' dependant on the calcareous march habitat which is provided by the tufa formation. The known range of both species within the SAC is also restricted to Louisa Bridge (spring). While there are no known petrifying springs or qualifying interests of the Rye Water Valley/Carton SAC within proximity of Site A i.e. Louisa Bridge. An ecological walkover survey of the SAC by MKO to identify any additional tufa springs or potential habitat for vertigo snails downstream of the Proposed Development site has not identified petrifying springs nor their associated qualifying interests in this area of the SAC. Irrespective of this the potential for the occurrence of unmapped petrifying springs within the SAC has also been considered below.

Although there is no potential for effects on the known QI of the SAC the following mitigation will ensure no impact on the SAC generally. Standard mitigation and SuDS drainage controls are proposed during the construction and operational phase of Site B (e.g., silt traps/road gullies, hydrocarbon interceptors, attenuation storage and infiltration, and hydro-brake flow limiters) which have been proven through widespread use in housing and commercial developments across the country. The proposed SuDs drainage system incorporated into the engineering design of the site are common drainage systems that are used in development sites. They are proposed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS, 2005) and the objectives outlined in the Meath County Development Plan 2021-2027.

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These standard drainage design controls and construction phase mitigation measures will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the proposed development.

The project design ensures that there will be no dewatering of the bedrock aquifer during the construction phase and so there will be no obstruction or alteration of existing groundwater flows.

There will be no significant alteration to groundwater recharge. The majority of rainfall will continue to percolate to shallow subsurface and discharge to the surface water systems locally with low levels of recharge to ground, in particular for Site B with is underlain with low permeability subsoils. During the construction phase, the recharge rates won't change materially.

With the implementation of the project as designed and the standard drainage control measures outlined above the potential for Site B to cause any groundwater drawdown or groundwater quality impacts in the SAC is imperceptible.

Groundwater flowpaths will be maintained during the construction phase as any excavation proposed will be shallow. The SI data shows that dewatering of groundwater from the bedrock aquifer will not occur and so there is no potential for significant effects on the calcareous tufa springs and associated species.

Following an extremely precautionary principle, the potential for other downstream designated sites (South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka SPA and North Bull Island SPA) to be impacted by the proposed works was also considered. On the basis of the Proposed Development design and the mitigation measures proposed to protect the immediate water receptors there will be no impacts on designated sites.

Pathway: Site drainage network and groundwater flowpaths.

Receptor: Rye Water Valley/Carton SAC and any associated Tufa Springs and vertigo snail populations (including the known spring 5km downstream at Louisa Bridge).

Pre-Mitigation Impact

Indirect, negative, slight, short term, likely impact to water quality and hydrology regime.

Proposed Mitigation Measures

The proposed mitigation measures for protection of surface water and groundwater quality which will include on site drainage control measures (i.e., silt fences, silt bags etc.) will ensure that the quality of runoff from Proposed Development areas will be good. All mitigation measures outlined throughout Section 8.6.3 of Chapter 8 provides controls which will be put in place to manage risks associated with sediment, hydrocarbons/chemicals and cement-based products used during construction phase.

The standard drainage design controls will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the Proposed Development.

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Residual Impact

With the application of the best practice mitigation outlined above, the residual effect will be – Imperceptible, direct, negative, short-term, high probability impact on surface and ground water receptors.

Significance of Effects

For the reasons outlined above, no significant effects will occur on any designated site.

The NIS report concludes that:

"Where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures ensure that the construction, operation of the proposed development does not adversely affect the integrity of European sites.

Taking into consideration the reported residual impacts from other plans and projects in the area and the predicted impacts with the current proposal, no residual cumulative impacts have been identified with regard to any European Site."

Therefore, it can be objectively concluded that the proposed development, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site".

Impacts on Nationally Designated Sites

Impacts on nationally designated sites including NHAs and pNHAs are considered in this section of the report. Those nationally designated sites that were also designated as SACs/SPAs were considered and the potential for significant or adverse effects to occur were discounted on the same basis as described above in relation to the corresponding European Sites. Where there are pathways for effect on Nationally designated sites that are not also designated as European Sites, a full ecological impact assessment is provided below.

The proposed development site is located directly adjacent to the Rye Water Valley/Carton NHA, which is also designated as Rye Water Valley/Carton SAC.

Liffey Valley pNHA located downstream of the proposed development with hydrological connectivity via the Rye Water River and River Liffey.

Standard best practice environmental control measures have been incorporated in the design of the development and are outlined in Chapter 4 and section 8.6 of Chapter 8 of this EIAR. All identified potential pathways for impact on water quality are robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within Chapter 4 and section 8.6 of Chapter 8 of this EIAR.

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6.7.3 Site C – Strategic Housing Development

6.7.3.1 Do Nothing Impact

If the proposed development were not to go ahead, it is likely that the development site would remain as it is in its current agricultural use. The development site may be subject to other development proposals.

6.7.3.2 *Impacts during Construction phase*

Habitat Loss

Habitats Local Importance (Lower Value)

Table 6-33.Habitats of Local Importance (Lower value)

Habitat	Area lost / Length lost
Improved Agricultural Grassland (GA1)	7.4ha

The development footprint will result in the permanent loss of Improved Agricultural Grassland

The effect is assessed a permanent non-significant negative impact on a receptor of *Local Importance Lower Value*. Loss of this habitat to the footprint of the proposal is not considered to be significant at any geographic scale. This habitat is common and widespread in the locality and have a low biodiversity value. The loss of this habitat is considered not significant and therefore no mitigation is required.

Habitats Local Importance (Higher Value)

Table 6-34.Habitats of Local Importance (Higher Value)

Habitat	Area/length lost
Hedgerow (WL1) (including 29 trees)	Approx. 1,022m
Mixed Broadleaved Woodland (WD4)	0.09ha

Assessment of the potential effects on the loss of Treeline (WL2) and Hedgerow (WL1) habitat

Table 6-35. Loss of Treeline and Hedgerow habitat associated with Site C

Description of Effect	1,022m of hedgerow in the centre of the site and along the northern boundary will be lost as it is within the footprint of the development. This represents 53% of hedgerow habitat within the development site. 29 trees located within the hedgerow habitat will be felled to facilitate the development, most occurring along the northern boundary adjacent to the L2214. The loss of 29 trees represents 22% of the total trees identified on site. The landscaping plan has been designed to avoid the mature Tree Line habitat that has been identified along the southern boundary of the site and the mature Trees surrounding Moygaddy Castle.
Characterisation of unmitigated effect	The loss of 1,022m of hedgerow would constitute a permanent negative effect within the site. This would not be reversible as it is within the construction footprint. The magnitude of this impact is Moderate at the local scale given the small area affected. The loss of 29 trees would constitute a permanent negative effect within the site. This would not be reversible as it is within the construction footprint. The magnitude of this impact is Moderate at the local scale given the small area affected.

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Assessment of Significance prior to mitigation	This is not significant at a county, national or international scale as it will not affect the conservation status of this habitat, which is widespread and common in the wider area outside the site.
Mitigation	The development has been designed to retain approximately 590m of mature treeline habitat along the southern boundary of the project area and hedgerow habitat along the eastern boundary, maintaining connectivity to wider environment. Approx. 888m of hedgerow will be retained within the site. **Mitigation** A landscaping plan has been prepared for the proposed development and is available in **Appendix 4-7.** › The tree survey report accompanying this application outlined the removal of 29 trees at the site, many of which have been highlighted for removal due to poor condition. A total of 125 trees will be retained at the site. › In addition to this, 591 new trees will be planted within the site. › This will significantly increase the tree coverage throughout the entire site, improving connectivity to the wider landscape and providing new nesting, foraging and commuting habitat for local biodiversity › The plan includes for the planting of a new native treeline along the southern boundary of the site. To ameliorate any tree loss and to maintain connectivity to the wider area. › Approximately 364m^2 of native hedgerow is proposed for planting along the northern and western boundaries. This will ensure habitat connectivity is maintained to the wider landscape. › Native tree species to be used for planting include Alder (*Alnus glutinosa*), Pedunculate oak (*Quercus robur),* Scots Pine (Pinus sylvestris), Silver Birch (*pendula*) and Rowan (Sorbus aucuparia). › Native hedgerows will be planting with Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) and Holly (*Ilex aquifolium*). › In addition to native hedgerow and tree planting, approximately 11,492m^2 of shrub planting is proposed throughout the development site. Pollinator friendly species such as *Lavandula angustifolia* and *Hypericum Hidcote* will provide a large increase in food source availability in the proposed shrub planting areas. › Large sections of grasslands throughout the site will be management as Wildflower meadows and planted with native wildflowers, including Common knapweed (*Centaura nigra*), Ribwort Plantain (*Plantago lanceolata*), Red clover (*Trifolium pratense*) and Birds foot trefoil (*Lotus comiculatus*). › The creation of swales will also add new wetland habitat to the landscape, provide new habitat for various invertebrates and amphibians. › The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site. › A tree protection plan is included in this application This will ensure that any trees or tree lines that are to be retained within the site are fully protected in accordance with the British Standard BS 5837: Trees in Relation to Construction.
Residual Effect following Mitigation	Following the implementation of the mitigation and compensation as described above, there will be no net loss of hedgerow or treeline habitat on the site. The residual impact on hedgerow will be a short term slight negative effect until the newly planted hedges develop and mature. Ultimately, there will be no residual significant effect on the hedgerow habitat as a result of the development.
Potential for Cumulative Effect	The proposed development will not result in any permanent or long-term loss of linear landscape features. It therefore cannot contribute to any significant cumulative effect in this regard

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Assessment of the potential effects on the loss of Mixed Broadleaved Woodland (WD4)

Table 6-36. Loss of Mixed broadleaved woodland (WD4) associated with Site C

Description of Effect	The proposed development has been designed to retain the vast majority of the mixed broadleaved woodland habitat. However, it is proposed approximately 0.09ha of mixed broadleaved woodland habitat will be lost to facilitate pedestrian and cycle pathways. This accounts for only 4.5% of the total area of woodland. 95.5% of woodland habitat will be retained.
Characterisation of unmitigated effect	In the absence of mitigation, the loss of 0.09ha of mixed mixed broadleaved woodland constitutes a slight permanent negative effect on the habitat within the site. Whilst this habitat does not correspond to any Annex I Habitat, it adds considerable biodiversity value to the site. It also contributes to the ecological and habitat connectivity throughout the site and within the wider area. However, given the very small area of woodland edge to be lost and the presence of similar habitat in the wider area, the loss of mixed broadleaved woodland is considered to be a permanent slight negative impact at the local scale.
Assessment of Significance prior to mitigation	The loss of 0.09 ha of this habitat is not significant at any geographic scale
Mitigation	The development has been designed to retain the vast majority of the woodland within the site boundary, with only a very small section (4.5%) of the woodland being lost to the development. Whilst no significant loss of woodland will occur, a landscaping plan has been prepared for the proposed development which provides for the replanting of native woodland habitat within the development site to ameliorate any tree loss and to maintain connectivity with the wider. **Mitigation** › The tree survey report accompanying this application outlined the removal of 29 trees at the site, many of which have been highlighted for removal due to poor condition. A total of 125 trees will be retained at the site. › In addition to this, 591 new trees will be planted within the site. › This will significantly increase the tree coverage throughout the entire site, improving connectivity to the wider landscape and providing new nesting, foraging and commuting habitat for local biodiversity › The plan includes for the planting of a new native treeline along the southern boundary of the site. To ameliorate any tree loss and to maintain connectivity to the wider area. › Approximately 364m^2 of native hedgerow is proposed for planting along the northern and western boundaries. This will ensure habitat connectivity is maintained to the wider landscape. › Native tree species to be used for planting include Alder (*Alnus glutinosa*), Pedunculate oak (*Quercus robur),* Scots Pine (Pinus sylvestris), Silver Birch (*pendula*) and Rowan (Sorbus aucuparia). › Native hedgerows will be planting with Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) and Holly (*Ilex aquifolium*). › In addition to native hedgerow and tree planting, approximately 11,492m^2 of shrub planting is proposed throughout the development site. Pollinator friendly species such as *Lavandula angustifolia* and *Hypericum Hidcote* will provide a large increase in food source availability in the proposed shrub planting areas. › Large sections of grasslands throughout the site will be management as Wildflower meadows and planted with native wildflowers, including Common knapweed (*Centaura nigra*), Ribwort Plantain (*Plantago lanceolata*), Red clover (*Trifolium pratense*) and Birds foot trefoil (*Lotus comiculatus*). › The creation of swales will also add new wetland habitat to the landscape, provide new habitat for various invertebrates and amphibians.

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	› The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site. A tree protection plan is included in this application This will ensure that any trees or tree lines that are to be retained within the site are fully protected in accordance with the British Standard BS 5837: Trees in Relation to Construction.
Residual Effect following Mitigation	Following the implementation of the mitigation as described above no signfiicant residual effects are anticipated.
Potential for Cumulative Effect	The proposed development will not result in any permanent or long-term loss of woodland habitat. It therefore cannot contribute to any significant cumulative effect in this regard

Assessment of the potential impacts on water quality and aquatic faunal species and habitats during construction

Table 6-37. Impacts on water quality associated with Site C

Description of Effect	The construction phase of the development will involve earth moving and levelling operations which create the potential for pollution in various forms, i.e. the generation of suspended solids and the potential for spillage of fuels associated with the refuelling of excavation machinery. The construction of the outfall pipes within the River Rye Water and the Blackhall Little River has the potential to result in the deterioration of water quality. The construction of two pedestrian and cycle bridges along the Blackhall Little River also have the potential to result in the deterioration of water quality. The Blackhall Little River flows through the eastern section of the site in a southerly direction and connects to the Rye Water River, located along the southern boundary of the development site. The Rye Water River flows into the River Rye/Carton Valley SAC, approximately 0.68km downstream of the proposed development site boundary. The South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA and North Bull Island SPA are also hydrologically connected to the proposed development site via the Rye Water River & River Liffey. Taking a precautionary approach, the proposed development has the potential, in the absence of mitigation, to impact on surface water quality through pollutants including hydrocarbons, fuel and cement during the construction phase. This section assesses the potential for likely significant effects on aquatic receptors including aquatic habitats (i.e. watercourses) white-clawed crayfish,, salmonids, lamprey, coarse fish, European eel, aquatic invertebrates, molluscs and other aquatic species identified during the desk study as likely to occur downstream of the site.
Characterisation of unmitigated effect	In the absence of best practice design and mitigation the potential impact on water quality and aquatic species is considered to be a moderate negative effect.
Assessment of Significance prior to mitigation	Significant effects on water quality could occur at a local level as a result of the construction works, should mitigation measures not be installed.
Mitigation	Mitigation measures outlined to protect water quality during the construction of the main development areas have been outlined in section 8.6.3.6 of Chapter 8 of this EIAR and are fully described in the CEMP located in Volume 3.c, Appendix 4-3. The mitigation measures are summarised below.

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The following best practice construction measures will be followed to ensure that there are no significant effects on the Rye Water River or the Blackhall Little as a result of construction works:

- Silt fencing will be constructed around the construction footprint, where there is a surface water receptor, in order to create a defined perimeter for the proposed works, leaving a natural vegetation buffer between the construction footprint (other than operational surface water outfall installations which are described below) and surface water receptors and associated riparian habitats.
- A silt fence will also be attached to solid boundary fencing where it is in place and where there is a surface water receptor. This will protect the stream from any potential sediment laden surface water run-off generated during construction activities.
- The silt fence will comprise a geotextile membrane that will buried beneath the ground to filter any run-off that may occur as a result of the proposed works. The silt fence will be monitored throughout the proposed works and will remain in place after the works are completed and until the exposed earth has re-vegetated.
- As construction advances there may be a requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground;
- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing;
- A suitably sized detention basin or settlement area will be installed at the lowest point before discharge to ground where excess run- off must leave the site. Silt curtains or earth berms will be used to channel run-off to locations where it can be controlled. These may take the form of an open detention area or, where the need arises, a portable skip/s, or similar, where inflow passes through straw bales, gravel etc.
- Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present;
- Daily monitoring and inspections of site drainage during construction will be completed;

The following best practice construction measures will be followed to ensure that there are no significant effects on the Rye Water River or the Blackhall Little River as a result of the in-stream construction works related to the outfall pipes.

- Prior to the outset of these works, small defined works areas will be fenced off at the location of the storm water outfall (between the main construction site and both water courses). Silt fences will be attached to these fences. The silt fence will provide a solid barrier between the proposed pipelaying works and the Rye Water River
- The necessary pipelaying works will be undertaken within this defined area.
- Following the installation of the pipework and reinstatement of the ground, the small section of the silt fence that protects the Rye Water River will be removed to facilitate the construction of the outfall.
- No instream works will take place outside the period July 1st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- Cofferdams will be constructed using one tonne sandbags at the edge of the Rye Water River at the outfall point to create dry working areas.
- A submersible pump will be used to dewater inside the cofferdammed area and will discharge any waters to land at a location of over 30m from the rivers. The pumped waters will discharge through a silt bag.
- The bankside will be excavated and a small pre-cast concrete headwall installed (with outfall pipe included).
- The banks and channel bed will be reinstated to avoid erosion or run off of silt. Following this the dams will be removed.
- The surface water discharge point is likely to take less than one day to install.

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Sondes will be put in place in the Rye Water River upstream and downstream of the works area. These will continuously measure turbidity throughout the construction period. If there is a 10% or greater difference between upstream and downstream turbidity, an alarm will sound and a message will be sent to the site foreman and the EcoW. Works will be ceased until the cause of the difference is identified and (if it is associated with the works) rectified

Aquatic species-White Clawed Crayfish

The following section described the mitigation measures that will ensure there is no significant effect on white clawed crayfish as a result of the in-stream construction works proposed.
Prior to any construction works carried out within the Rye Water River or Blackhall Little River, a pre-commencement white clawed crayfish survey will be undertaken to ensure no crayfish occur within the works areas.
The survey will be carried out by a qualified professional under licence from the National Parks and Wildlife Services (NPWS)
All works within this area will be subject to strict biosecurity protocols to prevent the spread of the crayfish plague which is caused by the fungal-like organism, *Aphanomyces astaci.*

The following best practice construction measures will be followed to ensure that there are no significant effects on the Blackhall Little River as a result of the construction of the two pedestrian and cycle bridges:

- The proposed design for water course crossings and culverts, which minimises interactions with water courses, ensures that there will be no perceptible effects on the morphology of those watercourses.
- Prior to the outset of these works, small defined works areas will be fenced off at the location of the storm water outfall (between the main construction site and both water courses). Silt fences will be attached to these fences. The silt fence will provide a solid barrier between the proposed pipelaying works and the Blackhall Little Stream
- The necessary pipelaying works will be undertaken within this defined area.
- Following the installation of the pipework and reinstatement of the ground, the small section of the silt fence that protects the Blackhall Little Stream will be removed to facilitate the construction of the outfall.
- No instream works will take place outside the period July 31st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- Cofferdams will be constructed using one tonne sandbags at the edge of the Blackhall Little Stream at the outfall point to create dry working areas.
- A submersible pump will be used to dewater inside the cofferdammed area and will discharge any waters to land at a location of over 30m from the rivers. The pumped waters will discharge through a silt bag.
- The bankside will be excavated and a small pre-cast concrete headwall installed (with outfall pipe included).
- The banks and channel bed will be reinstated to avoid erosion or run off of silt. Following this the dams will be removed.
- The surface water discharge point is likely to take less than one day to install. During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas; and,
- The Kildare Bridge upgrade works will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent, where considered necessary by the designer.

Prior to entering the works area, all machinery and personnel entering the works area will be thoroughly disinfected.

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Residual Effect following Mitigation	With the implementation of the prescribed mitigation measures, no significant effects are predicted.
Potential for Cumulative Effect	The proposed development will not result in any significant effects to water quality. It therefore cannot contribute to any significant cumulative effect in this regard.

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Fauna- Disturbance/habitat loss

Non-volant mammals not identified as KERs

The construction phase of the proposal has the potential for some disturbance to local faunal species. However, no significant faunal species or signs of significant mammal activity were recorded within or immediately adjacent to the proposal during the site visit.

The proposed development site is located in close proximity to the busy roads and existing residential housing developments. Local faunal species are therefore likely to be habituated to anthropogenic activity in the wider area. Impacts on fauna as a result of disturbance during the construction phase are not considered to be significant at any geographic scale.

Best practice measures

- All works will be completed during daylight hours and there will be no requirement for artificial lighting at any stage of the proposed construction works. This will avoid any potential impacts on crespular or nocturnal species, including bat species.
- Hoarding will be placed around the construction site. This will screen the site and any disturbance impacts on fauna in the wider surroundings.
- All plant and equipment for use will comply with Statutory Instrument No 359 of 1996 "European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1996".
- Plant machinery will be turned off when not in use.
- Operating machinery will be restricted to the proposed works site area.

Residual Effect

No significant effect

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Assessment on the potential impacts on bats during construction

Table 6-38. Potential impacts on bats during construction associated with site C

Description of Effect	**Habitat Loss** Trees within the development boundary, which are proposed to be felled, were inspected to determine their suitability for roosting bats. No signs of bats were observed. However, two trees to the east of the site contained ivy cover and/or small cavities and crevices and were considered to be of *'Low to Moderate'* suitability for bats given their roosting potential. Following the precautionary principle, the construction phase has the potential to result in some habitat loss to local bat species.
	Habitat Fragmentation There will be some loss of linear habitat features to facilitate the proposed development. Approximately 1,022m of hedgerow treeline are proposed for removal. However, significant additional planting is proposed. Following the precautionary principle, the construction phase has the potential to result in some habitat loss to local bat species. Potential effects on bats may include: Removal of potential commuting or foraging habitat through the felling of trees.
	Disturbance Construction of the proposed development will result in increased human activity, noise and lighting within the proposed development site. Therefore, the potential for disturbance to bats requires consideration. However, the proposed development is bordered by existing residential and commercial developments to south, as well as busy local road and adjacent amenity areas. It is likely that bat species in the area are accustomed to some levels of disturbance. In the absence of appropriate design, the development has the potential to disturb bats by illumination of commuting and foraging areas.
Characterisation of unmitigated effect	The construction of the proposed development has the potential to result in a Long-Term Slight Negative effect on the local bat populations in the form of habitat loss, disturbance or direct mortality.
Assessment of Significance prior to mitigation	Significant effects on bats are not anticipated at any geographic scale during the construction of the proposed development.
Mitigation	**Habitat Loss** Following the precautionary principle, a pre-construction survey will be undertaken on two trees to be felled in the east of the site, by a qualified ecologist prior to any works, to ensure there are no roosting bats. The requirement for a pre-construction survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of this survey will be to assess any changes in baseline environment since the time of undertaking the surveys in July and August 2021. If bats are found to be roosting in any of the structures, a bat derogation licence must be obtained, and further mitigation prescribed by a licenced ecologist.

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	Fragmentation **Mitigation** A landscaping plan has been prepared for the proposed development and is available in **Appendix 4-7.** › The tree survey report accompanying this application outlined the removal of 29 trees at the site, many of which have been highlighted for removal due to poor condition. A total of 125 trees will be retained at the site. › In addition to this, 591 new trees will be planted within the site. › This will significantly increase the tree coverage throughout the entire site, improving connectivity to the wider landscape and providing new nesting, foraging and commuting habitat for local biodiversity › The plan includes for the planting of a new native treeline along the southern boundary of the site. To ameliorate any tree loss and to maintain connectivity to the wider area. › Approximately 364m^2 of native hedgerow is proposed for planting along the northern and western boundaries. This will ensure habitat connectivity is maintained to the wider landscape. › Native tree species to be used for planting include Alder (*Alnus glutinosa*), Pedunculate oak (*Quercus robur),* Scots Pine (Pinus sylvestris), Silver Birch (*pendula*) and Rowan (Sorbus aucuparia). › Native hedgerows will be planting with Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) and Holly (*Ilex aquifolium*). › In addition to native hedgerow and tree planting, approximately 11,492m^2 of shrub planting is proposed throughout the development site. Pollinator friendly species such as *Lavandula angustifolia* and *Hypericum Hidcote* will provide a large increase in food source availability in the proposed shrub planting areas. › Large sections of grasslands throughout the site will be management as Wildflower meadows and planted with native wildflowers, including Common knapweed (*Centaura nigra*), Ribwort Plantain (*Plantago lanceolata*), Red clover (*Trifolium pratense*) and Birds foot trefoil (*Lotus comiculatus*). › The creation of swales will also add new wetland habitat to the landscape, provide new habitat for various invertebrates and amphibians. › The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site. A tree protection plan is included in this application This will ensure that any trees or tree lines that are to be retained within the site are fully protected in accordance with the British Standard BS 5837: Trees in Relation to Construction.
	Disturbance The majority of works, during the construction phase, will occur during daylight hours. Therefore, there will be no requirement for exterior lighting within the site. Where lighting is unavoidable (i.e. health and safety), low-intensity lighting and motion sensors will be used to limit illumination. Exterior lighting, during construction, shall be designed to minimize light spillage, thus reducing the effect on areas outside the proposed development, and consequently on bats i.e. Lighting will be directed away from mature trees/hedgerows/treelines around the periphery of the site boundary to minimize disturbance to bats.
Residual Effect following Mitigation	With the implementation of the prescribed mitigation measures, no significant effects are predicted.

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Potential for Cumulative Effect	The proposed development will not result in any significant effect in regard to habitat loss for bats. It therefore cannot contribute to any cumulative effect in this regard.

Assessment of the potential impacts on birds during construction

Table 6-39. Potential impacts on birds during construction associated with site C

Description of Effect	**Habitat Loss/Degradation** The footprint of the proposal will result in the loss of approximately 0.09ha of woodland habitat along with approx. 1,022m hedgerow and 29 trees. These provide good nesting habitat for a range of common bird species.
	Disturbance The loss of the woodland, hedgerow and tree line throughout the site has the potential to result in disturbance to birds and potentially to cause mortality to juvenile birds in the nest. Moygaddy castle to the northeast of the site provides suitable nesting habitat for barn owl. A dedicated barn owl survey carried out in July 2021 found that no owls were nesting in the tower. Although no works are proposed for the tower, proposed construction works surrounding the tower may result in disturbance on potential nesting barn owl habitat.
Characterisation of unmitigated effect	**Habitat Loss** In the absence of mitigation, the loss of a small area of woodland and linear habitat has the potential to result in a permanent negative effect in respect of bird nesting habitat. This is considered to be a slight effect on this receptor of local importance due to the presence of large areas of suitable habitat in the wider area.
	Disturbance In the absence of mitigation, the loss of woodland and linear features has the potential to result in a short-term negative effect on nesting bird species. The magnitude of this impact has the potential to be moderate if the works result in mortality of young birds in the nest.
Assessment of Significance prior to mitigation	**Habitat Loss** There is no potential for significant effects on this species as a result of habitat loss at any scale.
	Disturbance Whilst there will be no significant effect on birds at an international or national scale, following the precautionary principal, there is the potential for a significant negative effect of disturbance to birds at a local scale during the construction phase of the proposed development prior to mitigation.
Mitigation	**Habitat Loss** In order to mitigate for the loss of a small area of woodland, trees and hedgerow it is proposed to plant and maintain additional areas of native woodland and trees within the site boundary.

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	Disturbance Where possible, all cutting of trees, scrub and tall vegetation will be undertaken outside the bird nesting season which runs from the 1st March to the 31st August. Any cutting of vegetation that may be required outside the season described above will be supervised by a suitably qualified ecologist to ensure that no birds nests are present. Should nesting birds be encountered, the trees will be left until nesting activity has concluded. Although no barn owls were recorded during the dedicated barn owl survey carried out in 2021, a pre-construction Survey will be undertaken on Moygaddy castle to ensure no barns owls are nesting there. The requirement for a pre-construction survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of this survey will be to assess any changes in baseline environment since the time of undertaking the barn owl survey in July 2021.
Residual Effect following Mitigation	**Habitat Loss** – No significant effect
	Disturbance – No significant effect.
Potential for Cumulative Effect	**Habitat Loss** The proposed development will not result in any significant effect in regard to habitat loss for birds. It therefore cannot contribute to any cumulative effect in this regard.

Assessment of the potential impact on badgers during construction

Table 6-40. Potential impacts on badger during construction associated with site C

Description of Effect	**Habitat loss/Fragmentation** Given the nature of the proposed development, there will be some loss of suitable foraging habitat i.e, improved agricultural grasslands.
	Disturbance The main development footprint has been designed to maintain a 30m buffer from the main badger sett along the Blackhall Little River in the centre of the site, in line with NRA (2009). However, a small section of footpath is located 22 metres east of the sett. As such, the construction of the footpath has the potential to cause disturbance of badgers as a result of the proposed construction works. The hedgerow containing the identified outlier sett in the centre of the site will be lost to the development. Although no badger activity was recorded at this sett, there is potential for disturbance and also direct mortality of badgers as a result of the proposed construction works.
Characterisation of unmitigated effect	**Habitat loss/Fragmentation** The loss of agricultural fields is not considered to be significant at any geographical scale, as large areas of grassland will be retained along the southern section of the site and along

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	the Blackhall Little River. Large sections of woodland will also remain in the centre of the site.
	Disturbance Construction works to facilitate the development may cause disturbance or direct mortality badgers in the absence of mitigation. The magnitude of this impact has the potential to be moderate if the works result in mortality of badgers.
Assessment of Significance prior to mitigation	**Habitat loss/Fragmentation** No significant overall loss or fragmentation of badger foraging habitat is anticipated at any geographic scale.
	Disturbance Any potential for physical damage or disturbance of occupied setts would has been identified as significant at the local geographic scale in the absence of mitigation.
Mitigation	**Habitat loss/Fragmentation** The retention of the hedgerow, woodland habitat and grassland within the southern section of the site will ensure that badger foraging habitat remains available. Areas seeded with wildflower meadow mix will establish a species rich grassland which is likely to provide higher quality foraging habitat locally than the existing improved agricultural grassland habitat.
	Disturbance A section of footpath is proposed within 22 metres of the identified badger sett along the Blackhall Little River. As such, the following mitigation is prescribed during the construction phase to avoid impacts on badgers: **Mitigation** Badger sett tunnel systems can extend up to c. 20m from sett entrances. Therefore, no heavy machinery will be used within 30m of badger setts (unless carried out under licence); lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances. During the breeding season (December to June inclusive), none of the above works should be undertaken within 50m of active setts nor blasting or pile driving within 150m of active setts. If construction works are required closer to the active sett during the breeding season, consultation with the NPWS will be carried out and appropriate mitigation measures will be put in place, e.g. sett screening, restricted working hours, etc. Although no badger activity was recorded at the outlier sett along the hedgerow within the site, taking a precautionary approach, the following mitigation is prescribed during the construction phase to avoid impacts on badgers: **Mitigation** It is recommended that a pre-construction badger survey be carried out in order to assess activity levels at the outlier sett and to identify any additional sett

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	entrances that may have been excavated in the intervening period. All badger survey work will be undertaken in line with current NRA best practice guidance[4] Should this sett found to be in use by badgers during the pre-construction badger monitoring, it will be necessary to apply to NPWS for a licence for the temporary closure of the sett during the construction phase only. Construction activities within the vicinity of affected setts may commence once these setts have been evacuated and destroyed under licence from the NPWS. Where survey indicates that suitable alternative natural setts are not present, a badger expert may recommend the construction of an artificial sett to replace the sett that will be affected.
Residual Effect following Mitigation	**Habitat loss/Fragmentation** Following the incorporation of mitigation measures described above, no significant fragmentation to or loss of badger foraging habitat, is anticipated at any geographic scale.
	Disturbance Following the incorporation of the mitigation measures described above, no significant adverse impacts to badgers is anticipated at any geographic scale.

[4] *National Roads Authority (2006) Guidelines for the treatment of badgers prior to the construction of National Road Schemes.*

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Assessment on the potential impacts on Otter during construction

Table 6-41. Potential impacts on Otter during construction.

Description of Effect	The construction of the proposed surface water outfall will require construction works along the edge of the Rye Water River and the Blackhall Little. Although no otter holts were recorded at these locations, following the precautionary principal, the construction works has the potential to cause disturbance or direct mortality to otter. The proposed development also has the potential to result in indirect effects on otter habitat in the form of water pollution resulting from construction activity as described above.
Characterisation of unmitigated effect	Construction works to facilitate the development may cause disturbance or direct mortality otter in the absence of mitigation. The magnitude of this impact has the potential to be moderate if the works result in mortality of otter. In the absence of mitigation, the indirect effect of water pollution on otter during construction has the potential to be a short-term reversible impact. The magnitude of any such impact is likely to be at worst moderate, given that all major infrastructure such as turbine bases and construction compounds are located over 50 metres from any significant watercourse.
Assessment of Significance prior to mitigation	There is no potential for the construction phase of the proposed development to result in significant disturbance, displacement or habitat fragmentation for otter. In the absence of mitigation and following the precautionary principle, there is potential for the proposed development to result in significant indirect effects on otter at a local geographic scale in the form of habitat deterioration resulting from pollution.
Mitigation	Prior to the commencement of construction works associated with the installation of the new pedestrian bridge and outfall, the following measures will be undertaken for the avoidance of disturbance/displacement and direct mortality and to ensure that no otter holts/breeding sites have been established since the original surveys undertaken (TII, 2007): From a precautionary basis, a pre-commencement otter survey will be undertaken in accordance with standard best practice guidance prior to the commencement of the construction of the proposed bridge construction and the construction of the outfall. In the unlikely event that an otter holt is identified within or immediately adjacent to the proposed development footprint, consultation will be undertaken with the National Parks and Wildlife Service and a derogation licence applied for. All conditions of a derogation licence will be implemented in full. No works should be undertaken within 150m of any holts at which breeding females or cubs are present. No wheeled or tracked vehicles (of any kind) should be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance should also not take place within 15m of such holts, except under licence (TII, 2006[5]). All of the above works will be undertaken or supervised by an appropriately qualified ecologist.
Residual Effect following Mitigation	Following the implementation of mitigation, there will be no significant residual effect on otter as a result of the proposed development.

[5] *NRA, 2006. Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes. Dublin: Transport Infrastructure Ireland. Available at: www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Treatment-of-Otters-prior-to-the-Construction-of-National-Road-Schemes.pdf*

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6.7.3.3 Impacts during Operational Phase

Disturbance to Fauna

The surveys undertaken have identified that the site of the proposed development and the surrounding is used by a range of common bird species, small mammal and invertebrate species and provides biodiversity in the local context. Direct disturbance resulting from the operation of the proposed development has been assessed and the potential for effect is the same as for construction disturbance and thus the finding of the assessment is provided in section 6.7.3.2. This assessment is not repeated here but the conclusion that, following the mitigation described, there will be no significant residual impacts on faunal species are anticipated as a result of disturbance.

Local faunal species are likely to be habituated to anthropogenic activity in the area, given the developments close proximity to busy local roads and nearby residential housing. Impacts on fauna as a result of disturbance during the operational phase are not considered to be significant at any geographic scale.

Assessment on the potential impacts on bats during the operational phase

Table 6-42. Potential Impacts on bats during the operational phase

Description of Effect	Construction and operation of the proposed development will result in increased human activity, noise and lighting within the proposed site. Therefore, the potential for disturbance to bats requires consideration. However, the proposed development is in close proximity to existing residential areas to south as well as busy local roads. It is likely that bat species in the area are accustomed to some levels of disturbance.
Characterisation of unmitigated effect	In the absence of mitigation, the operational phase of the proposed development has the potential to result in Long-Term Slight Negative effect on the local bat populations in the form of disturbance as a result of lighting.
Assessment of Significance prior to mitigation	Whilst there will be no significant effect on bats at an international or national scale, following the precautionary principal, there is the potential for a significant negative effect on bats at a local scale during the operational phase of the proposed development prior to mitigation.
Mitigation	A lighting plan has been prepared as part of this application › The lighting plan for the operational phase of the proposed development, has been designed with consideration of the following guidelines: Bat Conservation Ireland (Bats and Lighting: Guidance Notes for Planners, Engineers, Architects and Developers, BCI, 2010) and the Bat Conservation Trust (Guidance Note 08/18 Bats and Artificial Lighting in the UK (BCT, 2018), Dark Sky Ireland, to minimise light spillage, thus reducing any potential disturbance to bats. › Bat surveys carried out in 2021 indicate the Treeline along the southern boundary of the site is the most important commuting habitat for bats. This linear feature will remain in darkness and not have any artificial lighting. › No lighting is proposed in proximity to the Moygaddy castle and surrounding woodland habitat. › Pedestrian footpaths which are located in close proximity to the Blackhall Little Stream and River Rye Water have been specified to a colour temperature of 2200k. › The proposed lamps have limited backward light properties thus assisting in reducing backward light spill. Lamps have also been specified with 0 Degree tilt (where possible) to ensure limited unwanted light spill.

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	› All luminaires are fitted with photocells which automatically switch luminaires on during night time and off during daytime. Additionally, all luminaires are to automatically dim by 75% 00:00 – 06:00 (U14 profile). If required and with agreement of the local authority additional dimming is available. › The proposed lighting design uses warmest available LEDs for chosen luminaires (colour temperature set by worst case luminaires, all luminaires same colour temperature for consistency), the peak wave length is 600nm.
Residual Effect following Mitigation	With the implementation of the prescribed mitigation measures, no significant residual effects are predicted.

Impacts on water quality during operation

The operational phase of the proposed project will result in the production of foul sewage and surface water runoff.

The proposed surface water drainage system incorporates a number of SUDs measures into its design to block potential pathways for impact on water quality, which are fully described in Chapter 4 of this EIAR.

Wastewater from the development will discharge to the proposed onsite wastewater pumping station, which will ultimately link up to the existing Maynooth town wastewater network prior to discharging to Leixlip Wastewater Treatment Plant. The wastewater treatment plant is regulated and operates under an EPA licence which controls emissions to acceptable levels.

Confirmation of Feasibility letters for Site C have been received from Irish Water and are included in volume 3c appendix 4-9 of this EIAR.

Mitigation

The risk of uncontrolled emissions is minimized by the collection, treatment and discharge of storm water to the Rye Water River and the Blackhall Little Stream via, attenuation tanks, filter drains and petrol/oil interceptors as described above. It is also proposed to retain the existing riparian zone which will act as a buffer between the development and the two watercourses.

Wastewater from the Proposed Development will be directed to an EPA regulated wastewater treatment plant via a proposed onsite pumping station

Residual effect

The potential source of pollution can be readily controlled, and standard procedures will ensure no significant releases will occur. Mitigation measures, in particular the attenuation tank, filter drains, and petrol/oil interceptor will break the pathway from the proposed works areas to the watercourse. The residual impacts are indirect, neutral, imperceptible, long term, unlikely impact.

Foul water discharges will be directed to the municipal sewer and regulated wastewater treatment plant and so the residual impacts are neutral, indirect, imperceptible, long term, unlikely impact.
Therefore, significant effects on surface water or ground water quality will not occur

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6.7.3.4 Impacts on European Designated Sites

The potential for impact on European sites has been fully assessed in the Appropriate Assessment NIS that has been prepared in support of the current application.

Following the precautionary principle, the AASR identified a potential pathway for impact on Rye Water Valley/Carton SAC, South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka SPA and North Bull Island SPA in the form of deterioration of surface and groundwater water quality resulting from pollution associated with the construction and operational phases of the development.

Potential Impacts on Rye Water Valley/Carton SAC

Site C drains into the Rye Water River to the south and the Blackhall Little within the centre of the site. The Rye Water Valley/Carton SAC is downstream of Site C, to the southeast, directly adjacent to the site boundary on the opposite side of the R157 Regional Road.

The qualifying interests of the SAC is linked to groundwater flows (calcareous tufa springs) There is no connection between groundwater at the development site, and that discharging to any known tufa springs within the SAC (including the mapped spring located approximately 5km from Site Cat Louisa Bridge).

Groundwater below Site C will flow to the south and discharge as baseflow to the Rye Water River and/or the Blackhall Little stream to the east of the housing units. Groundwater flow from the site will, therefore, have no impact on the Louisa Bridge (spring) groundwater flow (Rye Water Valley/Carton SAC) as previous site investigations and hydrological assessments (c.f. Section 2.4, (Hydro-G, 2008)) have shown that the flow to these springs is not derived from the Rye Water River and are in fact fed from a source further east of Louisa Bridge.

Two of the qualifying interests of the SAC are two species of vertigo snail (Vertigo angustior and Vertigo moulinsiana), with both species' dependant on the calcareous march habitat which is provided by the tufa formation. The known range of both species within the SAC is also restricted to Louisa Bridge (spring). While there are no known petrifying springs or qualifying interests of the Rye Water Valley/Carton SAC within proximity of Site A i.e. Louisa Bridge. An ecological walkover survey of the SAC by MKO to identify any additional tufa springs or potential habitat for vertigo snails downstream of the Proposed Development site has not identified petrifying springs nor their associated qualifying interests in this area of the SAC. Irrespective of this the potential for the occurrence of unmapped petrifying springs within the SAC has also been considered below.

Although there is no potential for effects on the known QI of the SAC the following mitigation will ensure no impact on the SAC generally. Standard mitigation and SuDS drainage controls are proposed during the construction and operational phase of Site C (e.g., silt traps/road gullies, hydrocarbon interceptors, attenuation storage and infiltration, and hydro-brake flow limiters) which have been proven through widespread use in housing and commercial developments across the country. The proposed SuDs drainage system incorporated into the engineering design of the site are common drainage systems that are used in development sites. They are proposed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS, 2005) and the objectives outlined in the Meath County Development Plan 2021-2027.

These standard drainage design controls and construction phase mitigation measures will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing

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greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the proposed development.

The project design ensures that there will be no dewatering of the bedrock aquifer during the construction phase and so there will be no obstruction or alteration of existing groundwater flows.

There will be no significant alteration to groundwater recharge. The majority of rainfall will continue to percolate to shallow subsurface and discharge to the surface water systems locally with low levels of recharge to ground, in particular for Site C with is underlain with low permeability subsoils. During the construction phase, the recharge rates won't change materially.

With the implementation of the project as designed and the standard drainage control measures outlined above the potential for Site C to cause any groundwater drawdown or groundwater quality impacts in the SAC is imperceptible.

Groundwater flowpaths will be maintained during the construction phase as any excavation proposed will be shallow. The SI data shows that dewatering of groundwater from the bedrock aquifer will not occur and so there is no potential for significant effects on the calcareous tufa springs and associated species.

Following an extremely precautionary principle, the potential for other downstream designated sites (South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka SPA and North Bull Island SPA) to be impacted by the proposed works was also considered. On the basis of the Proposed Development design and the mitigation measures proposed to protect the immediate water receptors there will be no impacts on designated sites.

Pathway: Site drainage network and groundwater flowpaths.

Receptor: Rye Water Valley/Carton SAC and any associated Tufa Springs and vertigo snail populations (including the known spring 5km downstream at Louisa Bridge).

Pre-Mitigation Impact

Indirect, negative, slight, short term, likely impact to water quality and hydrology regime.

Proposed Mitigation Measures

The proposed mitigation measures for protection of surface water and groundwater quality which will include on site drainage control measures (i.e., silt fences, silt bags etc.) will ensure that the quality of runoff from Proposed Development areas will be good. All mitigation measures outlined throughout Section 8.6.3 of Chapter 8 provides controls which will be put in place to manage risks associated with sediment, hydrocarbons/chemicals and cement-based products used during construction phase.

The standard drainage design controls will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the Proposed Development.

Residual Impact

With the application of the best practice mitigation outlined above, the residual effect will be – Imperceptible, direct, negative, short-term, high probability impact on surface and ground water receptors.

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Significance of Effects

For the reasons outlined above, no significant effects will occur on any designated site.

The NIS report concludes that:

"Where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures ensure that the construction, operation of the proposed development does not adversely affect the integrity of European sites.

Taking into consideration the reported residual impacts from other plans and projects in the area and the predicted impacts with the current proposal, no residual cumulative impacts have been identified with regard to any European Site."

Therefore, it can be objectively concluded that the proposed development, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site".

Impacts on Nationally Designated Sites

Impacts on nationally designated sites including NHAs and pNHAs are considered in this section of the report. Those nationally designated sites that were also designated as SACs/SPAs were considered and the potential for significant or adverse effects to occur were discounted on the same basis as described above in relation to the corresponding European Sites. Where there are pathways for effect on Nationally designated sites that are not also designated as European Sites, a full ecological impact assessment is provided below.

The proposed development site is located directly adjacent to the Rye Water Valley/Carton NHA, which is also designated as Rye Water Valley/Carton SAC.

Liffey Valley pNHA located downstream of the proposed development with hydrological connectivity via the Rye Water River and River Liffey.

Standard best practice environmental control measures have been incorporated in the design of the development and are outlined in Chapter 4 and section 8.6 of Chapter 8 of this EIAR. All identified potential pathways for impact on water quality are robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within Chapter 4 and section 8.6 of Chapter 8 of this EIAR.

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6.7.4 MOOR- Maynooth Outer Orbital Road

6.7.4.1 Do Nothing Impact

If the proposed development were not to go ahead, it is likely that the development site would remain as it is in its current agricultural use. The development site may be subject to other development proposals.

6.7.4.2 *Impacts during Construction phase*

Habitat Loss

Habitats Local Importance (Lower Value)

Table 6-43.Habitats of Local Importance (Lower value)

Habitat	Area lost / Length lost
Improved Agricultural Grassland (GA1)	3.6ha

The development footprint will result in the permanent loss of Improved Agricultural Grassland

The effect is assessed a permanent non-significant negative impact on a receptor of *Local Importance Lower Value*. Loss of this habitat to the footprint of the proposal is not considered to be significant at any geographic scale. This habitat is common and widespread in the locality and have a low biodiversity value. The loss of this habitat is considered not significant and therefore no mitigation is required.

Habitats Local Importance (Higher Value)

The habitats of local importance (higher value) that will be lost to the development and the area/length of each habitat lost are listed in Table 6.44.

Table 6-44. Habitat of Local Importance (Higher Value)

Habitat	Area/length lost
Treeline (WL2)	Approx. 1,253m
Hedgerow (WL1)	Approx. 1,563m

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Assessment of the potential effects on the loss of Hedgerow (WL1) and Treeline (WL2) habitat

Table 6-45. Loss of Treeline and Hedgerow habitat associated with the MOOR

Description of Effect	The MOOR has been designed to retain trees and hedgerow habitat where possible. Approximately 1, 253m of treeline and 1,563m of hedgerow will be lost to facilitate the construction of the MOOR. This includes for treeline and hedgerow along the R157, L22143 and delineating field boundaries.
Characterisation of unmitigated effect	The loss of 1, 253m of treeline and 1,563m of hedgerow would constitute a permanent negative effect within the site. This would not be reversible as it is within the construction footprint. The magnitude of this impact is significant at the local scale given the area affected.
Assessment of Significance prior to mitigation	This is not significant at a county, national or international scale as it will not affect the conservation status of this habitat, which is widespread and common in the wider area outside the site.
Mitigation	**Mitigation** A landscaping plan has been prepared for both application sites and is available in **Appendix 4-7.** › In order to mitigate for the significant loss of hedgerow habitat associated with the MOOR, approximately 6,208m of new hedgerow will be planting along the extend off the MOOR boundary. › Native hedgerow species such as Hawthorn (*Crataegus monogyna*), Blackthorn (Prunus spinosa) and Holly (*Ilex aquifolium*) will in the replanting schedule. › In addition to the 6,208m of new hedgerow proposed, 373 semi mature new trees will also be planted along the extent of the MOOR. › Native species to be used for planting include Alder (*Alnus glutinosa),* Pedunculate oak (*Quercus robur*), Scots Pine (*Pinus sylvestris*), Silver Birch (*betula pendula*) and Rowan (*Sorbus aucuparia*). › The planting of 6,208m of hedgerow habitat and 373 semi mature trees will increase the coverage of linear habitat on the overall proposed development site. › This will significantly increase the nesting, foraging and commuting habitat for wildlife while maintaining ecological connectivity to the wider landscape. › The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site. › A tree protection plan is included in this application. This will ensure that any trees or tree lines that are to be retained within the site are fully protected in accordance with the British Standard BS 5837: Trees in Relation to Construction.
Residual Effect following Mitigation	Following the implementation of the mitigation and compensation as described above, there will be no net loss of hedgerow or treeline habitat on the site. The residual impact on hedgerow will be a short term slight negative effect until the newly planted hedges and semi mature trees develop and mature. Ultimately, there will be no residual significant effect on the hedgerow and treeline habitat as a result of the development.
Potential for Cumulative Effect	The proposed development will not result in any permanent or long term loss of linear landscape features. It therefore cannot contribute to any significant cumulative effect in this regard

Assessment of potential effects on water quality and aquatic faunal species and habitats during construction

Table 6-46. Potential impacts on water during construction

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Description of Effect	The construction phase of the development will involve earth moving and levelling operations which create the potential for pollution in various forms, i.e. the generation of suspended solids and the potential for spillage of fuels associated with the refuelling of excavation machinery. The construction of the river bridges crossing at Moyglare and the Rye Water and the Blackhall little river have the potential to result in the deterioration of water quality. The Rye Water River flows into the River Rye/Carton Valley SAC, located east of the proposed development site boundary. The South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA and North Bull Island SPA are also hydrologically connected to the proposed development site via the Blackhall Little Stream, Rye Water River & River Liffey. Taking a precautionary approach, the proposed development has the potential, in the absence of mitigation, to impact on surface water quality through pollutants including hydrocarbons, fuel and cement during the construction phase. This section assesses the potential for likely significant effects on aquatic receptors including aquatic habitats (i.e. watercourses) salmonids, lamprey, coarse fish, European eel, aquatic invertebrates, molluscs and other aquatic species identified during the desk study as likely to occur downstream of the site.
Characterisation of unmitigated effect	In the absence of best practice design and mitigation the potential impact on water quality and aquatic species is considered to be a moderate negative effect.
Assessment of Significance prior to mitigation	Significant effects on water quality are anticipated could occur at a local level as a result of the construction works, prior to should mitigation measures not be installed.
Mitigation	Mitigation measures outlined to protect water quality during the construction of the main development areas have been outlined in section 8.6.3.7 of Chapter 8 of this EIAR and are fully described in the CEMP located in Volume 3.d, Appendix 4-3. The mitigation measures are summarised below. › Silt fencing will be constructed around the construction footprint, where there is a surface water receptor, in order to create a defined perimeter for the proposed works, leaving a natural vegetation buffer between the construction footprint (other than operational surface water outfall installations which are described below) and surface water receptors and associated riparian habitats. › A silt fence will also be attached to solid boundary fencing where it is in place and where there is a surface water receptor. This will protect the stream from any potential sediment laden surface water run-off generated during construction activities. › The silt fence will comprise a geotextile membrane that will buried beneath the ground to filter any run-off that may occur as a result of the proposed works. The silt fence will be monitored throughout the proposed works and will remain in place after the works are completed and until the exposed earth has re-vegetated. › As construction advances there may be a requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground; › Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing; › A suitably sized detention basin or settlement area will be installed at the lowest point before discharge to ground where excess run- off must leave the site. Silt curtains or earth berms will be used to channel run-off to locations where it can be controlled.

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These may take the form of an open detention area or, where the need arises, a portable skip/s, or similar, where inflow passes through straw bales, gravel etc.

- Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present;
- Daily monitoring and inspections of site drainage during construction will be completed;
- No instream works will take place outside the period July 1st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland is incorporated into the design of the proposed Kildare Bridge pedestrian/cycle structure upgrade works, the Blackhall Little Bridge and the Moyglare Bridge;
- Surface water outfalls will be constructed in accordance with the measures described in 8.6.3.4.4 and subject to agreement with IFI.
- Good construction practices such wheel washers and dust suppression on site roads, and regular plant maintenance, which will be implemented, will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRIA, 2001), which provides information on these issues. This will ensure that surface water arising during the course of construction activities will contain minimum sediment.
- During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas; and,
- The MOOR stream crossing upgrade works, the Moyglare Bridge and the Kildare Bridge Works will all require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent, where considered necessary by the designer.
- Preventative measures during construction have been incorporated into the Construction and Environmental Management Plan, which will be updated upon grant of permission and to provide any additional measures required pursuant to planning conditions and agreements with the planning authority.

The following best practice construction measures will be followed to ensure that there are no significant effects on the Rye Water River as a result of the construction of the two pedestrian and cycle bridges:

- The proposed design for water course crossings and culverts, which minimises interactions with water courses, ensures that there will be no perceptible effects on the morphology of those watercourses.
- Prior to the outset of these works, small defined works areas will be fenced off at the location of the storm water outfall (between the main construction site and both water courses). Silt fences will be attached to these fences. The silt fence will provide a solid barrier between the proposed pipelaying works and the Rye Water River
- The necessary pipelaying works will be undertaken within this defined area.
- Following the installation of the pipework and reinstatement of the ground, the small section of the silt fence that protects the Rye Water River will be removed to facilitate the construction of the outfall.
- No instream works will take place outside the period July 31st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- Cofferdams will be constructed using one tonne sandbags at the edge of the Rye Water River at the outfall point to create dry working areas.
- A submersible pump will be used to dewater inside the cofferdammed area and will discharge any waters to land at a location of over 30m from the rivers. The pumped waters will discharge through a silt bag.
- The bankside will be excavated and a small pre-cast concrete headwall installed (with outfall pipe included).

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	› The banks and channel bed will be reinstated to avoid erosion or run off of silt. Following this the dams will be removed. › The surface water discharge point is likely to take less than one day to install › The bridge works will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent, where considered necessary by the designer. › Prior to entering the works area, all machinery and personnel entering the works area will be thoroughly disinfected. As part of the application process, Inland Fisheries Ireland were consulted regarding the proximity of the works to the Blackhall Little and the River Rye Water.
	Prior to the commencement of any construction work associated with the development, the following pre-construction survey work will be undertaken to satisfy the recommendations outlined by IFI during consultation stage: Biotic and abiotic baseline data will be gathered on the River Rye and Blackhall Little both close to the development site and at a distance away from the site. Gathering this data will allow for a comparison between the current situation and that which may develop during the construction or operational phase.
Residual Effect following Mitigation	With the implementation of the prescribed mitigation measures, no significant effects are predicted.
Potential for Cumulative Effect	The proposed development will not result in any significant effects to water quality. It therefore cannot contribute to any significant cumulative effect in this regard.

Fauna- Disturbance/Habitat loss

Non volant mammals

The construction phase of the proposal has the potential for some localised disturbance to local faunal species. However, no significant faunal species or signs of significant mammal activity were recorded within or immediately adjacent to the proposal during the site visit.

The proposed development site is located in close proximity to the busy roads and existing residential housing developments. Local faunal species are therefore likely to be habituated to anthropogenic activity in the wider area. Impacts on fauna as a result of disturbance during the construction phase are not considered to be significant at any geographic scale.

Best practice measures

- All works will be completed during daylight hours and there will be no requirement for artificial lighting at any stage of the proposed construction works. This will avoid any potential impacts on crespular or nocturnal species, including bat species.
- Hoarding will be placed around the construction site. This will screen the site and minimise any disturbance impacts on fauna in the wider surroundings.
- All plant and equipment for use will comply with Statutory Instrument No 359 of 1996 "European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1996".
- Plant machinery will be turned off when not in use.
- Operating machinery will be restricted to the proposed works site area.

Residual Effect

No significant effect

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Assessment on the potential impacts on bats during construction

Table 6-47. Assessment of the potential impacts on bats associated with the MOOR

Description of Effect	**Habitat Loss** Trees within the development boundary, which are proposed to be felled, were inspected to determine their suitability for roosting bats. No signs of bats were observed. One individual tree adjacent to the Blackhall Little stream in the north section of the MOOR contained ivy cover and/or small cavities and crevices and were considered to be of 'Low to Moderate' suitability for bats given their roosting potential. Following the precautionary principle, the construction phase has the potential to result in some habitat loss to local bat species.
	Habitat Fragmentation There will be a loss of linear habitat features to facilitate the proposed development. Approximately 1, 253m of treeline and 1,563m of hedgerow are proposed for removal. However, significant additional planting is proposed. Following the precautionary principle, the construction phase has the potential to result in some habitat loss to local bat species. Potential effects on bats may include: Removal of potential commuting or foraging habitat through the felling of trees.
	Disturbance Construction of the proposed development will result in increased human activity, noise and lighting within the proposed development site. Therefore, the potential for disturbance to bats requires consideration. However, the proposed development is bordered by existing residential and commercial developments to south, as well as busy local road and adjacent amenity areas. It is likely that bat species in the area are accustomed to some levels of disturbance. In the absence of appropriate design, the development has the potential to disturb bats by illumination of commuting and foraging areas.
Characterisation of unmitigated effect	The construction of the proposed development has the potential to result in a Long-Term Slight Negative effect on the local bat populations in the form of habitat loss, disturbance or direct mortality.
Assessment of Significance prior to mitigation	Significant effects on bats are not anticipated at any geographic scale during the construction of the proposed development.
Mitigation	**Habitat Loss** › Following the precautionary principle, a pre-construction survey will be undertaken on the individual tree adjacent to the Blackhall Little stream with 'Low to Moderate' suitability for bats to be felled, by a qualified ecologist prior to any works, to ensure there are no roosting bats. The requirement for a pre-construction survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of this survey will be to assess any changes in baseline environment since the time of undertaking the bat survey in July 2021. › If bats are found to be roosting in any of the trees, a bat derogation licence must be obtained, and further mitigation prescribed by a licenced ecologist.

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	› Tree felling will follow guidelines set out in National Roads Authority, Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes. 2006.
	Fragmentation **Mitigation** A landscaping plan has been prepared for both application sites and is available in **Appendix 4-7.** › In order to mitigate for the significant loss of hedgerow habitat associated with the MOOR, approximately 6,208m of new hedgerow will be planting along the extend off the MOOR boundary. › Native hedgerow species such as Hawthorn (*Crataegus monogyna*), Blackthorn (Prunus spinosa) and Holly (*Ilex aquifolium*) will in the replanting schedule. › In addition to the 6,208m of new hedgerow proposed, 373 semi mature new trees will also be planted along the extent of the MOOR. › Native species to be used for planting include Alder (*Alnus glutinosa),* Pedunculate oak (*Quercus robur*), Scots Pine (*Pinus sylvestris*), Silver Birch (*betula pendula*) and Rowan (*Sorbus aucuparia*). › The planting of 6,208m of hedgerow habitat and 373 semi mature trees will increase the coverage of linear habitat on the overall proposed development site. › This will significantly increase the nesting, foraging and commuting habitat for wildlife while maintaining ecological connectivity to the wider landscape. › The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site. A tree protection plan is included in this application. This will ensure that any trees or tree lines that are to be retained within the site are fully protected in accordance with the British Standard BS 5837: Trees in Relation to Construction.
	Disturbance The majority of works, during the construction phase, will occur during daylight hours. Therefore, there will be no requirement for exterior lighting within the site. Where lighting is unavoidable (i.e. health and safety), low-intensity lighting and motion sensors will be used to limit illumination. Exterior lighting, during construction, shall be designed to minimize light spillage, thus reducing the effect on areas outside the proposed development, and consequently on bats i.e. Lighting will be directed away from mature trees/hedgerows/treelines around the periphery of the site boundary to minimize disturbance to bats.
Residual Effect following Mitigation	With the implementation of the prescribed mitigation measures, no significant effects are predicted.
Potential for Cumulative Effect	The proposed development will not result in any significant effect in regard to habitat loss for bats. It therefore cannot contribute to any cumulative effect in this regard.

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Assessment on the potential impacts on birds during construction

Table 6-48. Potential impacts on birds during the construction phase of site B

Description of Effect	**Habitat Loss/Degradation** The footprint of the proposal will result in the loss of approximately 1, 253m of treeline and 1,563m of hedgerow in the MOOR site are also proposed for removal. This provides good nesting habitat for a range of common bird species.
	Disturbance The loss of 21, 253m of treeline and 1,563m of hedgerow and throughout the site has the potential to result in disturbance to birds and potentially to cause mortality to juvenile birds in the nest
Characterisation of unmitigated effect	**Habitat Loss** In the absence of mitigation, the loss of 1, 253m of treeline and 1,563m of hedgerow has the potential to result in a permanent negative effect in respect of bird nesting habitat. This is considered to be a Moderate effect on this receptor of local importance due to the presence of large areas of suitable habitat in the wider area.
	Disturbance In the absence of mitigation, the loss of 1, 253m of treeline and 1,563m of hedgerow has the potential to result in a short-term negative effect on nesting bird species. The magnitude of this impact has the potential to be moderate if the works result in mortality of young birds in the nest.
Assessment of Significance prior to mitigation	**Habitat Loss** There is no potential for significant effects on this species as a result of habitat loss at any scale.
	Disturbance Whilst there will be no significant effect on birds at an international or national scale, following the precautionary principal, there is the potential for a significant negative effect of disturbance to birds at a local scale during the construction phase of the proposed development prior to mitigation.
Mitigation	**Habitat Loss** **Mitigation** A landscaping plan has been prepared for both application sites and is available in **Appendix 4-7.** › In order to mitigate for the significant loss of hedgerow habitat associated with the MOOR, approximately 6,208m of new hedgerow will be planting along the extend off the MOOR boundary. › Native hedgerow species such as Hawthorn (*Crataegus monogyna*), Blackthorn (Prunus spinosa) and Holly (*Ilex aquifolium*) will in the replanting schedule. › In addition to the 6,208m of new hedgerow proposed, 373 semi mature new trees will also be planted along the extent of the MOOR. › Native species to be used for planting include Alder (*Alnus glutinosa),* Pedunculate oak (*Quercus robur*), Scots Pine (*Pinus sylvestris*), Silver Birch (*betula pendula*) and Rowan (*Sorbus aucuparia*). › The planting of 6,208m of hedgerow habitat and 373 semi mature trees will increase the coverage of linear habitat on the overall proposed development site.

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	› This will significantly increase the nesting, foraging and commuting habitat for wildlife while maintaining ecological connectivity to the wider landscape. › The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site. › A tree protection plan is included in this application. This will ensure that any trees or tree lines that are to be retained within the site are fully protected in accordance with the British Standard BS 5837: Trees in Relation to Construction.
	Disturbance Where possible, all cutting of trees, scrub and tall vegetation will be undertaken outside the bird nesting season which runs from the 1st March to the 31st August. Any cutting of vegetation that may be required outside the season described above will be supervised by a suitably qualified ecologist to ensure that no birds nests are present. Should nesting birds be encountered, the trees will be left until nesting activity has concluded.
Residual Effect following Mitigation	**Habitat Loss** – No significant effect
	Disturbance – No significant effect.
Potential for Cumulative Effect	**Habitat Loss** The proposed development will not result in any significant effect in regard to habitat loss for birds. It therefore cannot contribute to any cumulative effect in this regard.

6.7.4.3 Impacts during operational phase

Disturbance to Fauna

The surveys undertaken have identified that the site of the proposed development and the surrounding is used by a range of common bird species, small mammal and invertebrate species and provides biodiversity in the local context. Direct disturbance resulting from the operation of the proposed development has been assessed and the potential for effect is the same as for construction disturbance and thus the finding of the assessment is provided in section 6.7.4.2. This assessment is not repeated here but the conclusion that, following the mitigation described, there will be no significant residual impacts on faunal species are anticipated as a result of disturbance.

Local faunal species are likely to be habituated to anthropogenic activity in the area, given the developments close proximity to busy local roads and nearby residential housing. Impacts on fauna as a result of disturbance during the operational phase are not considered to be significant at any geographic scale.

Assessment of the potential impact on bats during the operational phase

Table 6-49. Assessment of potential impacts on bats during the operational phase

Description of Effect	Construction and operation of the proposed development will result in increased human activity, noise and lighting within the proposed site. Therefore, the potential for disturbance to bats requires consideration.

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	However, the proposed development is in close proximity to existing residential areas to south as well as busy local roads. It is likely that bat species in the area are accustomed to some levels of disturbance.
Characterisation of unmitigated effect	In the absence of mitigation, the operational phase of the proposed development has the potential to result in Long-Term Slight Negative effect on the local bat populations in the form of disturbance as a result of lighting.
Assessment of Significance prior to mitigation	Whilst there will be no significant effect on bats at an international or national scale, following the precautionary principal, there is the potential for a significant negative effect on bats at a local scale during the operational phase of the proposed development prior to mitigation.
Mitigation	Bat surveys carried out in identified the treeline along the southern boundary of the MOOR to be the most important commuting habitat for bats across both sites. This habitat is being retained and will not be subject to artificial lighting. A lighting plan has been prepared as part of the MOOR application. › The lighting plan for the operational phase of the proposed development, has been designed with consideration of the following guidelines: Bat Conservation Ireland (Bats and Lighting: Guidance Notes for Planners, Engineers, Architects and Developers, BCI, 2010) and the Bat Conservation Trust (Guidance Note 08/18 Bats and Artificial Lighting in the UK (BCT, 2018), Dark Sky Ireland, to minimise light spillage, thus reducing any potential disturbance to bats. › The proposed lamps have limited backward light properties thus assisting in reducing backward light spill. Lamps have also been specified with 0 Degree tilt (where possible) to ensure limited unwanted light spill. › Bat survey results from 2021 indicate the most important commuting habitat for bats within the proposed development site is the treeline along the southern boundary with high levels of activity also recorded at Moygaddy castle. These areas will not be subject to artificial lighting and will remain in darkness. › All luminaires are fitted with photocells which automatically switch luminaires on during night time and off during daytime. Additionally, all luminaires are to automatically dim by 75% 00:00 – 06:00 (U14 profile). If required and with agreement of the local authority additional dimming is available. › The proposed lighting design uses warmest available LEDs for chosen luminaires (colour temperature set by worst case luminaires, all luminaires same colour temperature for consistency), the peak wavelength is 600nm.
Residual Effect following Mitigation	With the implementation of the prescribed mitigation measures, no significant residual effects are predicted.

Impacts on water quality during the operational

The operational phase of the MOOR will have the potential to result in increased surface water runoff. In the absence of mitigation, replacement of the greenfield surface with hardstand surfaces would result in an increased risk of pluvial flooding due to low permeability surfaces which will inhibit any downward percolation of rainwater. Furthermore, in the absence of mitigation measures the

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uncontrolled discharge of water to the Rye Water River could result in an increased risk of downstream fluvial flooding due to increased peak discharges in the river.

A full list of mitigation measures outlined to prevent surface and groundwater pollution during the operational phase of the MOOR is described in section 8.6.4.11 of chapter 8.

Mitigation

The risk of uncontrolled emissions is minimized by the collection, treatment and discharge of storm water to the Rye Water River and Blackhall Little via, attenuation tanks, filter drains and petrol/oil interceptors as described above. It is also proposed to retain the existing riparian zone which will act as a buffer between the development and that stream.

Residual effect

The potential source of pollution can be readily controlled, and standard procedures will ensure no significant releases will occur. Mitigation measures, in particular the attenuation tank, filter drains, and petrol/oil interceptor will break the pathway from the proposed works areas to the watercourse. The residual impacts are indirect, neutral, imperceptible, long term, unlikely impact.

Therefore, significant effects on surface water or ground water quality will not occur

6.7.4.4 Impacts on European Designated Sites

The potential for impact on European sites has been fully assessed in the Appropriate Assessment NIS that has been prepared in support of the current application.

Following the precautionary principle, the AASR identified a potential pathway for impact on Rye Water Valley/Carton SAC, South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka SPA and North Bull Island SPA in the form of deterioration of surface and groundwater water quality resulting from pollution associated with the construction and operational phases of the development.

Potential Impacts on Rye Water Valley/Carton SAC

The MOOR drains into the Rye Water River to the south and along the Blackhall Little Stream. The Rye Water Valley/Carton SAC is downstream of the MOOR, to the southeast, directly adjacent to the site boundary on the opposite side of the R157 Regional Road.

The qualifying interests of the SAC is linked to groundwater flows (calcareous tufa springs) There is no connection between groundwater at the development site, and that discharging to any known tufa springs within the SAC (including the mapped spring located approximately 5km from the MOOR at Louisa Bridge).

Groundwater below the MOOR will flow to the south and discharge as baseflow to the Rye Water River and/or the Blackhall Little stream to the centre of the site. Groundwater flow from the site will, therefore, have no impact on the Louisa Bridge (spring) groundwater flow (Rye Water Valley/Carton SAC) as previous site investigations and hydrological assessments (c.f. Section 2.4, (Hydro-G, 2008)) have shown that the flow to these springs is not derived from the Rye Water River and are in fact fed from a source further east of Louisa Bridge.

Two of the qualifying interests of the SAC are two species of vertigo snail (Vertigo angustior and Vertigo moulinsiana), with both species' dependant on the calcareous march habitat which is provided

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by the tufa formation. The known range of both species within the SAC is also restricted to Louisa Bridge (spring). While there are no known petrifying springs or qualifying interests of the Rye Water Valley/Carton SAC within proximity of Site A i.e. Louisa Bridge. An ecological walkover survey of the SAC by MKO to identify any additional tufa springs or potential habitat for vertigo snails downstream of the Proposed Development site has not identified petrifying springs nor their associated qualifying interests in this area of the SAC. Irrespective of this the potential for the occurrence of unmapped petrifying springs within the SAC has also been considered below.

Although there is no potential for effects on the known QI of the SAC the following mitigation will ensure no impact on the SAC generally. Standard mitigation and SuDS drainage controls are proposed during the construction and operational phase of the MOOR (e.g., silt traps/road gullies, hydrocarbon interceptors, attenuation storage and infiltration, and hydro-brake flow limiters) which have been proven through widespread use in housing and commercial developments across the country. The proposed SuDs drainage system incorporated into the engineering design of the site are common drainage systems that are used in development sites. They are proposed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS, 2005) and the objectives outlined in the Meath County Development Plan 2021-2027.

These standard drainage design controls and construction phase mitigation measures will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the proposed development.

The project design ensures that there will be no dewatering of the bedrock aquifer during the construction phase and so there will be no obstruction or alteration of existing groundwater flows.

There will be no significant alteration to groundwater recharge. The majority of rainfall will continue to percolate to shallow subsurface and discharge to the surface water systems locally with low levels of recharge to ground, in particular for the MOOR with is underlain with low permeability subsoils. During the construction phase, the recharge rates won't change materially.

With the implementation of the project as designed and the standard drainage control measures outlined above the potential for the MOOR to cause any groundwater drawdown or groundwater quality impacts in the SAC is imperceptible.

Groundwater flowpaths will be maintained during the construction phase as any excavation proposed will be shallow. The SI data shows that dewatering of groundwater from the bedrock aquifer will not occur and so there is no potential for significant effects on the calcareous tufa springs and associated species.

Following an extremely precautionary principle, the potential for other downstream designated sites (South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka SPA and North Bull Island SPA) to be impacted by the proposed works was also considered. On the basis of the Proposed Development design and the mitigation measures proposed to protect the immediate water receptors there will be no impacts on designated sites.

Pathway: Site drainage network and groundwater flowpaths.

Receptor: Rye Water Valley/Carton SAC and any associated Tufa Springs and vertigo snail populations (including the known spring 5km downstream at Louisa Bridge).

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Pre-Mitigation Impact

Indirect, negative, slight, short term, likely impact to water quality and hydrology regime.

Proposed Mitigation Measures

The proposed mitigation measures for protection of surface water and groundwater quality which will include on site drainage control measures (i.e., silt fences, silt bags etc.) will ensure that the quality of runoff from Proposed Development areas will be good. All mitigation measures outlined throughout Section 8.6.3 of Chapter 8 provides controls which will be put in place to manage risks associated with sediment, hydrocarbons/chemicals and cement-based products used during construction phase.

The standard drainage design controls will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the Proposed Development.

Residual Impact

With the application of the best practice mitigation outlined above, the residual effect will be – Imperceptible, direct, negative, short-term, high probability impact on surface and ground water receptors.

Significance of Effects

For the reasons outlined above, no significant effects will occur on any designated site.

The NIS report concludes that:

"Where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures ensure that the construction, operation of the proposed development does not adversely affect the integrity of European sites.

Taking into consideration the reported residual impacts from other plans and projects in the area and the predicted impacts with the current proposal, no residual cumulative impacts have been identified with regard to any European Site."

Therefore, it can be objectively concluded that the proposed development, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site".

Impacts on Nationally Designated Sites

Impacts on nationally designated sites including NHAs and pNHAs are considered in this section of the report. Those nationally designated sites that were also designated as SACs/SPAs were considered and the potential for significant or adverse effects to occur were discounted on the same basis as described above in relation to the corresponding European Sites. Where there are pathways for effect

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on Nationally designated sites that are not also designated as European Sites, a full ecological impact assessment is provided below.

The proposed development site is located directly adjacent to the Rye Water Valley/Carton NHA, which is also designated as Rye Water Valley/Carton SAC.

Liffey Valley pNHA located downstream of the proposed development with hydrological connectivity via the Rye Water River and River Liffey.

Standard best practice environmental control measures have been incorporated in the design of the development and are outlined in Chapter 4 and section 8.6 of Chapter 8 of this EIAR. All identified potential pathways for impact on water quality are robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within Chapter 4 and section 8.6 of Chapter 8 of this report.

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6.7.5 Kildare Bridge

6.7.5.1 Impacts during Construction phase

Habitat Loss

The habitats of local importance (higher value) that will be lost to the development and the area/length of each habitat lost are listed in Table 6.50.

Table 6-50. Habitat of Local Importance (Higher Value) recorded in site A

Habitat	Area lost / Length lost
Treeline (WL2)	8m

Assessment of the potential effects on the loss of Treeline (WL2) habitat

Table 6-51. Loss of Treeline and Hedgerow habitat associated within site A

Description of Effect	The proposed development will result in approximately 8m of Treeline habitat at the location of the new proposed Pedestrian and Cycle Bridge, adjacent to the existing Kildare bridge. This represents 0.6% of the total Treeline habitat present the Rye Water River within the development site.
Characterisation of unmitigated effect	The loss of 8m of treeline would constitute a permanent negative effect within the site. This would not be reversible as it is within the construction footprint. The magnitude of this impact is imperceptible at the local scale given the small area affected.
Assessment of Significance prior to mitigation	This is not significant at a county, national or international scale as it will not affect the conservation status of this habitat, which is widespread and common in the wider area outside the site.
Mitigation	The construction works required at the Kildare bridge will results in the loss of only 8m of treeline habitat, which represents a tiny fraction (0.6%) of the total treeline habitat along the Rye Water River. As part of the Kildare bridge application, there is no landscape report prepared, however, the landscaping plan for site B outlines additional hedgerow planting directly adjacent to the Kildare bridge. As a result, there will be a large increase in treeline and hedgerow coverage in the area.
Residual Effect following Mitigation	Following the implementation of the mitigation as described above, the impact on treelines and hedgerows is reduced to a permanent slight negative effect. There will be no significant residual effect on linear landscape features at any geographic scale as a result of this development.
Potential for Cumulative Effect	The proposed development will not result in any permanent or long term loss of linear landscape features. It therefore cannot contribute to any significant cumulative effect in this regard

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Assessment of potential effects on water quality and aquatic faunal species and habitats during construction

Table 6-52. Assessment of the potential impact on water quality and aquatic fauna during construction

Description of Effect	The construction of the Kildare Bridge crossing has the potential to result in the deterioration of water quality. The Rye Water River flows into the River Rye/Carton Valley SAC, located east of the proposed development site boundary. The South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA and North Bull Island SPA are also hydrologically connected to the proposed development site via the Blackhall Little Stream, Rye Water River & River Liffey. Taking a precautionary approach, the proposed development has the potential, in the absence of mitigation, to impact on surface water quality through pollutants including hydrocarbons, fuel and cement during the construction phase. This section assesses the potential for likely significant effects on aquatic receptors including aquatic habitats (i.e. watercourses) salmonids, lamprey, coarse fish, European eel, aquatic invertebrates, molluscs and other aquatic species identified during the desk study as likely to occur downstream of the site.
Characterisation of unmitigated effect	In the absence of best practice design and mitigation the potential impact on water quality and aquatic species is considered to be a moderate negative effect.
Assessment of Significance prior to mitigation	Significant effects on water quality could occur at a local level as a result of the construction works, should mitigation measures not be installed.
Mitigation	Mitigation measures outlined to protect water quality during the construction of the main development areas have been outlined in section 8.6.3.9 of Chapter 8 of this EIAR and are fully described in the CEMP located in Volume 3.e, Appendix 4-3. The mitigation measures are summarised below. › Silt fencing will be constructed around the construction footprint, where there is a surface water receptor, in order to create a defined perimeter for the proposed works, leaving a natural vegetation buffer between the construction footprint (other than operational surface water outfall installations which are described below) and surface water receptors and associated riparian habitats. › A silt fence will also be attached to solid boundary fencing where it is in place and where there is a surface water receptor. This will protect the stream from any potential sediment laden surface water run-off generated during construction activities. › The silt fence will comprise a geotextile membrane that will buried beneath the ground to filter any run-off that may occur as a result of the proposed works. The silt fence will be monitored throughout the proposed works and will remain in place after the works are completed and until the exposed earth has re-vegetated. › As construction advances there may be a requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground; › Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing; › A suitably sized detention basin or settlement area will be installed at the lowest point before discharge to ground where excess run- off must leave the site. Silt curtains or earth berms will be used to channel run-off to locations where it can be controlled. These may take the form of an open detention area or, where the need arises, a portable skip/s, or similar, where inflow passes through straw bales, gravel etc.

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- Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present;
- Daily monitoring and inspections of site drainage during construction will be completed;
- No instream works will take place outside the period July 1st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland is incorporated into the design of the proposed Kildare Bridge pedestrian/cycle structure upgrade works, the Blackhall Little Bridge and the Moyglare Bridge;
- Surface water outfalls will be constructed in accordance with the measures described in Chapter 6 and 8.6.3.4.4 and subject to agreement with IFI.
- Good construction practices such wheel washers and dust suppression on site roads, and regular plant maintenance, which will be implemented, will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRlA, 2001), which provides information on these issues. This will ensure that surface water arising during the course of construction activities will contain minimum sediment.
- Preventative measures during construction have been incorporated into the Construction and Environmental Management Plan, which will be updated upon grant of permission and to provide any additional measures required pursuant to planning conditions and agreements with the planning authority.

Mitigation for directional drilling

- For directional drilling the area around the bentonite batching, pumping and recycling plant will be bunded using terram (as it will clog) and sandbags in order to contain any spillages.
- Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area;
- Spills of drilling fluid will be clean up immediately and stored in an adequately sized skip before been taken off-site;
- The drilling fluid/bentonite will be non-toxic and naturally biodegradable (i.e., Clear Bore Drilling Fluid or similar will be used);
- The drilling process / pressure will be constantly monitored to detect any possible leaks or breakouts into the surrounding geology or local watercourse;
- This will be gauged by observation and by monitoring the pumping rates and pressures. If any signs of breakout occur then drilling will be immediately stopped;
- Any frac-out material will be contained and removed off-site;

Prior to entering the works area, all machinery and personnel entering the works area will be thoroughly disinfected.

As part of the application process, Inland Fisheries Ireland were consulted regarding the proximity of the works to the River Rye Water.

Prior to the commencement of any construction work associated with the development, the following pre-construction survey work will be undertaken to satisfy the recommendations outlined by IFI during consultation stage:

Biotic and abiotic baseline data will be gathered on the Rye Water River both close to the development site and at a distance away from the site. Gathering this data will allow for a comparison between the current situation and that which may develop during the construction or operational phase.

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Residual Effect following Mitigation	With the implementation of the prescribed mitigation measures, no significant effects are predicted.
Potential for Cumulative Effect	The proposed development will not result in any significant effects to water quality. It therefore cannot contribute to any significant cumulative effect in this regard.

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Fauna- Disturbance/Habitat loss

Non volant mammals

The construction phase of the proposal has the potential for some localised disturbance to local faunal species. However, no significant faunal species or signs of significant mammal activity were recorded within or immediately adjacent to the proposal during the site visit.

The proposed development site is located in close proximity to the busy roads and existing residential housing developments. Local faunal species are therefore likely to be habituated to anthropogenic activity in the wider area. Impacts on fauna as a result of disturbance during the construction phase are not considered to be significant at any geographic scale.

Best practice measures

- All works will be completed during daylight hours and there will be no requirement for artificial lighting at any stage of the proposed construction works. This will avoid any potential impacts on crespular or nocturnal species, including bat species.
- Hoarding will be placed around the construction site. This will screen the site and minimise any disturbance impacts on fauna in the wider surroundings.
- All plant and equipment for use will comply with Statutory Instrument No 359 of 1996 "European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1996".
- Plant machinery will be turned off when not in use.
- Operating machinery will be restricted to the proposed works site area.

Residual Effect

No significant effect

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Assessment on the potential impacts on bats during construction

Table 6-53: Assessment of the potential impacts on bats during construction associated with the Kildare bridge

Description of Effect	**Habitat Fragmentation** There will be some loss of linear habitat features to facilitate the proposed development. Approximately 8m of treeline are proposed for removal. However, significant additional planting is proposed. Following the precautionary principle, the construction phase has the potential to result in some habitat loss to local bat species. Potential effects on bats may include: Removal of potential commuting or foraging habitat through the felling of trees.
	Disturbance Construction of the Kildare bridge will result in increased human activity, noise and lighting within the proposed development site. Therefore, the potential for disturbance to bats requires consideration. However, the proposed development is bordered by existing residential and commercial developments to south, as well as busy local road and adjacent amenity areas. The Kildare bridge was assessed as having *Moderate* suitability for roosting bats, due to the presence of gaps in the stonework. However, no roosting bats were observed during the dedicated survey. It is likely that bat species in the area are accustomed to some levels of disturbance. In the absence of appropriate design, the development has the potential to disturb bats by illumination of commuting and foraging areas.
Characterisation of unmitigated effect	The construction of the proposed development has the potential to result in a Long-Term Slight Negative effect on the local bat populations in the form of habitat loss, disturbance or direct mortality.
Assessment of Significance prior to mitigation	Significant effects on bats are not anticipated at any geographic scale during the construction of the proposed development.
Mitigation	**Fragmentation** The construction works required at the Kildare bridge will results in the loss of only 8m of treeline habitat, which represents a tiny fraction (0.6%) of the total treeline habitat along the Rye Water River. As part of the Kildare bridge application, there is no landscape report prepared, however, the landscaping plan for site B outlines additional hedgerow planting directly adjacent to the Kildare bridge. As a result, there will be a large increase in treeline and hedgerow coverage in the area.
	Disturbance

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	The majority of works, during the construction phase, will occur during daylight hours. Therefore, there will be no requirement for exterior lighting within the site. Where lighting is unavoidable (i.e. health and safety), low-intensity lighting and motion sensors will be used to limit illumination. Exterior lighting, during construction, shall be designed to minimize light spillage, thus reducing the effect on areas outside the proposed development, and consequently on bats i.e. Lighting will be directed away from mature trees/hedgerows/treelines around the periphery of the site boundary to minimize disturbance to bats. No evidence of bats was recorded at the existing Kildare bridge. However, to account for changes between the completion of the surveys in 2022 and construction works, it is recommended that confirmatory pre-construction surveys are undertaken. The requirement for a pre-construction survey comes from NRA Guidelines For The Treatment Of Bats during The Construction of National Road Schemes. The function of the survey is to assess any changes to the baseline conditions of the water crossings that may have occurred between the surveys and construction stage. The measure does not represent a lacuna in the assessment and is in accordance with industry best practice.
Residual Effect following Mitigation	With the implementation of the prescribed mitigation measures, no significant effects are predicted.
Potential for Cumulative Effect	The proposed development will not result in any significant effect in regard to habitat loss for bats. It therefore cannot contribute to any cumulative effect in this regard.

6.7.5.2 Impacts during the Operational Phase

The surveys undertaken have identified that the site of the proposed development and the surrounding is used by a range of common bird species, small mammal and invertebrate species and provides biodiversity in the local context. Direct disturbance resulting from the operation of the proposed development has been assessed and the potential for effect is the same as for construction disturbance and thus the finding of the assessment is provided in section 6.7.5.1. This assessment is not repeated here but the conclusion that, following the mitigation described, there will be no significant residual impacts on faunal species are anticipated as a result of disturbance.

Local faunal species are likely to be habituated to anthropogenic activity in the area, given the developments close proximity to busy local roads and nearby residential housing. The exiting Kildare bridge is currently subject to artificial lighting via street light. As such, impacts on the local bat population as a result of lighting are not considered to be significant at any geographic scale.

Impacts on fauna as a result of disturbance during the operational phase are not considered to be significant at any geographic scale.

A full list of mitigation measures outlined to prevent surface and groundwater pollution during the operational phase of the Kildare bridge is described in section 8.6.4.13 of chapter 8.

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6.7.5.3 Impacts on European Designated Sites

The potential for impact on European sites has been fully assessed in the Appropriate Assessment NIS that has been prepared in support of the current application.

Following the precautionary principle, the AASR identified a potential pathway for impact on Rye Water Valley/Carton SAC, South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka SPA and North Bull Island SPA in the form of deterioration of surface and groundwater water quality resulting from pollution associated with the construction and operational phases of the development.

Potential Impacts on Rye Water Valley/Carton SAC

The qualifying interests of the SAC is linked to groundwater flows (calcareous tufa springs) There is no connection between groundwater at the development site, and that discharging to any known tufa springs within the SAC (including the mapped spring located approximately 5km from Kildare Bridge at Louisa Bridge).

Groundwater below Kildare Bridge will discharge as baseflow to the Rye Water River, flow from the site will, therefore, have no impact on the Louisa Bridge (spring) groundwater flow (Rye Water Valley/Carton SAC) as previous site investigations and hydrological assessments (c.f. Section 2.4, (Hydro-G, 2008)) have shown that the flow to these springs is not derived from the Rye Water River and are in fact fed from a source further east of Louisa Bridge.

Two of the qualifying interests of the SAC are two species of vertigo snail (Vertigo angustior and Vertigo moulinsiana), with both species' dependant on the calcareous march habitat which is provided by the tufa formation. The known range of both species within the SAC is also restricted to Louisa Bridge (spring). While there are no known petrifying springs or qualifying interests of the Rye Water Valley/Carton SAC within proximity of Site A i.e. Louisa Bridge. An ecological walkover survey of the SAC by MKO to identify any additional tufa springs or potential habitat for vertigo snails downstream of the Proposed Development site has not identified petrifying springs nor their associated qualifying interests in this area of the SAC. Irrespective of this the potential for the occurrence of unmapped petrifying springs within the SAC has also been considered below.

Although there is no potential for effects on the known QI of the SAC the following mitigation will ensure no impact on the SAC generally. Standard mitigation and SuDS drainage controls are proposed during the construction and operational phase of the Kildare Bridge works areas which have been proven through widespread use in bridge and pipelaying developments across the country. The proposed SuDs drainage system incorporated into the engineering design of the site are common drainage systems that are used in development sites. They are proposed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS, 2005) and the objectives outlined in the Meath County Development Plan 2021-2027.

These standard drainage design controls and construction phase mitigation measures will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the proposed development.

The project design ensures that there will be no dewatering of the bedrock aquifer during the construction phase and so there will be no obstruction or alteration of existing groundwater flows.

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There will be no significant alteration to groundwater recharge. The majority of rainfall will continue to percolate to shallow subsurface and discharge to the surface water systems locally with low levels of recharge to ground, in particular for Kildare Bridge with is underlain with low permeability subsoils. During the construction phase, the recharge rates won't change materially.

With the implementation of the project as designed and the standard drainage control measures outlined above the potential for Kildare Bridge to cause any groundwater drawdown or groundwater quality impacts in the SAC is imperceptible.

Groundwater flowpaths will be maintained during the construction phase as any excavation proposed will be shallow. The SI data shows that dewatering of groundwater from the bedrock aquifer will not occur and so there is no potential for significant effects on the calcareous tufa springs and associated species.

Following an extremely precautionary principle, the potential for other downstream designated sites (South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka SPA and North Bull Island SPA) to be impacted by the proposed works was also considered. On the basis of the Proposed Development design and the mitigation measures proposed to protect the immediate water receptors there will be no impacts on designated sites.

Pathway: Site drainage network and groundwater flowpaths.

Receptor: Rye Water Valley/Carton SAC and any associated Tufa Springs and vertigo snail populations (including the known spring 5km downstream at Louisa Bridge).

Pre-Mitigation Impact

Indirect, negative, slight, short term, likely impact to water quality and hydrology regime.

Proposed Mitigation Measures

The proposed mitigation measures for protection of surface water and groundwater quality which will include on site drainage control measures (i.e., silt fences, silt bags etc.) will ensure that the quality of runoff from Proposed Development areas will be good. All mitigation measures outlined throughout Section 8.6.3 of Chapter 8 provides controls which will be put in place to manage risks associated with sediment, hydrocarbons/chemicals and cement-based products used during construction phase.

The standard drainage design controls will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the Proposed Development.

Residual Impact

With the application of the best practice mitigation outlined above, the residual effect will be – Imperceptible, direct, negative, short-term, high probability impact on surface and ground water receptors.

Significance of Effects

For the reasons outlined above, no significant effects will occur on the designated site.

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"Where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures ensure that the construction, operation of the proposed development does not adversely affect the integrity of European sites.

Taking into consideration the reported residual impacts from other plans and projects in the area and the predicted impacts with the current proposal, no residual cumulative impacts have been identified with regard to any European Site."

Therefore, it can be objectively concluded that the proposed development, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site".

Impacts on Nationally Designated Sites

Impacts on nationally designated sites including NHAs and pNHAs are considered in this section of the report. Those nationally designated sites that were also designated as SACs/SPAs were considered and the potential for significant or adverse effects to occur were discounted on the same basis as described above in relation to the corresponding European Sites. Where there are pathways for effect on Nationally designated sites that are not also designated as European Sites, a full ecological impact assessment is provided below.

The proposed development site is located directly adjacent to the Rye Water Valley/Carton NHA, which is also designated as Rye Water Valley/Carton SAC.

Liffey Valley pNHA located downstream of the proposed development with hydrological connectivity via the Rye Water River and River Liffey.

Standard best practice environmental control measures have been incorporated in the design of the development and are outlined in Chapter 4 and section 8.6 of Chapter 8 of this EIAR. All identified potential pathways for impact on water quality are robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within Chapter 4 and section 8.6 of Chapter 8 of this EIAR.

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6.7.6 Moyglare Bridge

6.7.6.1 Impacts during Construction phase

Habitat Loss

The habitats of local importance (higher value) that will be lost to the development and the area/length of each habitat lost are listed in Table 6.54.

Table 6-54. Habitat of Local Importance (Higher Value) recorded in site A

Habitat	Area lost / Length lost
Treeline	25m

Assessment of the potential effects on the loss of Treeline (WL2) habitat

Table 6-55. Impacts on treeline habitat during the construction phase

Description of Effect	The proposed development will result in approximately 25m of Treeline habitat at the location of the new proposed Bridge at Moyglare, This represents 1.9% of the total Treeline habitat present the Rye Water River within the development site.
Characterisation of unmitigated effect	The loss of 25m of treeline would constitute a permanent negative effect within the site. This would not be reversible as it is within the construction footprint. The magnitude of this impact is imperceptible at the local scale given the small area affected.
Assessment of Significance prior to mitigation	This is not significant at a county, national or international scale as it will not affect the conservation status of this habitat, which is widespread and common in the wider area outside the site.
Mitigation	The construction works required at the Moyglare bridge will results in the loss of only 25m of treeline habitat, which represents a tiny fraction (1.9%) of the total treeline habitat along the Rye Water River. As part of the Moyglare bridge application, there is no landscape report prepared, however, the landscaping plan for site C outlines significant tree planting in the land north of the proposed Moyglare crossing point. As a result, there will be a large increase in treeline coverage in the area. As such, habitat connectivity will be maintain and enhanced to the wider landscape.
Residual Effect following Mitigation	Following the implementation of the mitigation as described above, the impact on treelines and hedgerows is reduced to a permanent slight negative effect. There will be no significant residual effect on linear landscape features at any geographic scale as a result of this development.
Potential for Cumulative Effect	The proposed development will not result in any permanent or long term loss of linear landscape features. It therefore cannot contribute to any significant cumulative effect in this regard

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Assessment of potential effects on water quality and aquatic faunal species and habitats during construction

Table 6-56. assessment of the potential impacts on water quality and aquatic species during the construction phase

Description of Effect	The construction of the Moyglare Bridge crossing has the potential to result in the deterioration of water quality. The Rye Water River flows into the River Rye/Carton Valley SAC, located east of the proposed development site boundary. The South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA and North Bull Island SPA are also hydrologically connected to the proposed development site via the Blackhall Little Stream, Rye Water River & River Liffey. Taking a precautionary approach, the proposed development has the potential, in the absence of mitigation, to impact on surface water quality through pollutants including hydrocarbons, fuel and cement during the construction phase. This section assesses the potential for likely significant effects on aquatic receptors including aquatic habitats (i.e. watercourses) salmonids, lamprey, coarse fish, European eel, aquatic invertebrates, molluscs and other aquatic species identified during the desk study as likely to occur downstream of the site.
Characterisation of unmitigated effect	In the absence of best practice design and mitigation the potential impact on water quality and aquatic species is considered to be a moderate negative effect.
Assessment of Significance prior to mitigation	Significant effects on water quality could occur at a local level as a result of the construction works, should mitigation measures not be installed.
Mitigation	Mitigation measures outlined to protect water quality during the construction of the main development areas have been outlined in section 8.6.3.11 of Chapter 8 of this EIAR and are fully described in the CEMP located in Volume 3.f, Appendix 4-3. The mitigation measures are summarised below. At surface water crossings silt fencing will be constructed around the construction footprint in order to create a defined perimeter for the proposed works, leaving a natural vegetation buffer between the construction footprint and surface water receptors and associated riparian habitats. › The silt fence will comprise a geotextile membrane that will buried beneath the ground to filter any run-off that may occur as a result of the proposed works. The silt fence will be monitored throughout the proposed works and will remain in place after the works are completed and until the exposed earth has re-vegetated. › As construction advances there may be a requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground; › Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing; › A suitably sized detention basin or settlement area will be installed at the lowest point before discharge to ground where excess run- off must leave the site. Silt curtains or earth berms will be used to channel run-off to locations where it can be controlled.

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	These may take the form of an open detention area or, where the need arises, a portable skip/s, or similar, where inflow passes through straw bales, gravel etc. › Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present; › Daily monitoring and inspections of site drainage during construction will be completed; › No instream works will take place outside the period July 1st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters. › All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland is incorporated into the design of the proposed Kildare Bridge pedestrian/cycle structure upgrade works, the Blackhall Little Bridge and the Moyglare Bridge; › Surface water outfalls will be constructed in accordance with the measures described in Chapter 6 and subject to agreement with IFI. › Good construction practices such wheel washers and dust suppression on site roads, and regular plant maintenance, which will be implemented, will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRIA, 2001), which provides information on these issues. This will ensure that surface water arising during the course of construction activities will contain minimum sediment. › During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas; and, › The MOOR stream crossing upgrade works, the Moyglare Bridge and the Kildare Bridge Works will all require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent, where considered necessary by the designer. › Preventative measures during construction have been incorporated into the Construction and Environmental Management Plan, which will be updated upon grant of permission and to provide any additional measures required pursuant to planning conditions and agreements with the planning authority. Prior to entering the works area, all machinery and personnel entering the works area will be thoroughly disinfected. As part of the application process, Inland Fisheries Ireland were consulted regarding the proximity of the works to the Rye Water River .
	Prior to the commencement of any construction work associated with the development, the following pre-construction survey work will be undertaken to satisfy the recommendations outlined by IFI during consultation stage: Biotic and abiotic baseline data will be gathered on the Rye Water River both close to the development site and at a distance away from the site. Gathering this data will allow for a comparison between the current situation and that which may develop during the construction or operational phase.
Residual Effect following Mitigation	With the implementation of the prescribed mitigation measures, no significant effects are predicted.
Potential for Cumulative Effect	The proposed development will not result in any significant effects to water quality. It therefore cannot contribute to any significant cumulative effect in this regard.

Fauna- Disturbance/Habitat loss

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Non volant mammals

The construction phase of the proposal has the potential for some localised disturbance to local faunal species. However, no significant faunal species or signs of significant mammal activity were recorded within or immediately adjacent to the proposal during the site visit.

The proposed development site is located in close proximity to the busy roads and existing residential housing developments. Local faunal species are therefore likely to be habituated to anthropogenic activity in the wider area. Impacts on fauna as a result of disturbance during the construction phase are not considered to be significant at any geographic scale.

Best practice measures

- All works will be completed during daylight hours and there will be no requirement for artificial lighting at any stage of the proposed construction works. This will avoid any potential impacts on crespular or nocturnal species, including bat species.
- Hoarding will be placed around the construction site. This will screen the site and minimise any disturbance impacts on fauna in the wider surroundings.
- All plant and equipment for use will comply with Statutory Instrument No 359 of 1996 "European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1996".
- Plant machinery will be turned off when not in use.
- Operating machinery will be restricted to the proposed works site area.

Residual Effect

No significant effect

6.7.6.2 Impacts during the Operational Phase

The surveys undertaken have identified that the site of the proposed development and the surrounding is used by a range of common bird species, small mammal and invertebrate species and provides biodiversity in the local context. Direct disturbance resulting from the operation of the proposed development has been assessed and the potential for effect is the same as for construction disturbance and thus the finding of the assessment is provided in section 6.7.5.1. This assessment is not repeated here but the conclusion that, following the mitigation described, there will be no significant residual impacts on faunal species are anticipated as a result of disturbance.

Local faunal species are likely to be habituated to anthropogenic activity in the area, given the developments close proximity to busy local roads and nearby residential housing. Impacts on fauna as a result of disturbance during the operational phase are not considered to be significant at any geographic scale.

The lighting proposal along the Moyglare bridge has been designed to minimise potential disturbance on commuting and foraging bats.

A full list of mitigation measures outlined to prevent surface and groundwater pollution during the operational phase of the Moyglare bridge is described in section 8.5.4.14 of chapter 8.

6.7.6.3 Impacts on European Designated Sites

The potential for impact on European sites has been fully assessed in the Appropriate Assessment NIS that has been prepared in support of the current application.

Following the precautionary principle, the AASR identified a potential pathway for impact on Rye Water Valley/Carton SAC, South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and

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River Tolka SPA and North Bull Island SPA in the form of deterioration of surface and groundwater water quality resulting from pollution associated with the construction and operational phases of the development.

Potential Impacts on Rye Water Valley/Carton SAC

The qualifying interests of the SAC is linked to groundwater flows (calcareous tufa springs) There is no connection between groundwater at the development site, and that discharging to any known tufa springs within the SAC (including the mapped spring located approximately 5km from Moyglare Bridge at Louisa Bridge).

Groundwater below Moyglare Bridge will discharge as baseflow to the Rye Water River, flow from the site will, therefore, have no impact on the Louisa Bridge (spring) groundwater flow (Rye Water Valley/Carton SAC) as previous site investigations and hydrological assessments (c.f. Section 2.4, (Hydro-G, 2008)) have shown that the flow to these springs is not derived from the Rye Water River and are in fact fed from a source further east of Louisa Bridge.

Two of the qualifying interests of the SAC are two species of vertigo snail (Vertigo angustior and Vertigo moulinsiana), with both species' dependant on the calcareous march habitat which is provided by the tufa formation. The known range of both species within the SAC is also restricted to Louisa Bridge (spring). While there are no known petrifying springs or qualifying interests of the Rye Water Valley/Carton SAC within proximity of Site A i.e. Louisa Bridge. An ecological walkover survey of the SAC by MKO to identify any additional tufa springs or potential habitat for vertigo snails downstream of the Proposed Development site has not identified petrifying springs nor their associated qualifying interests in this area of the SAC. Irrespective of this the potential for the occurrence of unmapped petrifying springs within the SAC has also been considered below.

Although there is no potential for effects on the known QI of the SAC the following mitigation will ensure no impact on the SAC generally. Standard mitigation and SuDS drainage controls are proposed during the construction and operational phase of Moyglare Bridge (e.g., silt traps/road gullies, hydrocarbon interceptors, attenuation storage and infiltration, and hydro-brake flow limiters) which have been proven through widespread use in road developments across the country. The proposed SuDs drainage system incorporated into the engineering design of the site are common drainage systems that are used in development sites. They are proposed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS, 2005) and the objectives outlined in the Meath County Development Plan 2021-2027.

These standard drainage design controls and construction phase mitigation measures will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the proposed development.

The project design ensures that there will be no dewatering of the bedrock aquifer during the construction phase and so there will be no obstruction or alteration of existing groundwater flows.

There will be no significant alteration to groundwater recharge. The majority of rainfall will continue to percolate to shallow subsurface and discharge to the surface water systems locally with low levels of recharge to ground, in particular for Kildare Bridge with is underlain with low permeability subsoils. During the construction phase, the recharge rates won't change materially.

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With the implementation of the project as designed and the standard drainage control measures outlined above the potential for Moyglare Bridge to cause any groundwater drawdown or groundwater quality impacts in the SAC is imperceptible.

Groundwater flowpaths will be maintained during the construction phase as any excavation proposed will be shallow. The SI data shows that dewatering of groundwater from the bedrock aquifer will not occur and so there is no potential for significant effects on the calcareous tufa springs and associated species.

Following an extremely precautionary principle, the potential for other downstream designated sites (South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka SPA and North Bull Island SPA)to be impacted by the proposed works was also considered. On the basis of the Proposed Development design and the mitigation measures proposed to protect the immediate water receptors there will be no impacts on designated sites.

Pathway: Site drainage network and groundwater flowpaths.

Receptor: Rye Water Valley/Carton SAC and any associated Tufa Springs and vertigo snail populations (including the known spring 5km downstream at Louisa Bridge).

Pre-Mitigation Impact

Indirect, negative, slight, short term, likely impact to water quality and hydrology regime.

Proposed Mitigation Measures

The proposed mitigation measures for protection of surface water and groundwater quality which will include on site drainage control measures (i.e., silt fences, silt bags etc.) will ensure that the quality of runoff from Proposed Development areas will be good. All mitigation measures outlined throughout Section 8.6.3 of Chapter 8 provides controls which will be put in place to manage risks associated with sediment, hydrocarbons/chemicals and cement-based products used during construction phase.

The standard drainage design controls will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the Proposed Development.

Residual Impact

With the application of the best practice mitigation outlined above, the residual effect will be – Imperceptible, direct, negative, short-term, high probability impact on surface and ground water receptors.

Significance of Effects

For the reasons outlined above, no significant effects will occur on the designated site.

"Where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures ensure that the construction, operation of the proposed development does not adversely affect the integrity of European sites.

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Taking into consideration the reported residual impacts from other plans and projects in the area and the predicted impacts with the current proposal, no residual cumulative impacts have been identified with regard to any European Site."

Therefore, it can be objectively concluded that the proposed development, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site".

Impacts on Nationally Designated Sites

Impacts on nationally designated sites including NHAs and pNHAs are considered in this section of the report. Those nationally designated sites that were also designated as SACs/SPAs were considered and the potential for significant or adverse effects to occur were discounted on the same basis as described above in relation to the corresponding European Sites. Where there are pathways for effect on Nationally designated sites that are not also designated as European Sites, a full ecological impact assessment is provided below.

The proposed development site is located directly adjacent to the Rye Water Valley/Carton NHA, which is also designated as Rye Water Valley/Carton SAC.

Liffey Valley pNHA located downstream of the proposed development with hydrological connectivity via the Rye Water River and River Liffey.

Standard best practice environmental control measures have been incorporated in the design of the development and are outlined in Chapter 4 and section 8.6 of Chapter 8 of this EIAR. All identified potential pathways for impact on water quality are robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within Chapter 4 and section 8.6 of Chapter 8 of EIAR.

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6.7.7 Cumulative Impacts- Interaction of Effects between Various Elements of the Proposed Development

The potential cumulative impacts from interactions between various elements of the Proposed Development have been considered in terms of impacts on Biodiversity. Due to the proximity, scale and timelines associated with each element, there is potential for cumulative effects with the Proposed Development.

6.7.7.1 Cumulative Impact of habitat loss

The proposed development will result in the loss of treeline, hedgerow and mixed broadleaved woodland throughout the site. Approximately 1,235m of treeline (WL2), 1,920m of hedgerow (WL1) and 0.009ha of mixed broadleaved woodland will be lost. Individual landscaping proposals have been prepared Site A, Site B, Site C and the MOOR application and as the planting proposals are described in sections 6.7.1.2.1, 6.7.2.2.1, 6.7.3.2.2 and 6.7.4.2.1 of the chapter. The Moygaddy masterplan landscaping proposal is available in appendix 4-7 and volumes 3a, 3b, 3c and appendix4-5 in volume 3d.

The proposed development will result in a significant increase in the total coverage of treeline and hedgerow habitat across the entire site. There will be a temporary slight impact on habitats of local importance associated with the construction of the development. However, following the implementation the replanting proposal, no significant effects will occur.

6.7.7.2 Cumulative impacts on water quality and aquatic faunal species and habitats

The construction phase of the development will involve earth moving and levelling operations which create the potential for pollution in various forms, i.e. the generation of suspended solids and the potential for spillage of fuels associated with the refuelling of excavation machinery. The construction of the surface water outfall pipes and the bridges on the Blackhall Little Stream and the within the Rye Water River associated with the development has the potential to result in the deterioration of water quality. The operational phase of the proposed development will result in the production of foul sewage and surface water runoff.

A full description of the proposed mitigation measures for pollution prevention during the construction phase are outlined in section 8.6 of Chapter 8. Six individual Construction Environmental Management (CEMP) have also been prepared for the individual applications. The CEMPs outline site specific mitigation measures that are to be taken to prevent significant effects to water quality and are available in Volume 3.a, appendix 4-3, Volume 3.b appendix 4-3, Volume 3.c appendix 4-3, Volume 3.d, appendix 4-3, Volume 3.e, appendix 4-3 and Volume 3.f, appendix 4-3 of the EIAR.

A full description of the proposed storm and wastewater drainage for the development is described section 4.6 of Chapter 4. Sites A, B & C will direct surface water from surfaced areas roads, and roofs, via gravity, infiltration area/attention storage, hydrocarbon interceptors and filtration drain to a high-level outfall at the Rye Water River, just west of the Kildare Bridge. The remaining areas are considered green space and will be allowed to drain naturally to ground, with negligible impact on the performance of the surface water network, and therefore do not contribute to the surface water drainage networks.

Following the implementation of the prescribed mitigation measures, there is no potential for significant effects on water quality and aquatic faunal species and habitats during the construction or operational phase of the proposed development.

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6.7.7.3 Cumulative Impact on fauna

The proposed development will result in the loss of treeline, hedgerow and mixed broadleaved woodland throughout the site. These habitats may be used by local biodiversity for commuting, foraging or purposes. Individual landscaping proposals have been prepared Site A, Site B, Site C and the MOOR application and as the planting proposals are described in sections 6.7.1.2.1, 6.7.2.2.1, 6.7.3.2.2 and 6.7.4.2.1 of the chapter. The proposed development will result in a significant increase in the total coverage of treeline and hedgerow habitat across the entire site. Details of the proposed replanting schedule are described in appendix 4-7. As such, ecological connectivity to the wider landscape will be retained and in certain sections of the site, enhanced. The increase in both native tree and hedgerow coverage will result in the creation of new foraging, nesting and commuting habitat. Native hedgerows will be maintained and managed for wildlife, this includes allowing hedgerows to grow wide and dense at the base, with a wide, uncultivated grassy margin. Hedgerows should be allowed to mature before the first cut and future cutting should happen on a 3/5-year rotation. Hedgerows should be kept as dark spaces to allow commuting and foraging habitat for local wildlife.

Several trees with '*Low to Medium'* Potential Roost Features (PRF) throughout the site will be felled to facilitate the works. A pre-construction survey will be undertaken on all trees with 'Low to Moderate' suitability for bats to be felled, by a qualified ecologist prior to any works, to ensure there are no roosting bats. Individual lighting plans have been prepared for the six separate planning applications. All lightings plans have been designed with consideration of the following guidelines: Bat Conservation Ireland (Bats and Lighting: Guidance Notes for Planners, Engineers, Architects and Developers, BCI, 2010) and the Bat Conservation Trust (Guidance Note 08/18 Bats and Artificial Lighting in the UK (BCT, 2018), Dark Sky Ireland, to minimise light spillage, thus reducing any potential disturbance to bats. Important linear features for commuting/foraging bats (i.e treeline in south of site and Moygaddy castle) within the site have been retained and will not be exposed to new artificial lighting.

One active badger sett was recorded within the centre of the site along the Blackhall little stream. The proposed development has been designed to avoid the badger sett and section 6.7.3.2.2 describes the mitigation to be implemented during the construction phase, to avoid potential impacts on badgers.

Following the implementation of the mitigation outlined in section 6.7 of this report, there is no potential for significant effects on faunal species and habitats during the construction or operational phase of the proposed development.

6.7.7.4 Cumulative Impacts on Designated site

European Designated Sites

The potential for impact on European sites has been fully assessed in the Appropriate Assessment NIS that has been prepared in support of the current application.

Following the precautionary principle, the AASR identified a potential pathway for impact on Rye Water Valley/Carton SAC, South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka SPA and North Bull Island SPA in the form of deterioration of surface and groundwater water quality resulting from pollution associated with the construction and operational phases of the development.

Section 8.6 of Chapter 8 outlines a full description of the mitigation measures proposed during the construction and operational phase of the development.

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Following the implementation of the mitigation measures, there is no potential for significant effects on any European Sites during the construction or operational phase of the proposed development.

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6.7.8 Likely Significant Effects During Decommissioning phase

It is not intended that the proposed buildings will be removed, as permanent planning permission is being sought for this development. The Proposed Development will form an integral part of the local area plan for Moygaddy as outlined in the Meath County Development Plan. Therefore, it is intended that the Proposed Development will be retained as permanent and will not be decommissioned.

Cumulative In-combination

A search and review in relation to plans and projects that may have the potential to result in cumulative and/or in-combination impacts on European Sites was conducted. This included a review of online Planning Registers and served to identify past and future plans and projects, their activities and their predicted environmental effects.

6.7.9 Assessment of Plans

The following development plans been reviewed and taken into consideration as part of this assessment:

Meath County Development Plan 2021-2027
Kildare County Development Plan 2017-2023
Draft Kildare County Development Plan 2023-2027
The County Heritage Plan 2019-2025
The County Biodiversity Plan 2015-2020

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Table 6-57 Assessment of Plans

Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
Meath County Development Plan 2021-2027	
HER POL 31- To ensure that the ecological impact of all development proposals on habitats and species are appropriately assessed by suitably qualified professional(s) in accordance with best practice guidelines – e.g. the preparation of an Ecological Impact Assessment (EcIA), Screening Statement for Appropriate Assessment, Environmental Impact Assessment, Natura Impact Statement (NIS), species surveys etc. (as appropriate).	The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the Natura 2000 network and other natural heritage interests. No potential for cumulative impacts on national designated sites including Natural Heritage Areas, Ramsar Sites and Nature Reserves or species protected under the wildlife act were identified when considered in conjunction with the current proposal. No potential for cumulative impacts on EU designated sites or Annex listed protected species were identified when considered in conjunction with the current proposal
HER OBJ 33- To ensure an Appropriate Assessment in accordance with Article 6(3) and Article 6(4) of the Habitats Directives (92/43/EEC) and in accordance with the Department of Environment, Heritage and Local Government Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities, 2009 and relevant EPA and European Commission guidance documents, is carried out in respect of any plan or project not directly connected with or necessary for the management of the site but likely to have a significant effect on a Natura 2000 site(s), either individually or in-combination with other plans or projects, in view of the site's conservation objectives.	
HER OBJ 60- To encourage, pursuant to Article 10 of the Habitats Directive (92/43/EEC), the management of features of the landscape, such as traditional field boundaries, important for the ecological coherence of the Natura 2000 network and essential for the migration, dispersal and genetic exchange of wild species.	
HER POL 288- To integrate in the development management process the protection and enhancement of biodiversity and landscape features wherever possible, by minimising adverse impacts on existing habitats (whether designated or not) and by including mitigation and/or compensation measures, as appropriate.	The strategy was reviewed, with particular reference to Policies and Objectives that relate to biodiversity. No potential for cumulative impacts when considered in conjunction with the current proposal were identified. There will be no impact on designated sites or biodiversity as a result of the development. Best practice preventative measures will be implemented to avoid effects on biodiversity as outlined in section 6.7 of this report.
HER POL 35- To ensure, where appropriate, the protection and conservation of areas, sites, species and ecological/networks of biodiversity value outside designated sites and to require an appropriate level of ecological assessment by suitably qualified professional(s) to accompany development proposals likely to impact on such areas or species.	
Kildare County Development Plan 2017-2023	
Policy NH2 - Promote the carrying out of basic habitat assessments to inform the design of new developments in order to ensure that proposals for development integrate the protection and enhancement of biodiversity and landscape features wherever possible, by minimising adverse impacts on existing habitats (whether designated or not) and by including mitigation and/or compensation measures, as appropriate.	The strategy was reviewed, with particular reference to Policies and Objectives that relate to biodiversity. No potential for cumulative
Policy NH04 - Identify, conserve and provide guidance on development in important local biodiversity sites.	

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Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
Policy NH8 - Ensure that any proposal for development within or adjacent to a Natural Heritage Area (NHA), Ramsar Sites and Nature Reserves is designed and sited to minimise its impact on the biodiversity, ecological, geological and landscape value of the site, particularly plant and animal species listed under the Wildlife Acts and the Habitats and Birds Directive including their habitats.	impacts when considered in conjunction with the current proposal were identified. There will be no impact on designated sites or biodiversity as a result of the development. Best practice preventative measures will be implemented to avoid effects on biodiversity as outlined in section 6.7 of this report.
Policy GI27- Require all new developments to identify, protect and enhance ecological features by making provision for local biodiversity (e.g. through provision of swift boxes or towers, bat roost sites, green roofs, etc.) and provide links to the wider Green Infrastructure network as an essential part of the design process.	
Draft Kildare County Development Plan 2023-2027	
BI P1 Integrate in the development management process the protection and enhancement of biodiversity and landscape features wherever possible, by minimising adverse impacts on existing habitats (whether designated or not) and by including mitigation and/or compensation measures, as appropriate.	The strategy was reviewed, with particular reference to Policies and Objectives that relate to biodiversity. No potential for cumulative impacts when considered in conjunction with the current proposal were identified. A detailed landscaping plan has been prepared for this application outlining the proposed native hedgerow/tree planting. Where any hedgerow/treeline is to be removed, it is proposed to replant it with native species, thus ensuring ecological connectivity is retained. There will be no impact on designated sites or biodiversity as a result of the development. Best practice preventative measures will be implemented to avoid effects on biodiversity as outlined in section 6.7 of this report.
BI O1 Require, as part of the Development Management Process, the preparation of Ecological Impact Assessments that adequately assess the biodiversity resource within proposed development sites, to avoid habitat loss and fragmentation and to integrate this biodiversity resource into the design and layout of new development and to increase biodiversity within the proposed development.	
BI O10 Ensure that any new development proposal does not have a significant adverse impact on rare and threatened species, including those protected under the Wildlife Acts 1976 and 2012, the Birds Directive 1979 the Habitats Directive 1992 and the Flora Protection Order species.	
BI O11 Ensure appropriate species and habitat avoidance and mitigation measures are incorporated into all new development proposals.	
BI O13 Require all applications for new developments to identify, protect and sensitively enhance the most important ecological features and habitats, and incorporate these into the overall open space network, keeping free from development and to provide links to the wider Green Infrastructure network as an essential part of the design process and by making provision for local biodiversity (e.g. through provision of swift boxes or towers, bat roost sites, hedgehog highways2, green roofs, etc.).	
BI O15 Prevent, in the first instance, the removal of hedgerows to facilitate development. Where their removal is unavoidable, same must be clearly and satisfactorily demonstrated to the Planning Authority. In any event, removal shall be kept to an absolute minimum and there shall be a requirement for mitigation planting comprising a hedge of similar length and species composition to the original, established as close as is practicable to the original and where possible linking to existing adjacent hedges. Native plants of a local provenance should be used for any such planting. Removal of hedgerows and trees prior to submitting a planning application will be viewed negatively by the planning authority and may result in an outright refusal.	

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Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
BI O16 Promote the integration of boundary hedges within and along development sites into development design so as to avoid "trapped hedges" located to the boundary of houses within the development layout. Encourage the planting of woodlands, trees and hedgerows as part of new developments and as part of the Council's own landscaping works using native plants of local provenance.	
BI O21 Ensure the protection of rivers, streams and other watercourses and, wherever possible, maintain them in an open state capable of providing suitable habitats for fauna and flora while discouraging culverting or realignment. Endeavour to re-open previously culverted streams and watercourses through any future development/redevelopment proposals.	The site layout was designed two maintain an appropriate buffer between the proposed development and the Rye Water River and Blackhall Little which border the site. Inland Fisheries Ireland were consulted at the outset of the design stage. Otter and bat surveys were carried out along the river corridor All proposed works take consideration of the relevant IFI guideline documents. During the operational phase all surface water arising on site will drain to attenuation tanks, hydrocarbon interceptor and filter drain before discharge to Rye Water River and Blackhall Little at less than controlled greenfield rates. Groundwater quality risks are reduced during the operational phase by use of hydrocarbon interceptors and silt traps prior to discharge to the watercourse.
BI O22 Require the preparation and submission of an Ecological Impact Assessment (EcIA) including bat and otter surveys for developments along river or canal corridors.	
BI O23 Consult with Inland Fisheries Ireland (IFI) in relation to any development (greenfield development or redevelopment of brownfield sites) that could potentially impact on the aquatic ecosystems and associated riparian habitats while taking account of 'Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites' (IFI, 2004) and 'Planning for Watercourses in the Urban Environment' (IFI, 2020).	
BI O27 Ensure that any runoff from developed areas does not result in any deterioration of downstream watercourses or habitats and require that pollution generated by a development is treated within the development area prior to discharge to local watercourses.	
BI O29 Ensure the protection, improvement or restoration of riverine floodplains and to promote strategic measures to accommodate flooding at appropriate locations including nature-based solutions, in order to protect ground and surface water quality and build resilience to climate change.	
BI O5 Avoid development that would adversely affect the integrity of any Natura 2000 site located within and immediately adjacent to the county and promote favourable conservation status of habitats and protected species including those listed under the Birds Directive, the Wildlife Acts and the Habitats Directive, to support the conservation and enhancement of Natura 2000 Sites including any additional sites that may be proposed for designation during the period of this Plan and protect the Natura 2000 network from any plans and projects that are likely to have a significant effect on the coherence or integrity of a Natura 2000 Site.	The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the Natura 2000 network and other natural heritage interests. No potential for cumulative impacts on national designated sites including Natural Heritage Areas, Ramsar Sites and Nature Reserves or species protected under the wildlife act were identified when considered in conjunction with the current proposal. No potential for cumulative impacts on EU designated sites or Annex listed protected species were identified when considered in conjunction with the current proposal.
BI O6 Ensure an Appropriate Assessment, in accordance with Article 6(3) and Article 6(4) of the Habitats Directive and with DEHLG guidance (2009), is carried out in respect of any plan or project not directly connected with or necessary to the management of a Natura 2000 site to determine the likelihood of the plan or project having a significant effect on a Natura 2000 site, either individually or in combination with other plans or projects and to ensure that projects which may give rise to significant cumulative, direct, indirect or secondary impacts on Natura 2000 sites will not be permitted (either individually or in combination with other plans or	

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Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
projects) unless for reasons of overriding public interest.	

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6.7.10 Assessment of Projects

The proposed development was considered in-combination with other plans and projects in the area that could result in cumulative impacts on designated Sites. The online National Planning Application Map Viewer was consulted on the 25/03/2022 for the area surrounding the development site.

A full list of the projects within the vicinity, which are of a similar nature and scale, is available in section 2.3 of Chapter 2.

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6.8 Conclusion

There will be no significant impacts on biodiversity given the nature, scale and design of the Proposed Development. No significant residual effects on surface water quality, groundwater quality or the local hydrological/hydrogeological regime were identified.

Potential negative effects on water quality and downstream ecological receptors and designated sites have been mitigated through a constraint led design process. With the implementation of best practice measures there will be no impact on water quality. Therefore, following an extremely precautionary principle a pathway for impact on designated sites was identified in the form of potential surface water and ground water pollution. This pathway has been robustly blocked and no potential for residual effects remains.

In the review of the projects that was undertaken, no connection, that could potentially result in additional or cumulative impacts was identified. Neither was any potential for different (new) impacts resulting from the combination of the various projects and plans in association with the Proposed Development.

Taking the above information into consideration and having regard to the precautionary principle, it is considered that the Proposed Development will not result in the loss of habitats or species of high ecological significance and will not have any significant effects on the ecology of the wider area.

Provided that the Proposed Development is constructed in accordance with the design and best practice that is described throughout this EIAR, significant effects on biodiversity are not anticipated at any geographic scale.

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7. LAND, SOILS AND GEOLOGY

7.1 Introduction

7.1.1 Background and Objectives

This section of the Environmental Impact Assessment Report (EIAR) provides a description and assessment of the residual direct and indirect potential effects of the Proposed Development on Land, Soils and Geology The full description of the Proposed Development is provided in Chapter 4 of this EIAR.

As outlined in Chapter 1: Introduction, this EIAR assess the impact of all six planning applications under the one 'Proposed Development' due to the proximity, timeline and links between the applications. Three planning applications will be submitted to Meath County Council (Site A, Site B and MOOR). One planning application will be submitted to An Bord Pleanála (Site C: SHD) as the competent authority, while two planning applications will be submitted to Kildare Council for infrastructure works required to connect the Proposed Development to services and utility infrastructure within Co. Kildare.

This chapter provides a baseline assessment of the environmental setting of the Proposed Development in terms of land, soils, and geology, and discusses the potential impacts that the construction and operation of the Proposed Development will have. Where required, appropriate mitigation measures to limit any identified potentially significant impacts to soils and geology are recommended and an assessment of residual impacts and significance of effects provided.

7.1.2 Statement of Authority

This section of the EIAR has been prepared by Michael Watson, David Naughton and Daire O'Shaughnessy, of MKO. Michael Watson is a professional geologist (PGeo) and full member of IEMA (MIEMA) as well as a Chartered Environmentalist (CEnv). Michael joined McCarthy Keville O'Sullivan Ltd. in 2014 having gained over 15 years' experience in a Cork based environmental & hydrogeological consultancy firm. David is an Environmental Scientist with over five years of consultancy experience with MKO and has been involved in a number of EIAR applications. David has worked as project manager for a number of EIAR applications, providing a pivotal link liaising between the applicant and the EIAR project team to ensure all work is carried out to a high standard. David and Daire hold a BSc (Hons) in Environmental Science.

7.1.3 Relevant Legislation

The EIAR is prepared in accordance with the requirements of European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive') as amended by Directive 2014/52/EU. The requirements of the following legislation are complied with:

- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2001 – 2018;
- Directives 2011/92/EU and 2014/52/EU on the assessment of the effects of certain public and private projects on the environment, including Circular Letter PL 1/2017: Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive);
- S.I. No. 349 of 1989: European Communities (Environmental Impact Assessment) regulations and subsequent amendments (S.I. No. 84 of 1995, S.I. No. 352 of 1998, S.I. No. 93 of 1999; S.I. No. 450 of 2000; S.I No. 538 of 2001); S.I. No. 30 of 2000 the

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Planning and Development Act, 2000; and S.I 600 of 2001 Planning and Development Regulations and subsequent amendments, on the assessment of the effects of certain public and private projects on the environment;
- Planning and Development Act, 2000, as amended;
- S.I. No 296 of 2018: S.I. No. 296 of 2018: European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 which transposes the provisions of Directive 2014/52/EU into Irish law; and,
- The Heritage Act 1995, as amended.

7.1.4 Relevant Guidance

The land, soils and geology chapter of this EIAR was prepared having regard, where relevant, to guidance contained in the following documents:

- Environmental Protection Agency (2022): Guidelines on the Information to be contained in Environmental Impact Assessment Reports;
- European Commission (2017) Guidance on the preparation of the Environmental Impact Assessment Report;
- Institute of Geologists Ireland (2013): Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements; and,
- National Roads Authority (2005): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.

7.2 Assessment Methodology

7.2.1 Desk Study

A desk study of the site and the surrounding study area was largely completed in advance of undertaking a site walkover survey. The desk study involved collecting all the relevant geological data for the Proposed Development site and study area. This included consultation with the following:

- Environmental Protection Agency (EPA) database (www.epa.ie);
- Geological Survey of Ireland (GSI) - National Draft Bedrock Aquifer map;
- GSI - Groundwater Database (www.gsi.ie);
- Bedrock Geology 1:100,000 Scale Map Series, Sheet 16 (Geology of Kildare-Wicklow). (GSI, 1994);
- GSI – 1:25,000 Field Mapping Sheets; and,
- General Soil Map of Ireland 2nd edition (www.epa.ie).

7.2.2 Site Investigation

Site Investigations were carried out by Site Investigations Ltd. (SIL) between June and July 2021. The scope of works included cable percussive boreholes, rotary coreholes, trial pits, dynamic probes and laboratory testing of field samples. All fieldwork was carried out in accordance with BS 5930:2015, Engineers Ireland GI Specification and Related Document 2nd Edition 2016 and Eurocode 7: Geotechnical Design. A summary of site investigation works are presented below;

- 18 no. cable percussive boreholes,
- 16 no. rotary coreholes,
- 21 no. trial pits with soakaway tests,
- 84 no. dynamic probes.

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Subsoil at **Site A** was broadly encountered to a depth of 0.1 – 3.2m maximum depth. Subsoil beneath the Topsoil is described as slightly sandy, slightly gravelly silty CLAY, which is generally firm to stiff.

Trial pit depths at **Site B** was broadly encountered to a depth of 0.1 – 2.6m maximum depth. Subsoil described as silty sandy, with gravelly clay occasionally observed at further depths, which is generally firm to stiff.

Subsoils at **Site C** was broadly encountered to a depth of 0.1 – 2.5m maximum depth. Made Ground was encountered to depths of 1.6m, 2.9m and 0.6m in TP 23, TP25 and TP26. The subsoil beneath the Topsoil/Made ground is described as silty sandy, with gravelly clay occasionally observed at further depths, which is generally firm to stiff.

Subsoils at the **MOOR** was broadly encountered to a depth of 0.1 – 2.5m maximum depth. Subsoil is described as silty sandy, with gravelly clay occasionally observed at further depths, which is generally firm to stiff.

Groundwater was encountered in five boreholes and ten trial pits at depths ranging from 1.50mbgl to 3.60mbgl within the Proposed Development area.

Groundwater ingresses were recorded in two boreholes within the Proposed Development, both of which were located within Site B, at depths of 3.20mbgl at BH14 and 3.60mbgl at BH17. All ingresses were sealed off by the casing as the drilling advanced and therefore indicates perched water lenses. There were water ingresses into 3 No. trial pits within the Proposed Development site, one of which was located within Site A, while the remaining two were located within Site B. A water ingress was recorded at trial pit no. TP11, located within Site A at a depth of 1.80mbgl, with the ingress rate logged as a seepage. Water ingresses were recorded at trial pits no. TP13 and TP21, within Site B at a depth of 1.80mbgl and 2.90mbgl respectively, with the ingress rate logged as a seepage at TP13 and at a medium rate at TP21.

Detailed reports on the Site Investigation works carried out at the Proposed Development site can be found in Volume 3c(i) - Appendix 4-9 – Appendix E of this EIAR.

7.2.3 Additional Site Investigation

Additional Site Investigations were carried out by Site Investigations Ltd. (SIL) and can be found in Volume 3c(i) - Appendix 4-9 – Appendix E of this EIAR. The additional works examine an area to the west of the Blackhall Little Stream (Site C). Site Investigations were carried out between June and July 2021. The scope of works comprises of 9 no. trial pits. All fieldwork was carried out in accordance with BS 5930:2015, Engineers Ireland GI Specification and Related Document 2nd Edition 2016 and Eurocode 7: Geotechnical Design.

Topsoil along the additional works area was broadly encountered to a depth of 0.1 – 3.1m maximum depth. Made Ground was encountered in TP23 to a depth of 1.6m, TP25 to a depth of 2.9m and TP26 to a depth of 0.6m. Subsoil beneath the Topsoil/Made Ground is described as silty gravelly fine to coarse sand, with gravelly clay occasionally observed at further depths, which is generally firm to stiff.

7.2.4 Walkover Survey

A visual inspection of the Proposed Development site was undertaken by MKO on the 5th of August 2021 and 19th August 2022. The purpose of the site inspection was to investigate the site for any surface indications of impacts to land, soils and geology resulting from current land use and confirm the baseline conditions. Particular attention was paid to identifying any potential areas of soil erosion that may have arisen from the operation of agricultural machinery on the site. No evidence of any residual impacts to land, soils and geology was observed.

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7.2.5 Impact Assessment Methodology

Using information from the desk study, visual inspection and site investigation, an estimation of the importance of the soil and geological environment within the study area is assessed using the criteria set out in Table 7-1 (NRA, 2008).

Table 7-1 Estimation of Importance of Soil and Geology Criteria (NRA, 2008).

Importance	Criteria	Typical Example
Very High	Attribute has a high quality, significance or value on a regional or national scale. Degree or extent of soil contamination is significant on a national or regional scale. Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale.	Geological feature rare on a regional or national scale (NHA). Large existing quarry or pit. Proven economically extractable mineral resource.
High	Attribute has a high quality, significance or value on a local scale. Degree or extent of soil contamination is significant on a local scale. Volume of peat and/or soft organic soil underlying site is significant on a local scale.	Contaminated soil on site with previous heavy industrial usage. Large recent landfill site for mixed wastes. Geological feature of high value on a local scale (County Geological Site). Well drained and/or high fertility soils. Moderately sized existing quarry or pit. Marginally economic extractable mineral resource.
Medium	Attribute has a medium quality, significance or value on a local scale. Degree or extent of soil contamination is moderate on a local scale. Volume of peat and/or soft organic soil underlying site is moderate on a local scale.	Contaminated soil on site with previous light industrial usage. Small recent landfill site for mixed wastes. Moderately drained and/or moderate fertility soils. Small existing quarry or pit. Sub-economic extractable mineral resource.

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Importance	Criteria	Typical Example
Low	Attribute has a low quality, significance or value on a local scale. Degree or extent of soil contamination is minor on a local scale. Volume of peat and/or soft organic soil underlying site is small on a local scale.	Large historical and/or recent site for construction and demolition wastes. Small historical and/or recent landfill site for construction and demolition wastes. Poorly drained and/or low fertility soils. Uneconomically extractable mineral resource.

The statutory criteria (EPA 2017) for the assessment of impacts require that likely impacts are described with respect to their extent, magnitude, type (*i.e.* negative, positive, or neutral) probability, duration, frequency, reversibility, and transfrontier nature (if applicable). The descriptors used in this environmental impact assessment are those set out in EPA (2017) Glossary of Impacts as outlined in Chapter 1 of this EIAR. In addition, the two impact characteristics, proximity and probability, are described for each impact and these are defined in Table 7-2.

In order to provide an understanding of this descriptive system in terms of the geological/hydrological environment, elements of this system of description of impacts are related to examples of potential impacts on the geology and morphology of the existing environment, as listed in Table 7-3.

Table 7-2 Additional Impact Characteristics.

Impact Characteristic	Degree/ Nature	Description
Proximity	Direct	An impact which occurs within the area of the proposed project, as a direct result of the proposed project.
	Indirect	An impact which is caused by the interaction of effects, or by off-site developments.
Probability	Low	A low likelihood of occurrence of the impact.
	Medium	A medium likelihood of occurrence of the impact.
	High	A high likelihood of occurrence of the impact.

Table 7-3 Impact descriptors related to the receiving environment.

Impact Characteristics		Potential Geological/Hydrological Impacts
Quality	Significance	
Negative only	Profound	Widespread permanent impact on: • The extent or morphology of a designated site • Regionally important aquifers. • Extents of floodplains. • Loss of a geologically sensitive site.

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Impact Characteristics		Potential Geological/Hydrological Impacts
Quality	Significance	
		Mitigation measures are unlikely to remove such impacts.
Positive or Negative	Very Significant/ Significant	Local or widespread time dependent impacts on: • The extent or morphology of a cSAC / ecologically important area. • A regionally important geological feature (or widespread effects to minor geological features). • Extent of floodplains. Widespread permanent impacts on the extent or morphology of an NHA/ecologically important area, Mitigation measures (to design) will reduce but not completely remove the impact – residual impacts will occur.
Positive or Negative	Moderate	Local time dependent impacts on: • The extent or morphology of a cSAC / NHA / ecologically important area. • A minor geological feature. • Extent of floodplains. Mitigation measures can mitigate the impact OR residual impacts occur, but these are consistent with existing or emerging trends
Positive, Negative or Neutral	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Positive, Negative or Neutral	Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Neutral	Imperceptible	No impacts, or impacts which are beneath levels of perception, within normal bounds of variation, or within the bounds of measurement or forecasting error.

7.3 Existing Environment

7.3.1 Site Description and Land-Use

Each of Site A, Site B, Site C (SHD) and the MOOR of the Proposed Development are located in County Meath on the northern environs of Maynooth town, Co. Kildare. The Kildare Bridge works and Moyglare Bridge works are located within County Kildare.

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The proposed healthcare facilities are located approximately 500m north of Maynooth town at its closest point, while the proposed strategic employment zone is located approximately 1km north of Maynooth at its closest point. The proposed strategic housing development is located approximately 1.1km from Maynooth at its closest point. The Maynooth outer orbital road is located approximately 1km from Maynooth. The Kildare Bridge application is located within Maynooth. The Moyglare Bridge application is located 100m from Maynooth.

Please refer to Figure 1-1 of Chapter: Introduction, for the site location. Both the healthcare site (Site B) and the strategic employment zone (Site A) within the Proposed Development are accessed by the existing R157 Regional Road. The strategic housing development (Site C) within the proposed development is accessed from the L6219 & L22143 Locals Roads.

Site A: Strategic Employment Zone Application

The site boundary for the proposed Site A is approximately 6.8 hectares (ha). The site is bounded by the R157 Regional Road to the east, the L22143 Local Road to the west, and farmland to the north, south and west. Site A is currently a green-field site which supports small-scale agriculture. The site is relatively flat with a topography ranging from approximately 56m OD (Ordnance Datum) in the south of the site to 60m OD in the centre and north of the site. There is an existing drainage ditch around the perimeter of the agricultural field in which the site is located. The drainage ditch was observed to be dry during site visits due to good draining soils (moderate permeability) and flat topography of the site. The Blackhall Little Stream is located to the northwest of the site, more than 250m northwest of the proposed office buildings and associated infrastructure. The proposed 360m section of the Maynooth Outer Orbital Road (MOOR) will run in a northwest direction from the office/business park towards the Blackhall Little Stream. The MOOR will run right up to the southern boundary of the stream which will be traversed by a new bridge structure that will form part of a separate planning application for the MOOR.

Due to the nature of Site A, there will be a substantial water requirement once operational, primarily for washing and plumbing facilities. The existing Irish Water Mains within the Study Area are reported as having their source as the Dunboyne Water Supply Zone (WSZ). Site A is located entirely within the Liffey and Dublin Bay (09) Water Framework Directive (WFD) Catchment.

Site B: Healthcare Application

The site boundary for the proposed Site B is approximately 6.6 hectares (ha). The site is bounded by the Rye Water River to the south and the R157 regional road to the east. The site is currently a green-field site which supports small-scale agricultural practices. The areas to the north and west of the site are also used for small scale agriculture. The site is relatively flat where infrastructure is proposed although the topography slopes gradually down towards the Rye Water River to the south. The topography ranges from approximately 56m OD (Ordnance Datum) in the north of the site to 46m OD at the southern boundary of the site at the Rye Water River. There is an existing drainage ditch around the western and northern perimeter of the agricultural field in which the site is located. The drainage ditch was observed to be dry during site visits due to good draining soils and relatively flat topography of the site. The Rye Water River is located to the south of the site, more than 45m south of the closest proposed infrastructure.

Due to the nature of Site B, there will be a substantial water requirement once operational, primarily for washing and plumbing facilities. The existing Irish Water Mains within the Study Area are reported as having their source as the Dunboyne Water Supply Zone (WSZ). Site B is located entirely within the Liffey and Dublin Bay (09) Water Framework Directive (WFD) Catchment.

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Site C: Strategic Housing Development (SHD)

The site boundary for the proposed Site C (SHD) is approximately 19.5 hectares (ha). The site is located approximately 250m west of the R157 Regional Road and is bounded by the L22143 Local Road which runs along the north of the site from east to west with farmland to the north, south and west. Site C is currently a green-field site which supports small-scale agriculture.

The site is relatively flat with a topography ranging from approximately 58m OD (Ordnance Datum) in the west of the site to 47m OD in the south and east of the site. There is an existing drainage ditch around the perimeter of the agricultural field in which the site is located. The drainage ditch was observed to be dry during site visits due to good draining soils (moderate permeability). The Blackhall Little Stream runs from north to south through the centre of the site, approximately 55m east of the proposed housing development. The proposed section of the Maynooth Outer Orbital Road (MOOR) will run in a northeast direction from the proposed Moyglare Bridge northeast towards the Blackhall Little Stream. The MOOR will run across the western boundary of the Rye Water River which will include a new watercourse crossing. The upgrade works on an existing crossing, to provide for a new pedestrian and cycle bridge will take place to the northeast of the site and these works form part of the SHD application.

Due to the nature of Site C, there will be a substantial water requirement once operational, primarily for washing and plumbing facilities. The existing Irish Water Mains within the Study Area are reported as having their source as the Dunboyne Water Supply Zone (WSZ). Site C is located entirely within the Liffey and Dublin Bay (09) Water Framework Directive (WFD) Catchment.

MOOR: Maynooth Outer Orbital Road

The site boundary for the proposed Maynooth Outer Orbital Road (MOOR) is approximately 6.6 hectares (ha). The site is bounded by the R157 Regional Road to the east, the site is bounded by the Moyglare Hall road to the southwest, the L22143 Local Road to the west, the L2214 Local Road to the north and the R157 Regional Road to the east and southeast. The MOOR once constructed will provide connectivity from the R157 to the southeast of the site to the L2214 to the north and finally to the Moyglare hall road to the west. The site is relatively flat with a topography ranging from approximately 48m OD (Ordnance Datum) in the south of the site to 62m OD to the north of the site. There are existing drainage ditches adjacent to the existing roads in which upgrade works will be carried out as part of the MOOR. The drainage ditches were observed to be dry during site visits due to good draining soils (moderate permeability) and flat topography of the site. The Rye Water River travels through the south of the MOOR at two points, one located to the west and one located to the east. Watercourse crossings will be constructed at Moyglare, to the west in the form of a single span bridge and a new pedestrian and cycle bridge will be constructed adjacent to the Kildare bridge in the east. The Blackhall Little Stream is located to the north and east of the site and travels through the MOOR at two points, one located to the northeast and one located within the centre. A new watercourse crossing will be constructed as part of the MOOR over the Blackhall Little Stream and upgrade works on an existing crossing will occur in the centre of the site.

Kildare Bridge Application

The site boundary for the proposed Kildare Bridge application is approximately 1.2 hectares (ha). The site includes upgrade works to the R157 Regional Road to the north of the site along with a standalone pedestrian and cycle bridge across the Rye Water River adjacent to the existing Kildare Bridge. The site boundary is bounded by the L1013 Local Road to the south of the site. The wastewater pumping station (WWPS) which is part of the Proposed Development and the associated rising main will cross the Rye Water River along the public road and footpath to the Maynooth Municipal WWTP. The Kildare Bridge application is located entirely within the Liffey and Dublin Bay (09) Water Framework Directive (WFD) Catchment.

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Moyglare Bridge Application

The site boundary for the proposed Moyglare Bridge application is approximately 0.5 hectares (ha). The site includes a single span bridge over the Rye Water River as well as services and utilities connection from the proposed onsite pumping station at Site C (SHD) to). There are no existing buildings or structures within the site boundary. The site is relatively flat ranging from 48m OD at the north of the site to 55m OD to the west. The Moyglare Bridge application is located entirely within the Liffey and Dublin Bay (09) Water Framework Directive (WFD) Catchment.

The location of the Proposed Development and associated Topography is shown in Figure 7-1 below.

7.3.1.2 Soils and Subsoils

According to GSI mapping (www.gsi.ie), the Proposed Development is predominantly underlain by soils which are largely derived from basic parent materials (surface water gleys/ basic poorly drained mineral [BminPD] soils). There is a small section of the Proposed Development site which is underlain by mineral alluvial (AlluvMin) soils along the banks of the Rye Water River.

There is no proposed infrastructure in this area with the exception of drainage infrastructure and road widening and upgrade works along the existing R157 Regional Road.

GSI mapping for the site also indicates that the entirety of the site is underlain by dark limestone and shale which form the Lucan formation (CDLUCAN).

The Teagasc soils map (www.gis.teagasc.ie/soils/map) identifies the soil association within the wider region of the site as fine loamy drift with limestones. These soils are generally well drained and well suited to pastoral agricultural systems. Site Investigations at the site reported average soil depths of approximately 2.6m across the Proposed Development site. The local subsoils map is shown as Figure-7-2.

It was noted that during the site walkover that most of the site is under agricultural use for pasture and grazing. The site is used for grazing of livestock such as sheep and cattle with relatively low stocking densities. Low levels of soil erosion are likely due to intermittent farm machinery use.

The extensive Site Investigation results confirm that the subsoils are predominantly brown/black slightly sandy gravelly silty CLAY with cobbles and boulders. They are relatively homogenous across the entire site and are typical of the natural subsoils in the area and across North Leinster which are derived from limestone parent materials.

7.3.1.3 Bedrock Geology

Based on the GSI bedrock map of the region, the site of both Proposed Developments is underlain by the Lucan Formation (Dark Limestone and Shale) formation (LU) which consists of dark grey to black, fine-grained, occasionally cherty limestones that weather paler, usually to pale grey. There are also rare dark coarser grained calcarenitic limestones, sometimes graded, and interbedded dark-grey calcar. This formation spreads both east and west, encompassing large areas of counties Meath, Dublin, Kildare Westmeath and Offaly.

The Lucan Formation is classified by the GSI as a Locally Important Aquifer – Bedrock which is Generally Moderately Productive only in Local Zones (LI).

A bedrock geology map of the area is included as Figure 7-3. The bedrock and aquifer receptors at and adjacent to the Proposed Development are considered to be of Moderate value.

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Bedrock (Limestone interbedded with moderately strong grey calcareous MUDSTONE with pyrite crystals) was encountered in the Site Investigation at depths ranging from 2.8m, below ground level to 7.8m below ground level and was in excess of 8m below ground level in the east of the site.

7.3.1.4 Geological Heritage and Designated Sites

There are no Geological Heritage sites within or close to the Proposed Development. The closest Geological Heritage Site to the Proposed Development is located in the environs of Leixlip town, approximately 5km east of the Proposed Development at its closest point. This Geological Heritage site is Louisa Bridge Cold Spring (KE016), which is a cold spring which was formerly a warm spring used as a spa.

The site lies immediately adjacent to the west of the Rye Water Valley/ Carton Special Area of Conservation (SAC). This SAC is nationally important as it possesses petrifying springs with tufa formation and possesses habitat supporting the Narrow-mouthed Whorl Snail and the Desmoulin's Whorl Snail. The nearest Special Protection Area (SPA) is the River Boyne and River Blackwater SPA, located approximately 20km northwest of the Proposed Development site at its closest point. Further assessment of potential impacts to designated sites are included in Chapter 6: Biodiversity of this EIAR.

7.3.1.5 Soil Contamination

According to the EPA online mapping (https://gis.epa.ie/EPAMaps), there are no licenced waste facilities on or within the immediate environs of the Proposed Development.

There are no historic mines at or in the immediate vicinity of the site that could potentially have contaminated tailings.

The site walkover did not identify any evidence of potential soil contamination at or adjacent to the Proposed Development, and there are no records from the current landowners of any environmental incidents with the potential to cause significant soil contamination.

The additional Site Investigation works were completed to determine the location and nature of some Made Ground identified in the first round of SI works. The additional work included for 9 No Trail Pits in one field. 6 No of the Trial Pits confirmed natural ground conditions. Small volumes of Made Ground including traces of plastic bags, tarmacadum, tree branch's and wire were observed in small volumes within the natural clays in 3 No Trial Pits located in close proximity to each other. The Site Investigation report and the photographic evidence indicates that the Made Ground is likely inert. No water ingress was noted in the Trial Pit logs. The environmental risk associated with the Made Ground is considered Low on the basis of the nature of the material and scale of the area. There is no evidence of significant ground contamination or unauthorised waste disposal activities.

7.3.1.6 Economic Geology

The GSI Online Minerals Database accessed via the Public Data Viewer shows no commercial pits or quarries within the vicinity of the Proposed Development.

The GSI online Aggregate Potential Mapping Database shows that the Proposed Development is not located within an area mapped as being of 'Very High' or 'High' granular aggregate potential (i.e., potential for gravel reserves considered Low).

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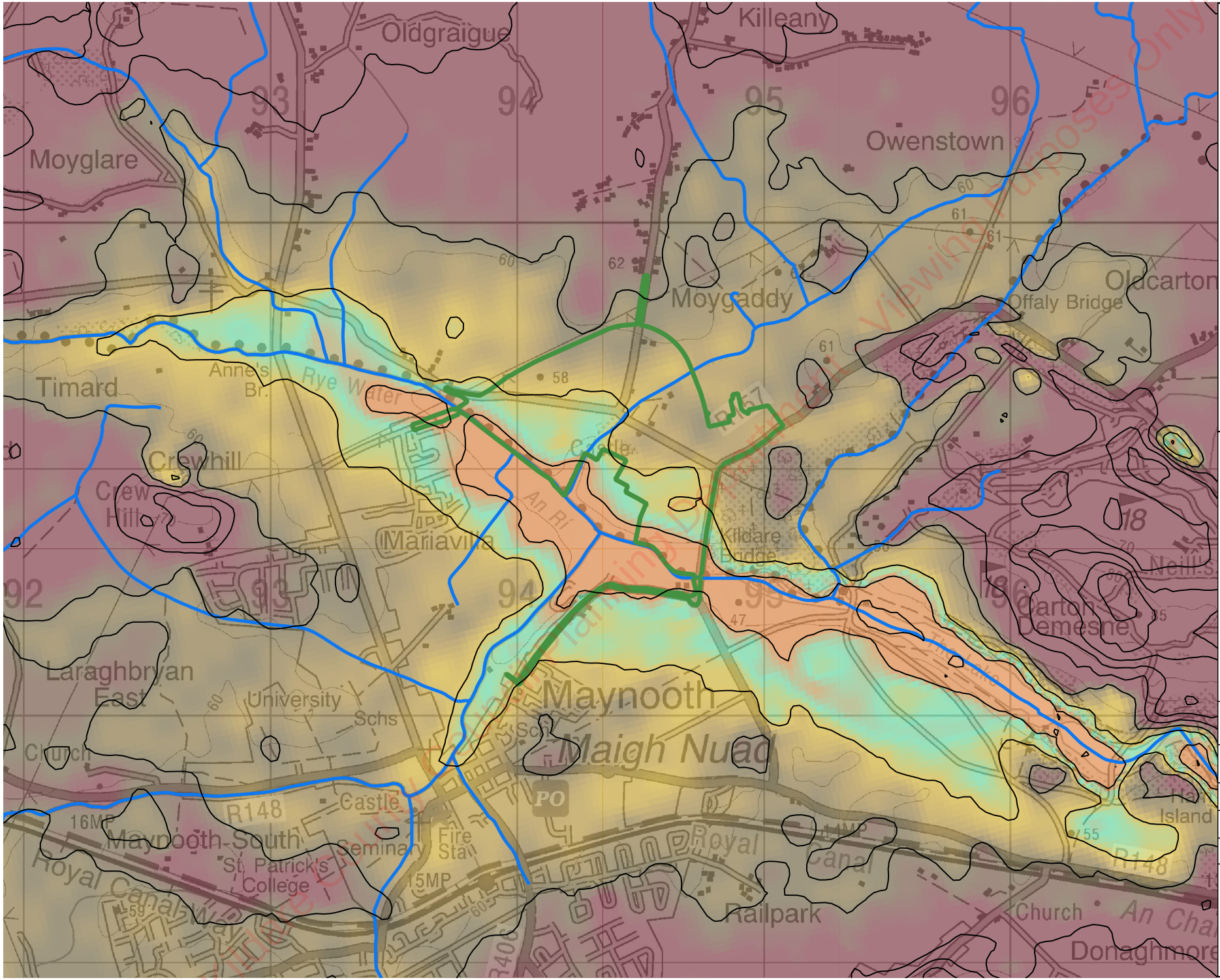

Map Legend

- EIAR Site Boundary

Elevation (m)

- 50
- 52.5
- 55
- 57.5
- 60
- 62.5
- Watercourses
- 5m Contours

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N

Drawing Title: Site Topography

Project Title: Moygaddy Mixed-Use Development

Drawn By	Checked By
TM	MW
Project No.	Drawing No.
210414	Figure 7-1
Scale	Date
1:20,000	30.08.2022

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

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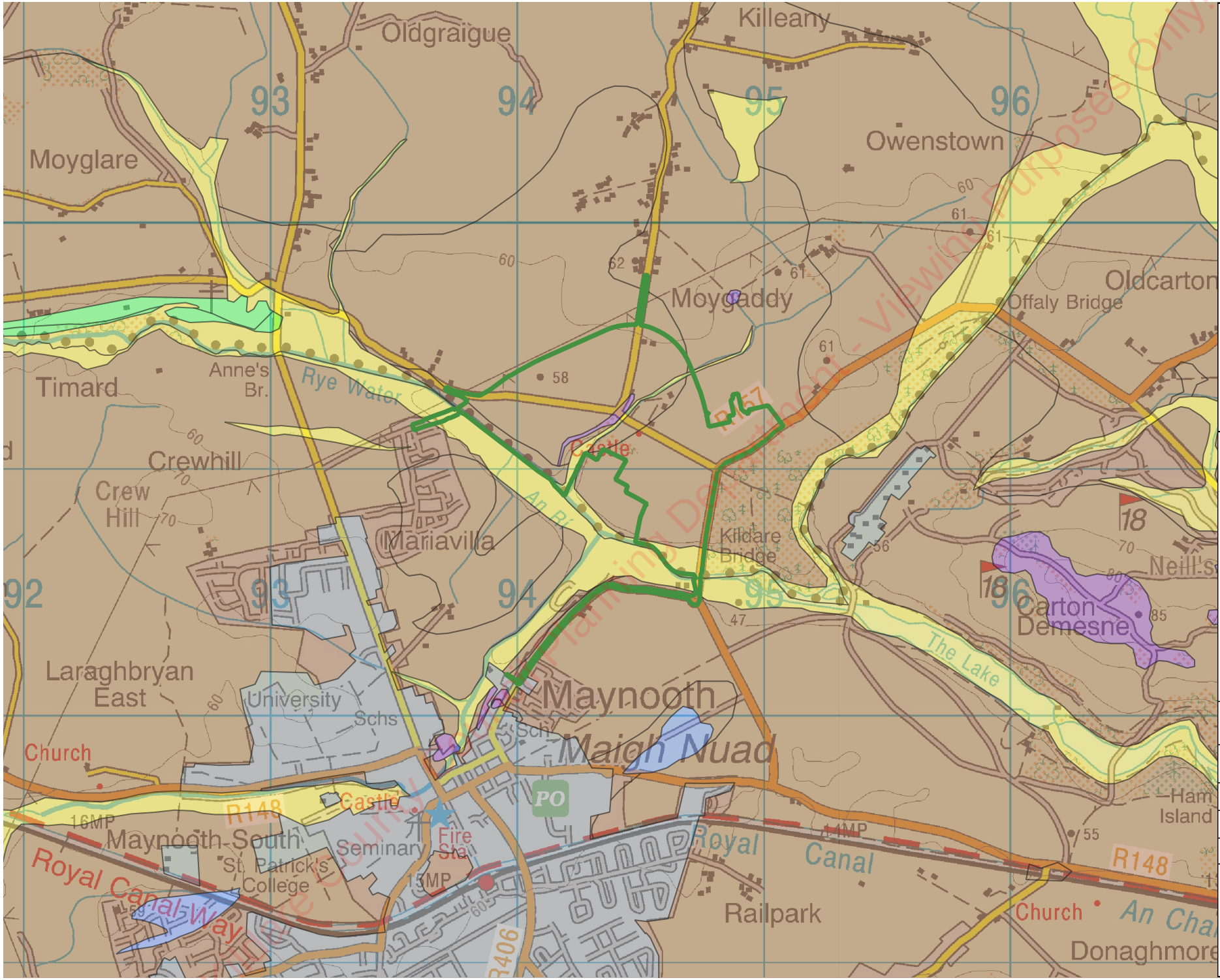

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Map Legend

EIAR Site Boundary

Local Subsoils

- Alluvium
- Sand and Gravels
- Lacustrine Sediments
- Made Ground
- Rock
- Limestone Tills

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N

Drawing Title: Local Subsoils

Project Title: Moygaddy Mixed-Use Development

Drawn By	Checked By
TM	MW
Project No.	Drawing No.
210414	Figure 7-2
Scale	Date
1:20,000	30.08.2022

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

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Map Legend

EIAR Site Boundary

Bedrock Geology

- Visean basinal limestone "Calp"
- Waulsortian mudbank

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N

Drawing Title: Bedrock Geology

Project Title: Moygaddy Mixed-Use Development

Drawn By	Checked By
TM	MW
Project No.	Drawing No.
210414	Figure 7-3
Scale	Date
1:20,000	23.08.2022

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

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7.4 Characteristics of the Development

The Proposed Development is described in full in Chapter 4 and will generally comprise the following:

- A Strategic Employment Zone (**Site A**) which consists of three office buildings, public road widening, and rod realignment works along the existing R157 Regional Road, the delivery new public access road under the Maynooth Outer Orbital Road (MOOR) scheme, internal access road and associated car parking;
- Healthcare Facilities (**Site B**) which includes a nursing home and primary care centre as well public road widening and rod realignment works along the existing R157 Regional Road, internal access road and associated car parking, and all associated infrastructure;
- The Strategic Housing Development (**Site C**) will consist of 360 no. residential homes, a creche facility, internal access roads, approximately 500m of distributor road, pedestrian and cycle improvements, a cycle bridge, shared communal and private open space and all associated site development works.
- The Maynooth Outer Orbital Road (**MOOR**) which consists of approximately 1.7km of distributor road, a single span bridge, pedestrian and cycle improvement measures, a cycle bridge, upgrade works to an existing road and all associated utilities,
- The **Kildare Bridge** planning application includes road upgrade works to the existing R157 Regional Road, a proposed pedestrian / cycle bridge adjacent to the existing Kildare Bridge, as well as a proposed wastewater connection to the Maynooth Municipal Wastewater Pumping Station to the southeast of the Proposed Development in County Kildare.
- The **Moyglare Bridge** planning application includes for the provision of an integral single span bridge over the Rye Water River with associated flood plain works and embankments, as well as services and utilities connections from the proposed onsite pumping station at SHD site.

The Proposed Development will require minor alteration of ground levels to ensure it is at an adequate level for the proposed surface water drainage and foul water drainage due to the relatively flat topography as described in Section 7.3.1 above. Excavation of soil and subsoil will be required for the Proposed Development in preparation for the construction of building foundations, suitable sub-formation for road construction, trenching for foul and drainage water infrastructure and other services.

The estimated amounts of excavations and earthworks required for the various components of the Proposed Development are described in the relevant Construction & Environmental Management Plans appended to this EIAR.

Surface Water Drainage

Surface water management proposals are described in detail in Volumes 3a, 3b & 3c(i) Appendix 4-9 Engineering Services Report and Volume 3d Appendix 4-6 MOOR Preliminary Design Report and are summarised below.

Surface water management for the Proposed Development is designed to comply with the Greater Dublin Strategic Drainage Study (GDSDS) policies and guidelines and the requirements of Meath County Council. The surface water design includes for a climate change factor of 20%

It is proposed that surface water within Site A (from roads, roofs and hardstanding areas) will drain via gravity, and via hydrocarbon interceptors, and infiltration area/attenuation storage areas, to an existing ditch along the southern boundary, which is to be replaced by a new filter trench as part of the upgraded and re-aligned R157. This drain conveys surface water runoff in a southerly direction, ultimately towards the Rye Water River at the proposed outfall location described below. The main Site A attenuation systems will comprise underground poly-tunnel systems, to be located within the Proposed Development's green spaces, with adequate drainage to maintain functionality.

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It is proposed that surface water within Site B (from roads, roofs and hardstanding areas) will drain via gravity, and via hydrocarbon interceptors, and infiltration area/attenuation storage (located in the shared carpark at Site B), to a high-level outfall at the Rye Water River, just west of the Kildare Bridge.

It is proposed that surface water within Site C (from roads, roofs and hardstanding areas) will drain via gravity, and via hydrocarbon interceptors, and infiltration areas/attenuation storage The main Site C attenuation systems will comprise underground poly-tunnel systems, to be located within the Proposed Development's green spaces, with adequate drainage to maintain functionality.

It is proposed that surface water run off on the MOOR is to be captured by adequately spaced trapped road gullies, which connect to a main carrier drain under the road. Surface water attenuation will be used to control runoff from all hard surfaces in accordance with the GDSDS.

The discharge rates for Site A, Site B**,** Site C and the MOOR are to be restricted to a flow rate less than the current greenfield equivalent runoff rate, to ensure that there is no increase in flow rates and volumes to be discharged from the Proposed Development to the receiving infrastructure and waterbodies. Therefore, there will be no adverse impact on downstream properties.

Water Supply

Water Supply proposals are described in detail in Volumes 3a, 3b & 3c(i) in Appendix 4-9 Engineering Services Report and are summarised below.

It is proposed for Site A to provide an extension from the existing 200mm watermain located at Kildare Bridge, to be provided along the MOOR road to the connection point at the site boundary. It is anticipated that a metered 150mm high density polyethylene connection will be required to serve the proposed office units.

It is proposed for Site B to provide an extension from the existing 200mm watermain located at Kildare Bridge, to be provided along the MOOR road to the connection point at the site boundary. It is anticipated that a metered 150mm high density polyethylene connection will be required to serve the proposed healthcare units.

It is proposed for Site C to provide an extension to the extension to the existing 200m ductile iron watermain at Moyglare Close, with a metered 200mm high density polyethylene connection serving the site. Internal distribution networks will serve the proposed residential units. An extension from the site's watermain will be provided to serve the proposed crèche facility and scouts den.

The Proposed Development will be subject to a New Connection Agreement with Irish Water, with all details in accordance with their requirements. There is no proposed extraction of groundwater at the site for drinking water purposes.

Wastewater Infrastructure

Wastewater management proposals are described in detail in Volumes 3a, 3b & 3c(i) in Appendix 4-9 Engineering Services Report and are summarised below.

It is proposed to provide a Pumping Station constructed to IW standards and specifications to the west of the proposed nursing home building at Site B within the Proposed Development. Site A to the northeast, Site B to the east and Site C to the west of the proposed pumping station will drain by gravity to the Pumping Station where it will then be pumped to the existing Irish Water network along the L1013 Local Road in County Kildare, approximately 1km south of the proposed pumping station.

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Individual buildings will connect to the 225mm diameter foul drains via individual 100mm diameter connections, as per Irish Water Code of Practice for Wastewater Infrastructure.

The foul sewers are sealed and there will be no discharge of wastewater to ground within the Proposed Development. Wastewater will be pumped from the Proposed Development to the Maynooth pumping station, and onwards from Maynooth pumping station to the Leixlip Wastewater Treatment Plant.

7.5 Potential Impacts and Mitigation Measures Implemented

7.5.1 Do-Nothing Scenario

The 'Do-Nothing' scenario considers the evolution of the site, from an environmental perspective, if the Proposed Development were not to be carried out. In this scenario, the site would remain as a green-field site for grazing by livestock and the land use would remain as small-scale pastural agriculture. The impact to the topsoil from compaction and poaching of soft ground from the presence of livestock would continue as a result of the Do-Nothing Scenario. The potential effects associated with continuing the Do-Nothing scenario are considered to be likely long term and imperceptible in the context of impacts on soils and geology.

The lands are zoned for development and so continuing the existing land uses would be contrary to local policy and, would have a slight negative effect in the context of losing the benefits associated with the proposed land uses.

7.5.2 Construction Phase Impacts

7.5.2.1 Site A - Strategic Employment Zone

The likely impacts of Site A and mitigation measures that will be put in place to eliminate or reduce them are outlined below.

7.5.2.1.1 *Effects on Land and Land-Use*

The construction of the Site A footprint (6.8 ha) will result in the loss of the majority of this land as agricultural land. There will be no effects on the lands adjoining Site A.

Pathway: Excavation/ foundation construction.

Receptor: Land or Land-Use

Potential Pre-mitigation Impact: Negative, slight, direct, likely, permanent impact on land and land-use.

Impact Assessment/ Mitigation Measures

There will be loss of agricultural land within the site, and therefore the effects of actual agricultural land-use in the area must be considered. As per the Meath County Development Plan 2021-2027 and the Maynooth Environs Local Area Plan 2013-2019, Site A is zoned for Strategic Employment. Site A use is in keeping with the current land zoning; therefore, the Proposed Development will have a slight, positive impact on land use.

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Residual Impact

Agriculture is the dominant land use in the area of Site A. As Site A is in keeping with the current land zoning, the residual effect is considered to be positive, direct, slight, likely, permanent impact on land and land-use.

Significance of Effects

For the reasons outlined above, no significant effects on land or land-use will occur.

7.5.2.1.2 *Subsoil Excavation and Bedrock Excavation*

Excavation of subsoil and bedrock will be required for site levelling, for the installation of foundations for the access roads, carpark and buildings, and service trenching. This will result in a permanent loss of subsoil and bedrock at excavation locations. The bedrock at the site can be classified as of "Low" importance, and the soil and subsoil deposits at the site could be classified as of "Low" importance as neither are unique and are abundant in the wider landscape. Due to the nature of the proposed works, which do not require deep excavations combined with the topography and nature of the underlying subsoils and bedrock, significant volumes of excavated materials are not anticipated. It is estimated that c13,843m^3 of soil, subsoil and bedrock will be excavated that that the majority of this will be required for reuse onsite. Approximately 12,400m^3 of additional fill material will be required to achieve formation levels which will be sourced from offsite authorised quarries or from excavation works from nearby construction projects, including other components of the Proposed Development, in accordance with relevant waste legislation.

Pathway: Extraction/ excavation.

Receptor: Land, topsoil, subsoil and bedrock.

Potential Pre-mitigation Impact: Negative, slight/moderate, direct, likely, permanent impact on subsoil and bedrock.

Mitigation Measures

- Excavated (existing) overburden and/or bedrock material will be reused on site, where possible;
- Excavated materials will be used at adjacent sites subject to Article 17 authorisations or other regulatory consents in order to minimise environmental effects.
- A minimal volume of topsoil and subsoil will be removed to allow for infrastructural work to take place due to optimisation of the layout by mitigation by design; and,
- Construction of service trenching, and surface water attenuation features will generate excess material, and excess material will be used locally within the site for achieving building formation levels and landscaping.
- Any spoil generated which will be removed offsite will be done so in accordance with the relevant regulations and best practice including waste management legislation if the material is considered a by-product or waste.

Residual Impact

Due to the shallow nature of the excavations, the design and mitigation measures to reuse excavated materials onsite and the 'low' value of the soil and rock resource the magnitude of the effect is considered to be a negative, direct, slight, likely, permanent impact on topsoil, subsoils and bedrock.

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Significance of Effects

For the reasons outlined above, no significant effects on land, topsoil, subsoils or bedrock will occur.

7.5.2.1.3 *Contamination of Soil by Leakages and Spillages and Alteration of Soil Geochemistry*

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk. The accumulation of spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. Large spills or leaks have the potential to result in significant effects on the geological and water environment.

Pathway: Topsoil, subsoil and bedrock pore space.

Receptor: Topsoil, subsoil and bedrock.

Potential Pre-Mitigation Impact: Negative, direct, slight, short term, unlikely impact on topsoil, subsoils and bedrock.

Proposed Mitigation Measures

- All plant and machinery will be serviced before being mobilised to site;
- No plant maintenance will be completed on site, any broken down plant will be removed from site to be fixed;
- Refuelling will be completed in a controlled manner using drip trays at all times;
- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water;
- Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores;
- Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored;
- Ancillary equipment such as hoses and pipes will be contained within the bund;
- Taps, nozzles or valves will be fitted with a lock system;
- Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Drip-trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills;
- Only designated trained operators will be authorised to refuel plant on site;
- Procedures and contingency plans will be set up to deal with emergency accidents or spills; and,
- An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment.

Highest standards of site management will be maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A suitably qualified individual will be given the task of overseeing the pollution prevention measures agreed for the site to ensure that they are operating safely and effectively as well as having responsibility for the implementation of Emergency Procedures for spill control measures.

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Residual Impacts

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction sites. Proven and effective measures to mitigate the risk of spills and leaks have been proposed above and will break the pathway between the potential source and the receptor. The residual effect is considered to be - Negative, imperceptible, direct, short-term, unlikely effect on topsoil, subsoils and bedrock.

Significance of Effects

For the reasons outlined above, no significant effects on land, topsoil, subsoil or bedrock will occur.

7.5.2.1.4 *Soil and Subsoil Compaction*

Unintended soil and subsoil compaction may occur due to inadvertent construction traffic throughout Site A. Soil compaction leads to bulk density of the soil increasing and the total porosity decreasing which can pose a risk to site drainage due to the lower level of ground permeability on the site.

Mechanism: Excavation / handling / storage.

Receptor: Land, topsoil, subsoil.

Pre-Mitigation Potential Impact: Negative, direct, slight, likely impact on topsoil and subsoils.

Proposed Mitigation Measures

The underlying in-situ soils and subsoils will be subject to a certain amount of compaction, but this will be unavoidable.

Any infill material/landscaping that is required will be placed and levelled in appropriate lift thicknesses to ensure the material is not over compacted thereby retaining drainage properties. This will be relevant within the proposed landscaped and green areas of the site.

Residual Impacts

The potential effects are limited to the period of the constriction phase when soils are exposed. The entire site will be subject to ground level finishes which will eliminate the potential for any significant residual effects. Negative, slight, direct, likely impact on topsoil and subsoils.

Significance of Effects

For the reasons outlined above, no significant effects on topsoil or subsoil will occur.

7.5.2.1.5 *Geological impact on Local Designated Sites*

Mechanism: Excavation / handling / storage of soil/subsoils.

Receptor: Land, topsoil, subsoil and associated designated sites.

Potential Impact: None, no direct excavation or development of any local designated sites are proposed. No indirect or indirect impacts on land, topsoil, subsoil or bedrock underlying Designated Sites are anticipated.

Residual Impact: None.

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7.5.2.2 Site B – Healthcare Application

The likely impacts of Site B and mitigation measures that will be put in place to eliminate or reduce them are outlined below.

7.5.2.2.1 *Effects on Land and Land-Use*

The construction of the Site B footprint (6.6 ha) will result in the loss of the majority of this land as agricultural land. There will be no effects on the lands adjoining Site B.

Pathway: Excavation/ foundation construction.

Receptor: Land or Land-Use

Potential Pre-mitigation Impact: Negative, slight, direct, likely, permanent impact on land and land-use.

Impact Assessment/ Mitigation Measures

There will be loss of agricultural land within the site, and therefore the effects of actual agricultural land-use in the area must be considered. As per the Meath County Development Plan 2021-2027 and the Maynooth Environs Local Area Plan 2013-2019, Site B is zoned for Community Infrastructure. Site B use is in keeping with the current land zoning; therefore, Site B will have a slight positive impact on land use.

Residual Impact

Agriculture is the dominant land use in the area of Site B. As Site B is in keeping with the current land zoning, the residual effect is considered to be positive, direct, slight, likely, permanent impact on land and land-use.

Significance of Effects

For the reasons outlined above, no significant effects on land or land-use will occur.

7.5.2.2.2 *Subsoil Excavation and Bedrock Excavation*

Excavation of subsoil and bedrock will be required for site levelling, for the installation of foundations for the access roads, carpark and buildings, and service trenching. This will result in a permanent loss of subsoil and bedrock at excavation locations. The bedrock at the site can be classified as of "Low" importance, and the soil and subsoil deposits at the site could be classified as of "Low" importance as neither are unique and are abundant in the wider landscape. Due to the nature of the proposed works, which do not require deep excavations combined with the topography and nature of the underlying subsoils and bedrock, significant volumes of excavated materials are not anticipated. It is estimated that c11,000m^3 of soil, subsoil and bedrock will be excavated that that the majority of this will be required for reuse onsite (approximately 6,500m^3). Approximately 4,500m^3 of additional cut material will be required to be moved from the site to achieve formation levels. This may be available to either supply other parts of the Proposed Development site, supply other adjacent projects or will be managed in accordance with either by-product or waste legislation obligations.

Pathway: Extraction/ excavation.

Receptor: Land, topsoil, subsoil and bedrock.

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Potential Pre-mitigation Impact: Negative, slight/moderate, direct, likely, permanent impact on subsoil and bedrock.

Mitigation Measures

- Excavated (existing) overburden material will be reused on site, where possible;
- A minimal volume of topsoil and subsoil will be removed to allow for infrastructural work to take place due to optimisation of the layout by mitigation by design; and,
- Construction of service trenching, and surface water attenuation features will generate excess material, and excess material will be used locally within the site for achieving building formation levels and landscaping.
- Any spoil generated which will be removed offsite will be done so in accordance with the relevant regulations and best practice including waste management legislation if the material is considered a waste.

Residual Impact

Due to the shallow nature of the excavations, the design and mitigation measures to reuse excavated materials onsite and the 'low' value of the soil and rock resource the magnitude of the effect is considered to be a negative, direct, slight, likely, permanent impact on topsoil, subsoils and bedrock.

Significance of Effects

For the reasons outlined above, no significant effects on land, topsoil, subsoils or bedrock will occur.

7.5.2.2.3 *Contamination of Soil by Leakages and Spillages and Alteration of Soil Geochemistry*

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk. The accumulation of spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. Large spills or leaks have the potential to result in significant effects on the geological and water environment.

Pathway: Topsoil, subsoil and bedrock pore space.

Receptor: Topsoil, subsoil and bedrock.

Potential Pre-Mitigation Impact: Negative, direct, slight, short term, unlikely impact on topsoil, subsoils and bedrock.

Proposed Mitigation Measures

- All plant and machinery will be serviced before being mobilised to site;
- No plant maintenance will be completed on site, any broken down plant will be removed from site to be fixed;
- Refuelling will be completed in a controlled manner using drip trays at all times;
- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water;
- Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores;
- Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored;
- Ancillary equipment such as hoses and pipes will be contained within the bund;

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- Taps, nozzles or valves will be fitted with a lock system;
- Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Drip-trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills;
- Only designated trained operators will be authorised to refuel plant on site;
- Procedures and contingency plans will be set up to deal with emergency accidents or spills; and,
- An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment.

Highest standards of site management will be maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A suitably qualified individual will be given the task of overseeing the pollution prevention measures agreed for the site to ensure that they are operating safely and effectively as well as having responsibility for the implementation of Emergency Procedures for spill control measures.

Residual Impacts

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction sites. Proven and effective measures to mitigate the risk of spills and leaks have been proposed above and will break the pathway between the potential source and the receptor. The residual effect is considered to be - Negative, imperceptible, direct, short-term, unlikely effect on topsoil, subsoils and bedrock.

Significance of Effects

For the reasons outlined above, no significant effects on land, topsoil, subsoil or bedrock will occur.

7.5.2.2.4 *Soil and Subsoil Compaction*

Unintended soil and subsoil compaction may occur due to inadvertent construction traffic throughout Site B. Soil compaction leads to bulk density of the soil increasing and the total porosity decreasing which can pose a risk to site drainage due to the lower level of ground permeability on the site.

Mechanism: Excavation / handling / storage.

Receptor: Land, topsoil, subsoil.

Pre-Mitigation Potential Impact: Negative, direct, slight, likely impact on topsoil and subsoils.

Proposed Mitigation Measures

The underlying in-situ soils and subsoils will be subject to a certain amount of compaction, but this will be unavoidable.

Any infill material/landscaping that is required will be placed and levelled in appropriate lift thicknesses to ensure the material is not over compacted thereby retaining drainage properties. This will be relevant within the proposed landscaped and green areas of the site.

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Residual Impacts

The potential effects are limited to the period of the construction phase when soils are exposed. The entire site will be subject to ground level finishes which will eliminate the potential for any significant residual effects. Negative, slight, direct, likely impact on topsoil and subsoils.

Significance of Effects

For the reasons outlined above, no significant effects on topsoil or subsoil will occur.

7.5.2.2.5 *Geological impact on Local Designated Sites*

Mechanism: Excavation / handling / storage of soil/subsoils.

Receptor: Land, topsoil, subsoil and associated designated sites.

Potential Impact: None, no direct excavation or development of any local designated sites are proposed. No indirect or indirect impacts on land, topsoil, subsoil or bedrock underlying Designated Sites are anticipated.

Residual Impact: None.

7.5.2.3 Site C – Strategic Housing Development

The likely impacts of Site C and mitigation measures that will be put in place to eliminate or reduce them are outlined below.

7.5.2.3.1 *Effects on Land and Land-Use*

The construction of the Site C footprint (19.5 ha) will result in the loss of the majority of this land as agricultural land. There will be no effects on the lands adjoining Site C.

Pathway: Excavation/ foundation construction.

Receptor: Land or Land-Use

Potential Pre-mitigation Impact: Negative, slight, direct, likely, permanent impact on land and land-use.

Impact Assessment/ Mitigation Measures

There will be loss of agricultural land within the site, and therefore the effects of actual agricultural land-use in the area must be considered. As per the Meath County Development Plan 2021-2027 and the Maynooth Environs Local Area Plan 2013-2019, Site C is zoned for Housing. Site C use is in keeping with the current land zoning; therefore, Site C will have a slight positive impact on land use.

Residual Impact

Agriculture is the dominant land use in the area of Site C. As Site C is in keeping with the current land zoning, the residual effect is considered to be positive, direct, slight, likely, permanent impact on land and land-use.

Significance of Effects

For the reasons outlined above, no significant effects on land or land-use will occur.

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7.5.2.3.2 *Subsoil Excavation and Bedrock Excavation*

Excavation of subsoil and bedrock will be required for site levelling, for the installation of foundations for the access roads, carpark and buildings, and service trenching. This will result in a permanent loss of subsoil and bedrock at excavation locations. The bedrock at the site can be classified as of "Low" importance, and the soil and subsoil deposits at the site could be classified as of "Low" importance as neither are unique and are abundant in the wider landscape. Due to the nature of the proposed works, which do not require deep excavations combined with the topography and nature of the underlying subsoils and bedrock, significant volumes of excavated materials are not anticipated. It is estimated that c22,450m^3 of soil, subsoil and bedrock will be excavated and that the majority of this will be required for reuse onsite. Approximately 26,560m^3 of additional fill material will be required to achieve formation levels which will be sourced from offsite authorised quarries or from excavation works from nearby construction projects, including other component of the Proposed Development, in accordance with relevant waste legislation.

Pathway: Extraction/ excavation.

Receptor: Land, topsoil, subsoil and bedrock.

Potential Pre-mitigation Impact: Negative, slight/moderate, direct, likely, permanent impact on subsoil and bedrock.

Mitigation Measures

- Excavated (existing) overburden material will be reused on site, where possible;
- A minimal volume of topsoil and subsoil will be removed to allow for infrastructural work to take place due to optimisation of the layout by mitigation by design; and,
- Construction of service trenching, and surface water attenuation features will generate excess material, and excess material will be used locally within the site for achieving building formation levels and landscaping.
- Any spoil generated which will be removed offsite will be done so in accordance with the relevant regulations and best practice including waste management legislation if the material is considered a by-product or a waste.

Residual Impact

Due to the shallow nature of the excavations, the design and mitigation measures to reuse excavated materials onsite and the 'low' value of the soil and rock resource the magnitude of the effect is considered to be a negative, direct, slight, likely, permanent impact on topsoil, subsoils and bedrock.

Significance of Effects

For the reasons outlined above, no significant effects on land, topsoil, subsoils or bedrock will occur.

7.5.2.3.3 *Contamination of Soil by Leakages and Spillages and Alteration of Soil Geochemistry*

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk. The accumulation of spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. Large spills or leaks have the potential to result in significant effects on the geological and water environment.

Pathway: Topsoil, subsoil and bedrock pore space.

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Receptor: Topsoil, subsoil and bedrock.

Potential Pre-Mitigation Impact: Negative, direct, slight, short term, unlikely impact on topsoil, subsoils and bedrock.

Proposed Mitigation Measures

- All plant and machinery will be serviced before being mobilised to site;
- No plant maintenance will be completed on site, any broken down plant will be removed from site to be fixed;
- Refuelling will be completed in a controlled manner using drip trays at all times;
- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water;
- Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores;
- Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored;
- Ancillary equipment such as hoses and pipes will be contained within the bund;
- Taps, nozzles or valves will be fitted with a lock system;
- Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Drip-trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills;
- Only designated trained operators will be authorised to refuel plant on site;
- Procedures and contingency plans will be set up to deal with emergency accidents or spills; and,
- An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment.

Highest standards of site management will be maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A suitably qualified individual will be given the task of overseeing the pollution prevention measures agreed for the site to ensure that they are operating safely and effectively as well as having responsibility for the implementation of Emergency Procedures for spill control measures.

Residual Impacts

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction sites. Proven and effective measures to mitigate the risk of spills and leaks have been proposed above and will break the pathway between the potential source and the receptor. The residual effect is considered to be - Negative, imperceptible, direct, short-term, unlikely effect on topsoil, subsoils and bedrock.

Significance of Effects

For the reasons outlined above, no significant effects on land, topsoil, subsoil or bedrock will occur.

7.5.2.3.4 *Soil and Subsoil Compaction*

Unintended soil and subsoil compaction may occur due to inadvertent construction traffic throughout Site C. Soil compaction leads to bulk density of the soil increasing and the total porosity decreasing which can pose a risk to site drainage due to the lower level of ground permeability on the site.

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Mechanism: Excavation / handling / storage.

Receptor: Land, topsoil, subsoil.

Pre-Mitigation Potential Impact: Negative, direct, slight, likely impact on topsoil and subsoils.

Proposed Mitigation Measures

The underlying in-situ soils and subsoils will be subject to a certain amount of compaction, but this will be unavoidable.

Any infill material/landscaping that is required will be placed and levelled in appropriate lift thicknesses to ensure the material is not over compacted thereby retaining drainage properties. This will be relevant within the proposed landscaped and green areas of the site.

Residual Impacts

The potential effects are limited to the period of the construction phase when soils are exposed. The entire site will be subject to ground level finishes which will eliminate the potential for any significant residual effects

Negative, slight, direct, likely impact on topsoil and subsoils.

Significance of Effects

For the reasons outlined above, no significant effects on topsoil or subsoil will occur.

7.5.2.3.5 *Geological impact on Local Designated Sites*

Mechanism: Excavation / handling / storage of soil/subsoils.

Receptor: Land, topsoil, subsoil and associated designated sites.

Potential Impact: None, no direct excavation or development of any local designated sites are proposed. No indirect or indirect impacts on land, topsoil, subsoil or bedrock underlying Designated Sites are anticipated.

Residual Impact: None.

7.5.2.4 MOOR – Maynooth Outer Orbital Road

The likely impacts of the MOOR and mitigation measures that will be put in place to eliminate or reduce them are outlined below.

7.5.2.4.1 *Effects on Land and Land-Use*

The construction of the MOOR footprint (6.6ha) will result in the loss of land as agricultural land. There will be no effects on the lands adjoining the MOOR.

Pathway: Excavation/ foundation construction.

Receptor: Land or Land-Use

Potential Pre-mitigation Impact: Negative, slight, direct, likely, permanent impact on land and land-use.

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Impact Assessment/ Mitigation Measures

There will be loss of agricultural land within the site, and therefore the effects of actual agricultural land-use in the area must be considered. As per the Meath County Development Plan 2021-2027 and the Maynooth Environs Local Area Plan 2013-2019, the MOOR is zoned for transport as an indicative road route. The MOOR use is in keeping with the current land zoning; therefore, the MOOR will have a slight positive impact on land use.

Residual Impact

Agriculture is the dominant land use in the area of the MOOR. As the MOOR is in keeping with the current land zoning, the residual effect is considered to be positive, direct, slight, likely, permanent impact on land and land-use.

Significance of Effects

For the reasons outlined above, no significant effects on land or land-use will occur.

7.5.2.4.2 *Subsoil Excavation and Bedrock Excavation*

Excavation of subsoil and bedrock will be required for site levelling, for the installation of foundations and service trenching. This will result in a permanent loss of subsoil and bedrock at excavation locations. The bedrock at the site can be classified as of "Low" importance, and the soil and subsoil deposits at the site could be classified as of "Low" importance as neither are unique and are abundant in the wider landscape. Due to the nature of the proposed works, which do not require deep excavations combined with the topography and nature of the underlying subsoils and bedrock, significant volumes of excavated materials are not anticipated. It is estimated that c34,750m^3 of soil, subsoil and bedrock will be excavated and that the majority of this will be required for reuse onsite. Approximately 17,500m^3 of additional cut material will be required to be moved from the site to achieve formation levels. This may be available to either supply other parts of the Proposed Development site, supply other adjacent projects or will be managed in accordance with either by-product or waste legislation obligations.

Pathway: Extraction/ excavation.

Receptor: Land, topsoil, subsoil and bedrock.

Potential Pre-mitigation Impact: Negative, slight/moderate, direct, likely, permanent impact on subsoil and bedrock.

Mitigation Measures

- Excavated (existing) overburden material will be reused on site, where possible;
- A minimal volume of topsoil and subsoil will be removed to allow for infrastructural work to take place due to optimisation of the layout by mitigation by design; and,
- Construction of service trenching, and surface water attenuation features will generate excess material, and excess material will be used locally within the site for achieving building formation levels and landscaping.
- Any spoil generated which will be removed offsite will be done so in accordance with the relevant regulations and best practice including waste management legislation if the material is considered a by-product or waste.

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Residual Impact

Due to the shallow nature of the excavations, the design and mitigation measures to reuse excavated materials onsite and the 'low' value of the soil and rock resource the magnitude of the effect is considered to be a negative, direct, slight, likely, permanent impact on topsoil, subsoils and bedrock.

Significance of Effects

For the reasons outlined above, no significant effects on land, topsoil, subsoils or bedrock will occur.

7.5.2.4.3 *Contamination of Soil by Leakages and Spillages and Alteration of Soil Geochemistry*

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk. The accumulation of spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. Large spills or leaks have the potential to result in significant effects on the geological and water environment.

Pathway: Topsoil, subsoil and bedrock pore space.

Receptor: Topsoil, subsoil and bedrock.

Potential Pre-Mitigation Impact: Negative, direct, slight, short term, unlikely impact on topsoil, subsoils and bedrock.

Proposed Mitigation Measures

- All plant and machinery will be serviced before being mobilised to site;
- No plant maintenance will be completed on site, any broken down plant will be removed from site to be fixed;
- Refuelling will be completed in a controlled manner using drip trays at all times;
- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water;
- Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores;
- Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored;
- Ancillary equipment such as hoses and pipes will be contained within the bund;
- Taps, nozzles or valves will be fitted with a lock system;
- Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Drip-trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills;
- Only designated trained operators will be authorised to refuel plant on site;
- Procedures and contingency plans will be set up to deal with emergency accidents or spills; and,
- An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment.

Highest standards of site management will be maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A suitably qualified individual will be given the task of overseeing the pollution

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prevention measures agreed for the site to ensure that they are operating safely and effectively as well as having responsibility for the implementation of Emergency Procedures for spill control measures.

Residual Impacts

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction sites. Proven and effective measures to mitigate the risk of spills and leaks have been proposed above and will break the pathway between the potential source and the receptor. The residual effect is considered to be - Negative, imperceptible, direct, short-term, unlikely effect on topsoil, subsoils and bedrock.

Significance of Effects

For the reasons outlined above, no significant effects on land, topsoil, subsoil or bedrock will occur.

7.5.2.4.4 *Soil and Subsoil Compaction*

Unintended soil and subsoil compaction may occur due to inadvertent construction traffic throughout the construction of the MOOR. Soil compaction leads to bulk density of the soil increasing and the total porosity decreasing which can pose a risk to site drainage due to the lower level of ground permeability on the site.

Mechanism: Excavation / handling / storage.

Receptor: Land, topsoil, subsoil.

Pre-Mitigation Potential Impact: Negative, direct, slight, likely impact on topsoil and subsoils.

Proposed Mitigation Measures

The underlying in-situ soils and subsoils will be subject to a certain amount of compaction, but this will be unavoidable.

Any infill material/landscaping that is required will be placed and levelled in appropriate lift thicknesses to ensure the material is not over compacted thereby retaining drainage properties. This will be relevant within the proposed landscaped and green areas of the site.

Residual Impacts

The potential effects are limited to the period of the construction phase when soils are exposed. The entire site will be subject to ground level finishes which will eliminate the potential for any significant residual effects

Negative, slight, direct, likely impact on topsoil and subsoils.

Significance of Effects

For the reasons outlined above, no significant effects on topsoil or subsoil will occur.

7.5.2.4.5 *Geological impact on Local Designated Sites*

Mechanism: Excavation / handling / storage of soil/subsoils.

Receptor: Land, topsoil, subsoil and associated designated sites.

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Potential Impact: None, no direct excavation or development of any local designated sites are proposed. No indirect or indirect impacts on land, topsoil, subsoil or bedrock underlying Designated Sites are anticipated.

Residual Impact: None.

7.5.2.5 Kildare Bridge Application

As the Kildare Bridge application currently exists as existing road, there will be no considerable works associated with its construction. The likely impacts of the Kildare Bridge application and mitigation measures that will be put in place to eliminate or reduce them are outlined below.

7.5.2.5.1 *Effects on Land and Land-Use*

The construction of the Kildare Bridge works application footprint (1.2ha) will result in the upgrade of existing road. A loss of a small portion of agricultural land will be associated with this component of the Proposed Development along each side of the proposed pedestrian/cycle bridge

Approximately 115m of existing road will also be upgraded. There will be no effects on the lands adjoining the Kildare Bridge application.

Pathway: Excavation/ Bridge Construction.

Receptor: Land or Land-Use

Potential Pre-mitigation Impact: Negative, slight, direct, likely, permanent impact on land and land-use.

Impact Assessment/ Mitigation Measures

There will be minimal loss of agricultural land within the site, however the effects of actual agricultural land-use in the area must be considered. As per the Greater Dublin Area Cycle Network Plan a number of cycle routes have been proposed in the surrounding area. The proposed Kildare Bridge works will provide pedestrian and cycle infrastructure to the local area providing a positive impact on land use.

Residual Impact

Road network is the dominant land use in the area of the Kildare Bridge application. As the Kildare Bridge works are in keeping with the current existing infrastructure, the residual effect is considered to be positive, direct, slight, likely, permanent impact on land and land-use.

Significance of Effects

For the reasons outlined above, no significant effects on land or land-use will occur.

7.5.2.5.2 *Subsoil Excavation and Bedrock Excavation*

Excavation of subsoil will be required for the installation of piled foundations and reinforced earth abutments. The excavation of

The excavation of existing road materials will also occur in the installation of the wastewater infrastructure which will travel along the existing public road.

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This will result in a permanent loss of subsoil excavation locations. The soil and subsoil deposits at the site could be classified as of "Low" importance as neither are unique nor abundant in the wider landscape.

Pathway: Extraction/ excavation.

Receptor: Land, topsoil, subsoil, existing road network.

Potential Pre-mitigation Impact: Negative, slight/moderate, direct, likely, permanent impact on subsoil and bedrock.

Mitigation Measures

- Excavated (existing) overburden material will be reused on site, where possible;
- A minimal volume of topsoil and subsoil will be removed to allow for infrastructural work to take place due to optimisation of the layout by mitigation by design; and,
- Construction of service trenching, and surface water attenuation features will generate excess material, and a excess material will be used locally within the site for achieving building formation levels and landscaping.
- Any spoil generated which will be removed offsite will be done so in accordance with the relevant regulations and best practice including waste management legislation if the material is considered a waste or a by-product.

Residual Impact

Due to the shallow nature of the excavations, the design and mitigation measures to reuse excavated materials onsite and the 'low' value of the soil and rock resource the magnitude of the effect is considered to be a negative, direct, slight, likely, permanent impact on topsoil, subsoils.

Significance of Effects

For the reasons outlined above, no significant effects on land, topsoil, subsoils or bedrock will occur.

7.5.2.5.3 *Contamination of Soil by Leakages and Spillages and Alteration of Soil Geochemistry*

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk. The accumulation of spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. Large spills or leaks have the potential to result in significant effects on the geological and water environment.

Pathway: Topsoil, subsoil and bedrock pore space.

Receptor: Topsoil, subsoil and bedrock.

Potential Pre-Mitigation Impact: Negative, direct, slight, short term, unlikely impact on topsoil, subsoils and bedrock.

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Proposed Mitigation Measures

- All plant and machinery will be serviced before being mobilised to site;
- No plant maintenance will be completed on site, any broken down plant will be removed from site to be fixed;
- Refuelling will be completed in a controlled manner using drip trays at all times;
- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water;
- Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores;
- Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored;
- Ancillary equipment such as hoses and pipes will be contained within the bund;
- Taps, nozzles or valves will be fitted with a lock system;
- Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Drip-trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills;
- Only designated trained operators will be authorised to refuel plant on site;
- Procedures and contingency plans will be set up to deal with emergency accidents or spills; and,
- An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment.

Highest standards of site management will be maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A suitably qualified individual will be given the task of overseeing the pollution prevention measures agreed for the site to ensure that they are operating safely and effectively as well as having responsibility for the implementation of Emergency Procedures for spill control measures.

Residual Impacts

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction sites. Proven and effective measures to mitigate the risk of spills and leaks have been proposed above and will break the pathway between the potential source and the receptor. The residual effect is considered to be - Negative, imperceptible, direct, short-term, unlikely effect on topsoil, subsoils and bedrock.

Significance of Effects

For the reasons outlined above, no significant effects on land, topsoil, subsoil or bedrock will occur.

7.5.2.5.4 *Soil and Subsoil Compaction*

Unintended soil and subsoil compaction may occur due to inadvertent construction traffic throughout the construction of the Kildare Bridge works. Soil compaction leads to bulk density of the soil increasing and the total porosity decreasing which can pose a risk to site drainage due to the lower level of ground permeability on the site.

Mechanism: Excavation / handling / storage.

Receptor: Land, topsoil, subsoil.

Pre-Mitigation Potential Impact: Negative, direct, slight, likely impact on topsoils and subsoils.

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Proposed Mitigation Measures

The underlying in-situ soils and subsoils will be subject to a certain amount of compaction, but this will be unavoidable.

Any infill material/landscaping that is required will be placed and levelled in appropriate lift thicknesses to ensure the material is not over compacted thereby retaining drainage properties. This will be relevant within the proposed landscaped and green areas of the site.

Residual Impacts

The potential effects are limited to the period of the construction phase when soils are exposed. The entire site will be subject to ground level finishes which will eliminate the potential for any significant residual effects

Negative, slight, direct, likely impact on topsoil and subsoils.

Significance of Effects

For the reasons outlined above, no significant effects on topsoil or subsoil will occur.

7.5.2.5.5 *Geological impact on Local Designated Sites*

Mechanism: Excavation / handling / storage of soil/subsoils.

Receptor: Land, topsoil, subsoil and associated designated sites.

Potential Impact: None, no direct excavation or development of any local designated sites are proposed. No indirect or indirect impacts on land, topsoil, subsoil or bedrock underlying Designated Sites are anticipated.

Residual Impact: None.

7.5.2.6 Moyglare Bridge Application

The likely impacts of the Moyglare Bridge application and mitigation measures that will be put in place to eliminate or reduce them are outlined below.

7.5.2.6.1 *Effects on Land and Land-Use*

The construction of the Moyglare Bridge application footprint (0.5ha) will result in the loss of the majority of this land as agricultural land. There will be no effects on the lands adjoining the Moyglare Bridge.

Pathway: Excavation/ Bridge construction.

Receptor: Land or Land-Use

Potential Pre-mitigation Impact: Negative, slight, direct, likely, permanent impact on land and land-use.

Impact Assessment/ Mitigation Measures

There will be loss of agricultural land within the site, and therefore the effects of actual agricultural land-use in the area must be considered. As per the Meath County Development Plan 2021-2027 and the

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Maynooth Environs Local Area Plan 2013-2019, The Moyglare Bridge is zoned for transport as an indicative road route linking the Moyglare Hall housing estate to the proposed MOOR. The Moyglare Bridge use is in keeping with current land zoning; therefore, the Moyglare Bridge will have a slight positive impact on land use.

Residual Impact

Agriculture is the dominant land use in the area of the Moyglare Hall application. As it is in keeping with the current land zoning, the residual effect is considered to be positive, direct, slight, likely, permanent impact on land and land-use.

Significance of Effects

For the reasons outlined above, no significant effects on land or land-use will occur.

7.5.2.6.2 *Subsoil Excavation and Bedrock Excavation*

Excavation of subsoil and bedrock will be required for site levelling, for the installation of foundations for the proposed road and bridge. This will result in a permanent loss of subsoil and bedrock at excavation locations. The bedrock at the site can be classified as of "Low" importance, and the soil and subsoil deposits at the site could be classified as of "Low" importance as neither are unique and are abundant in the wider landscape.

Pathway: Extraction/ excavation.

Receptor: Land, topsoil, subsoil and bedrock.

Potential Pre-mitigation Impact: Negative, slight/moderate, direct, likely, permanent impact on subsoil and bedrock.

Mitigation Measures

- Excavated (existing) overburden material will be reused on site, where possible;
- A minimal volume of topsoil and subsoil will be removed to allow for infrastructural work to take place due to optimisation of the layout by mitigation by design; and,
- Construction of service trenching, and surface water attenuation features will generate excess material, and excess material will be used locally within the site for achieving building formation levels and landscaping.
- Any spoil generated which will be removed offsite will be done so in accordance with the relevant regulations and best practice including waste management legislation if the material is considered a waste or a by-product.

Residual Impact

Due to the shallow nature of the excavations, the design and mitigation measures to reuse excavated materials onsite and the 'low' value of the soil and rock resource the magnitude of the effect is considered to be a negative, direct, slight, likely, permanent impact on topsoil, subsoils and bedrock.

Significance of Effects

For the reasons outlined above, no significant effects on land, topsoil, subsoils or bedrock will occur.

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7.5.2.6.3 *Contamination of Soil by Leakages and Spillages and Alteration of Soil Geochemistry*

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk. The accumulation of spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. Large spills or leaks have the potential to result in significant effects on the geological and water environment.

Pathway: Topsoil, subsoil and bedrock pore space.

Receptor: Topsoil, subsoil and bedrock.

Potential Pre-Mitigation Impact: Negative, direct, slight, short term, unlikely impact on topsoil, subsoils and bedrock.

Proposed Mitigation Measures

- All plant and machinery will be serviced before being mobilised to site;
- No plant maintenance will be completed on site, any broken down plant will be removed from site to be fixed;
- Refuelling will be completed in a controlled manner using drip trays at all times;
- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water;
- Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores;
- Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored;
- Ancillary equipment such as hoses and pipes will be contained within the bund;
- Taps, nozzles or valves will be fitted with a lock system;
- Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Drip-trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills;
- Only designated trained operators will be authorised to refuel plant on site;
- Procedures and contingency plans will be set up to deal with emergency accidents or spills; and,
- An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment.

Highest standards of site management will be maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A suitably qualified individual will be given the task of overseeing the pollution prevention measures agreed for the site to ensure that they are operating safely and effectively as well as having responsibility for the implementation of Emergency Procedures for spill control measures.

Residual Impacts

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction sites. Proven and effective measures to mitigate the risk of spills and leaks have been proposed above and will break the pathway between the potential source and the receptor. The residual effect is considered to be - Negative, imperceptible, direct, short-term, unlikely effect on topsoil, subsoils and bedrock.

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Significance of Effects

For the reasons outlined above, no significant effects on land, topsoil, subsoil or bedrock will occur.

7.5.2.6.4 *Soil and Subsoil Compaction*

Unintended soil and subsoil compaction may occur due to inadvertent construction traffic throughout the Moyglare Bridge application. Soil compaction leads to bulk density of the soil increasing and the total porosity decreasing which can pose a risk to site drainage due to the lower level of ground permeability on the site.

Mechanism: Excavation / handling / storage.

Receptor: Land, topsoil, subsoil.

Pre-Mitigation Potential Impact: Negative, direct, slight, likely impact on topsoil and subsoils.

Proposed Mitigation Measures

The underlying in-situ soils and subsoils will be subject to a certain amount of compaction, but this will be unavoidable.

Any infill material/landscaping that is required will be placed and levelled in appropriate lift thicknesses to ensure the material is not over compacted thereby retaining drainage properties. This will be relevant within the proposed landscaped and green areas of the site.

Residual Impacts

The potential effects are limited to the period of the construction phase when soils are exposed. The entire site will be subject to ground level finishes which will eliminate the potential for any significant residual effects

Negative, slight, direct, likely impact on topsoil and subsoils.

Significance of Effects

For the reasons outlined above, no significant effects on topsoil or subsoil will occur.

7.5.2.6.5 *Geological impact on Local Designated Sites*

Mechanism: Excavation / handling / storage of soil/subsoils.

Receptor: Land, topsoil, subsoil and associated designated sites.

Potential Impact: None, no direct excavation or development of any local designated sites are proposed. No indirect or indirect impacts on land, topsoil, subsoil or bedrock underlying Designated Sites are anticipated.

Residual Impact: None.

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7.5.3 Operational Phase Impacts

7.5.3.1 Site A – Strategic Employment Zone

Due to the nature of Site A, no impacts on soils and geology are anticipated during the operational phase. The operational stage of the Proposed Development consists of the typical activities in a commercial area and will not involve further disturbance to the topsoil, subsoils and geology of the area.

No cumulative impacts on the land, soils and geology environment are envisaged during the operational stage.

7.5.3.2 Site B – Healthcare Application

Due to the nature of Site B, no impacts on soils and geology are anticipated during the operational phase. The operational stage of Site B consists of the typical activities in a commercial area and will not involve further disturbance to the topsoil, subsoils and geology of the area.

No cumulative impacts on the land, soils and geology environment are envisaged during the operational stage.

7.5.3.3 Site C – Strategic Housing Development

Due to the nature of Site C, no impacts on soils and geology are anticipated during the operational phase. The operational stage of Site C consists of the typical activities in a residential area and will not involve further disturbance to the topsoil, subsoils and geology of the area.

No cumulative impacts on the land, soils and geology environment are envisaged during the operational stage.

7.5.3.4 MOOR – Maynooth Outer Orbital Road

Due to the nature of the MOOR, potential impacts during the operational phase include the accidental spillage of petroleum hydrocarbons as a result of operational use of the road. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. Large spills or leaks have the potential to result in significant effects on the geological and water environment.

Pathway: Topsoil, subsoil and bedrock pore space.

Receptor: Topsoil, subsoil and bedrock.

Pre-Mitigation Potential Impact: Negative, direct, slight, short term, unlikely impact on topsoil, subsoils and bedrock.

Proposed Mitigation Measures:

Drainage design measures are set out in Volume 3d Appendix 4-6 MOOR Preliminary Design Report. Adequately spaced trapped road gullies, which connect to a carrier drain is proposed for the MOOR. Surface water attenuation systems included in the design will comprise of large enclosed vegetated ponds, and shall be preceded by a Class 1 bypass fuel separator.

No cumulative impacts on the land, soils and geology environment are envisaged during the operational stage.

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7.5.3.5 Kildare Bridge Application

Due to the nature of the Kildare Bridge application, no impacts on soils and geology are anticipated during the operational phase. The operational stage of Kildare Bridge application consists of the typical activities involved with public amenity and will not involve further disturbance to the topsoil, subsoils and geology of the area.

No cumulative impacts on the land, soils and geology environment are envisaged during the operational stage.

7.5.3.6 Moyglare Bridge Application

Due to the nature of the Moyglare Bridge application, no impacts on soils and geology are anticipated during the operational phase. The operational stage of Moyglare Bridge application consists of the typical activities involved with transport infrastructure and will not involve further disturbance to the topsoil, subsoils and geology of the area.

No cumulative impacts on the land, soils and geology environment are envisaged during the operational stage.

7.5.4 Cumulative effects resulting from Interactions between various elements of the proposed development

The interaction of the various elements of the Proposed Development was considered and assessed in this EIAR with regards land, soils and geology. The potential for each individual element of the Proposed Development on its own to result in significant effects on land, soils and geology was considered throughout this impact assessment. The entire project including the interactions between all its elements was also considered and assessed for its potential to result in significant effects on geological receptors in the impact assessment presented. The complex interactions between the requirement for site grading and the requirement to protect the Rye Water River and Blackhall Little Stream, human health, and other receptors were taken into account for the entire project and any impacts avoided through a series of mitigation measures that were fully described. The management and handling of potentially harmful materials across the entire project was assessed with mitigation proposed and described fully.

All interactions between the various elements of the project were considered and assessed both individually and cumulatively within this chapter. Where necessary, mitigation was employed to ensure that no cumulative effects will arise as a result of the interaction of the various elements of the development with one another.

7.5.5 Cumulative In-combination Effects

The potential cumulative effects of the Proposed Development in combination with the other projects described in Chapter 2 of this report have been considered in terms of impacts of impacts on land, soils and geology.

There are no active quarries, major earthworks, or other associated activities which could impact upon the soils and geological environment adjacent the proposed development site.

There are a number of proposed or permitted housing developments within the vicinity of the Proposed Development. A description of the developments is provided in Chapter 2, and where appropriate the application documentation, EIAR and NIS for each development have been reviewed

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Further information on the above is provided in Table 2-8 of Chapter 2.

The proposed and permitted developments listed above will require minimal earthworks due to size, scale and nature of the developments. Furthermore, the scale of the proposed earthworks at the Proposed Development site is negligible in the context of the land, soil and geology type, which is common in the area, and so the potential cumulative effects are considered imperceptible.

With the implementation of mitigation measures for the Proposed Development as outlined above, no significant cumulative impacts on land, soils and geology environment are anticipated during the construction or operation phases of the Proposed Development in combination with other developments. The other developments listed above will also include appropriate mitigation measures to reduce impacts to local land, soil and geology. Potential cumulative impact will be permanent, imperceptible, and neutral.

7.5.6 Human Health Effects

In the context of land soils and geology, human health effects may arise on sites where there are known and unknown risks associated with soil and ground contamination. The walkovers and extensive site investigations show that the site is a greenfield rather than brownfield site. Detailed Human Health risk assessments are required for brownfield sites with the potential for exposures to gases or chemicals which does not arise for the Proposed Development site. The operation of residential and commercial developments including the MOOR in accordance with established Health & Safety legislation and best practice ensures that there will be no significant negative effects associated with its operation on human health. Conclusion

Excavation of topsoil, subsoil and bedrock will be required for site levelling, building foundations, road construction and for the installation of drainage and services (wastewater, water supply, electricity, etc.). This will result in a permanent relocation and removal of subsoil and bedrock at most excavation locations. Due to the nature of the site topography and geology it will be possible to reuse cut material as fill which minimises the need to remove all excavated materials. Excess material will be used for reinstatement and landscaping works around the site at the end of the construction phase where possible. Any material moved offsite will be manage in accordance with relevant waste legislation should it be considered either a by-product or a waste. The bedrock at the site can be classified as of “Low” importance, and the soil and subsoil deposits at the site could be classified as of “Low” importance as neither are unique and are abundant in the wider landscape.

Storage and handling of hydrocarbons/chemicals will be carried out using best practice methods. Measures to prevent subsoil compaction during excavation and reinstatement will be undertaken to prevent impacts on soil and subsoils with potential also minimising potential indirect effects on water quality.

No significant impacts on land, soil and geology will occur.

No significant cumulative impacts on land, soil and geology will occur due to the Proposed Development

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8. HYDROLOGY & HYDROGEOLOGY

8.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) identifies, describes, and assesses the potential effects of the 'Proposed Development' on the local hydrological and hydrogeological environment (surface water and ground water). This section of the EIAR has been completed in accordance with the EIA guidance and legislation set out in Chapter 1: Introduction. The full description of the Proposed Development is provided in Chapter 4 of this EIAR.

The '**Proposed Development'** comprises a number of components:

- **Site A** – Strategic Employment Zone, which consists of three office buildings, public road widening, and road realignment works along the existing R157 Regional Road and L22143 Local Road, the delivery of a new public access road under the Maynooth Outer Orbital Road (MOOR) scheme, internal access road and associated car parking;
- **Site B** – Healthcare Facilities which includes a nursing home and primary care centre as well public road widening and rod realignment works along the existing R157 Regional Road, internal access road and associated car parking, and all associated infrastructure;
- **Site C** – Strategic Housing Development which consists of 360 no. residential homes, a creche facility, internal access roads, approximately 500m of distributor road, pedestrian and cycle improvements, a cycle bridge, shared communal and private open space and all associated site development works.
- Maynooth Outer Orbital Road (**MOOR**) which consists of approximately 1.7km of new distributor road, a single span bridge, pedestrian and cycle improvement measures, a cycle bridge, upgrade works to existing road network and all associated utilities.
- The **Kildare Bridge** planning application includes road upgrade works to the existing R157 Regional Road, a proposed pedestrian / cycle bridge adjacent to the existing Kildare Bridge, as well as a proposed wastewater connection to the Maynooth Municipal Wastewater Pumping Station to the southeast of the Proposed Development in County Kildare.
- The **Moyglare Bridge** planning application includes for the provision of an integral single span bridge over the Rye Water River with associated flood plain works and embankments, as well as services and utilities connections.

While there are multiple planning applications, it was considered prudent to consider all six applications together under one EIAR, due to the proximity, construction timelines and shared infrastructure between the developments. **Site A, Site B, Site C, MOOR, Kildare Bridge and Moyglare Bridge** will be collectively referred to as the 'Proposed Development' henceforth.

The Proposed Development site is located on the northern environs of Maynooth town, Co. Kildare. While the development sites are located in County Meath, two planning applications will also be submitted to Kildare County Council due to commonly shared road and utility infrastructure works required to connect the Proposed Development to services and utility infrastructure within Co. Kildare.

This Environmental Impact Assessment Report (EIAR) chapter provides a baseline assessment of the environmental setting of the Proposed Development in terms of hydrology and hydro-geology, and discusses the potential likely significant effects of the construction and operation of this Proposed Development. This chapter also discusses any mitigation measures required to be put in place to limit any identified potentially significantly impacts to hydrology and hydrogeology and provides an assessment of residual impacts and significance of effects.

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The objectives of this assessment are to:

- Produce a baseline study of the existing water environment (surface and groundwater) in the area of the Proposed Development;
- Identify likely positive and negative impacts of the development on surface and groundwater during construction and operational phases of the Proposed Development;
- Identify mitigation measures to be implemented to avoid, reduce, or offset significant negative impacts;
- Assess significant residual impacts and effects;
- Assess cumulative and in-combination impacts of the Proposed Development along with other local infrastructure developments.

8.2 Statement of Authority

This section of the EIAR has been prepared by Michael Watson, David Naughton and Daire O'Shaughnessy of MKO. Michael Watson is a professional geologist (PGeo) and full member of IEMA (MIEMA) as well as a Chartered Environmentalist (CEnv). Michael joined McCarthy Keville O'Sullivan Ltd. in 2014 having gained over 15 years' experience in a Cork based environmental & hydrogeological consultancy firm and has 20 years' experience completing hydrological and hydrogeological assessments including EIAR assessments. David is an Environmental Scientist with over five years of consultancy experience with MKO and has been involved in a number of EIAR applications. David has worked as project manager for a number of EIAR applications, providing a pivotal link liaising between the applicant and the EIAR project team to ensure all work is carried out to a high standard. David holds a BSc (Hons) in Environmental Science. Daire O'Shaughnessy is an Environmental Scientist who holds a B.Sc (Hons) in Environmental Science with three years of consultancy experience with MKO and has been involved in a range of EIAR applications.

8.2.1 Scoping and Consultation

The scope for this chapter of the EIAR has also been informed by consultation with statutory consultees, bodies with environmental responsibility and other interested parties. This consultation process is outlined in Section 2.6 of this EIAR. Issues and concerns highlighted with respect to the hydrological and hydrogeological environment are summarised in Table 8-1 below.

Table 8-1 Summary of Water Environment related Scoping Responses

Consultee	Description	Addressed in Section
Geological Survey of Ireland (GSI)	› Recommended use of Groundwater Data Viewer to identify areas of High to Extreme Vulnerability and 'Rock near or at surface'.	8.3.1 & 8.4.4 The Groundwater Data Viewer was used during the desk study of the and has been used for the assessment. As outlined in Section 8.3.1 below.
Health Service Executive (HSE)	› Any natural flood plains or wetlands on or in the vicinity of the Proposed Development should be identified and measures implemented to ensure they	8.4.3 & 8.5.1 The recommendations set out by the HSE have been taken into account in the project design and EIAR & NIS.

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Consultee	Description	Addressed in Section
	are protected from the development. › The impact the Prosed Development could have on watercourses further downstream should be identified and assessed. › An integrated approach to surface water management should be implemented on site. › It is recommended that green space and nature-based solutions are provided for the storage and conveyance of rainwater on site to improve flood mitigation as outlined in the Greater Dublin Strategic Drainage Study (SUDS).	
Inland Fisheries Ireland (IFI)	› The Liffey Catchment is regarded as a very important fishery and so requests due consideration to the catchment area. › A buffer zone of 10 meters (minimum) is requested between the Rye Water River and the Proposed Development. › The Blackhall Little Stream which runs through the middle of the site should not be altered or disturbed, and again a buffer zone is requested. › Riparian vegetation should be left undisturbed as much as possible. › Best practice is recommended at all times in relation to activities that may impact surface waters. › Comprehensive surface water management measures must be implemented.	8.4.3.2, 6.4.2& 8.5.1 The project design has taken account of and implemented the IFI requests.
Department of Agriculture, Food & the Marine	› Following initial scoping and consultation the department made no observations or raised any concerns related to the Proposed Development	N/A

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Consultee	Description	Addressed in Section
Irish Water (IW)	› No response received at the time of report issue.	N/A
Meath County Council, Water Services	› No response received at the time of report issue.	N/A
National Parks and Wildlife Services (NPWS)	› No response received at the time of report issue.	N/A

8.2.2 Relevant Legislation

This EIAR is prepared in accordance with the requirements of European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive') as amended by Directive 2014/52/EU.

Regard has also been taken of the requirements of the following legislation (where relevant) as it pertains to the water environment:

- S.I. No. 349 of 1989: European Communities (Environmental Impact Assessment) Regulations, and subsequent Amendments (S.I. No. 84 of 1994, S.I. No. 101 of 1996, S.I. No. 351 of 1998, S.I. No. 93 of 1999, S.I. No. 450 of 2000 and S.I. No. 538 of 2001, S.I. 134 of 2013 and the Minerals Development Act 2017), the Planning and Development Act 2000 (as amended), and S.I. 600 of 2001 Planning and Development Regulations and subsequent Amendments. These instruments implement EU Directive 85/337/EEC and subsequent amendments, on the assessment of the effects of certain public and private projects on the environment;
- Directives 2011/92/EU and 2014/52/EU on the assessment of the effects of certain public and private projects on the environment, including Circular Letter PL 1/2017: Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive);
- Planning and Development Act, 2000, as amended;
- S.I. No 296 of 2018: European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 which transposes the provisions of Directive 2014/52/EU into Irish law;
- S.I. No. 293 of 1988: European Communities (Quality of Salmonid Waters) Regulations, resulting from EU Directive 78/659/EEC on the Quality of Fresh Waters Needing Protection or Improvement in order to Support Fish Life;
- S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009 (as amended by S.I. No. 296/2009; S.I. No. 386/2015; S.I. No. 327/2012; and S.I. No. 77/2019 and giving effect to Directive 2008/105/EC on environmental quality standards in the field of water policy and Directive 2000/60/EC establishing a framework for Community action in the field of water policy) and S.I. No. 722 of 2003 European Communities (Water Policy) Regulations which implement EU Water Framework Directive (2000/60/EC) establishing a framework for the Community action in the field of water policy and provide for implementation of 'daughter' Groundwater Directive (2006/118/EC) on the protection of groundwater against pollution and deterioration. Since 2000 water management in the EU has been directed by the Water Framework Directive (2000/60/EC) (as amended by Decision No. 2455/2011/EC; Directive 2008/32/EC; Directive 2008/105/EC; Directive

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2009/31/EC; Directive 2013/39/EU; Council Directive 2013/64/EU; and Commission Directive 2014/101/EU ("WFD"). The WFD was given legal effect in Ireland by the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003

- S.I. No. 684 of 2007: Waste Water Discharge (Authorisation) Regulations 2017, resulting from EU Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances (the Groundwater Directive);S.I. No. 106 of 2007: European Communities (Drinking Water) Regulations 2007and S.I. No. 122 of 2014: European Communities (Drinking Water) Regulations 2014, arising from EU Directive 98/83/EC on the quality of water intended for human consumption (the "Drinking Water Directive") and EU Directive 2000/60/EC;
- S.I. No. 9 of 2010: European Communities Environmental Objectives (Groundwater) Regulations 2010 (as amended by S.I. No. 389/2011; S.I. No. 149/2012; S.I. No. 366/2016; the Radiological Protection (Miscellaneous Provisions) Act 2014; and S.I. No. 366/2016); and,

8.2.3 Relevant Guidance

The water section of the EIAR is carried out in accordance with guidance contained in the following:

- Environmental Protection Agency (2022): Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;
- European Commission (2017) Guidance on Screening;
- European Commission (2017) Guidance on Scoping;
- European Commission (2017) Guidance on the preparation of the Environmental Impact Assessment Report;
- Institute of Geologists Ireland (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- National Roads Authority (2005): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (Inland Fisheries Ireland, 2016);
- PPG1 - General Guide to Prevention of Pollution (UK Guidance Note);
- PPG5 – Works or Maintenance in or Near Watercourses (UK Guidance Note);
- CIRIA (Construction Industry Research and Information Association) 2006: Guidance on 'Control of Water Pollution from Linear Construction Projects' (CIRIA Report No. C648, 2006); and,
- CIRIA 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2006.

8.3 Methodology

8.3.1 Desk Study & Preliminary Hydrological Assessment

A desk study and preliminary hydrological assessment of the site of the Proposed Development and the surrounding area was completed in advance of the site walkover. This involved collection of all relevant geological, hydrological, hydrogeological and meteorological data for the area. This included review of the following sources:

- Environmental Protection Agency (EPA) Maps application (https://gis.epa.ie/EPAMaps/);
- Geological Survey of Ireland (GSI) - Groundwater Database (www.gsi.ie);
- GSI – Groundwater Wells and Springs database (https://www.rgsi.ie/en-ie/data-and-maps/Pages/Groundwater.aspx#Wells)

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- GSI – 1:500,000 scale bedrock geology map of Ireland (https://www.gsi.ie/en-ie/data-and-maps/Pages/Bedrock.aspx)
- Met Eireann Meteorological Databases (www.met.ie);
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- EPA/Water Framework Directive Map Viewer (www.catchments.ie);
- Bedrock Geology 1:100,000 Scale Map Series, Sheet 21 (Geology of Meath - Kildare). Geological Survey of Ireland (GSI, 2003);
- Geological Survey of Ireland (2003) – Groundwater Body Initial Characterization Reports;
- OPW Flood Hazard Mapping (www.floodinfo.ie);
- Environmental Protection Agency – "Hydrotool" Map Viewer (www.epa.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie); and,
- Department of Environment, Community and Local Government on-line mapping viewer (www.myplan.ie).

8.3.2 Impact Assessment Methodology

Please refer to Chapter 1 of the EIAR for details on the impact assessment methodology (EPA, 2002, 2003, 2015 and 2017). In addition to the above methodology, the sensitivity of the water environment receptors was assessed on completion of the desk study and baseline study. Levels of sensitivity which are defined in Table 8-2 are then used to assess the potential effect that the Proposed Development may have on them.

Table 8-2: Receptor Sensitivity Criteria (Adapted from www.sepa.org.uk)

Sensitivity of Receptor	
Not sensitive	Receptor is of low environmental importance (e.g., surface water quality classified by EPA as A3 waters or seriously polluted), fish sporadically present or restricted. Heavily engineered or artificially modified and may dry up during summer months. Environmental equilibrium is stable and is resilient to changes which are considerably greater than natural fluctuations, without detriment to its present character. No abstractions for public or private water supplies. GSI groundwater vulnerability "Low" – "Medium" classification and "Poor" aquifer importance.
Sensitive	Receptor is of medium environmental importance or of regional value. Surface water quality classified by EPA as A2. Salmonid species may be present and may be locally important for fisheries. Abstractions for private water supplies. Environmental equilibrium copes well with all natural fluctuations but cannot absorb some changes greater than this without altering part of its present character. GSI groundwater vulnerability "High" classification and "Locally" important aquifer.
Very sensitive	Receptor is of high environmental importance or of national or international value i.e., NHA or SAC. Surface water quality classified by EPA as A1 and salmonid spawning grounds present. Abstractions for public drinking water supply. GSI groundwater vulnerability "Extreme" classification and "Regionally" important aquifer

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8.4 Receiving Environment

8.4.1 Site Description and Topography

The Proposed Development is located in both County Meath on the northern environs of Maynooth town and Co. Kildare. Please refer to Figure 1-1 of Chapter: Introduction, for the site location.

Site A: Strategic Employment Zone Application

The site boundary for the proposed Site A is approximately 6.8 hectares (ha). the site is bounded by the R157 Regional Road to the east, the L22143 Local Road to the west, and farmland to the north, south and west. Site A is currently a green-field site which supports small-scale agriculture. The site is relatively flat with a topography ranging from approximately 56m OD (Ordnance Datum) in the south of the site to 60m OD in the centre and north of the site. There is an existing drainage ditch around the perimeter of the agricultural field in which the site is located. The drainage ditch was observed to be dry during site visits due to good draining soils (moderate permeability) and flat topography of the site. The Blackhall Little stream is located to the northwest of the site, more than 250m northwest of the proposed office buildings and associated infrastructure. The proposed section of the Maynooth Outer Orbital Road (MOOR) will run in a northwest direction from the office/business park towards the Blackhall Little stream. The MOOR will run right up to the southern boundary of the site where it will cross the stream.

Due to the nature of Site A, there will be a substantial water requirement once operational, primarily for washing and plumbing facilities. The existing Irish Water Mains within the Study Area are reported as having their source as the Dunboyne Water Supply Zone (WSZ). Site A is located entirely within the Liffey and Dublin Bay (09) Water Framework Directive (WFD) Catchment.

Site B: Healthcare Application

The site boundary for the proposed Site B is approximately 6.6 hectares (ha). The site is bounded by the Rye Water River to the south and the R157 regional road to the east. The site is currently a green-field site which supports small-scale agricultural practices. The areas to the north and west of the site are also used for small scale agriculture. The site is relatively flat where infrastructure is proposed although the topography slopes gradually down towards the Rye Water River to the south. The topography ranges from approximately 56m OD (Ordnance Datum) in the north of the site to 46m OD at the southern boundary of the site at the Rye Water River. There is an existing drainage ditch around the western and northern perimeter of the agricultural field in which the site is located. The drainage ditch was observed to be dry during site visits due to good draining soils and relatively flat topography of the site. The Rye Water River is located to the south of the site, more than 45m south of the closest proposed infrastructure.

Due to the nature of Site B, there will be a substantial water requirement once operational, primarily for washing and plumbing facilities. The existing Irish Water Mains within the Study Area are reported as having their source as the Dunboyne Water Supply Zone (WSZ). Site B is located entirely within the Liffey and Dublin Bay (09) Water Framework Directive (WFD) Catchment.

Site C: Strategic Housing Development (SHD)

The site boundary for the proposed Site C (SHD) is approximately 19.5 hectares (ha). The site infrastructure is located approximately 250m west of the R157 Regional Road and is bounded by the L22143 Local Road which runs along the north of the site from east to west with farmland to the north, south and west. Site C is currently a green-field site which supports small-scale agriculture.

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The site is relatively flat with a topography ranging from approximately 58m OD (Ordnance Datum) in the west of the site to 47m OD in the south and east of the site. There is an existing drainage ditch around the perimeter of the agricultural field in which the site is located. The drainage ditch was observed to be dry during site visits due to good draining soils (moderate permeability). The Blackhall Little stream runs from north to south through the centre of the site, approximately 55m east of the proposed housing development. The proposed section of the Maynooth Outer Orbital Road (MOOR) will run in a northeast direction from the proposed Moyglare Bridge northeast towards the Blackhall Little stream. The MOOR will run across the western boundary of the Rye Water River which will include a new watercourse bridge crossing, and upgrade works on an existing crossing [un named]over the Blackhall Little will take place to the northeast of the site.

Due to the nature of Site C, there will be a substantial water requirement once operational, primarily for washing and plumbing facilities. The existing Irish Water Mains within the Study Area are reported as having their source as the Dunboyne Water Supply Zone (WSZ). Site C is located entirely within the Liffey and Dublin Bay (09) Water Framework Directive (WFD) Catchment.

MOOR: Maynooth Outer Orbital Road

The site boundary for the proposed Maynooth Outer Orbital Road (MOOR) is approximately 6.6 hectares (ha). The site is bounded by the R157 Regional Road to the east, the site is bounded by the Moyglare Hall road to the southwest, the L22143 Local Road to the west, the L2214 Local Road to the north and the R157 Regional Road to the east and southeast. The MOOR once constructed will provide connectivity from the R157 to the southeast of the site to the L2214 to the north and finally to the Moyglare hall road to the west. The site is relatively flat with a topography ranging from approximately 48m OD (Ordnance Datum) in the south of the site to 62m OD to the north of the site. There is an existing drainage ditch adjacent to the existing roads in which upgrade works will be carried out as part of the MOOR. The drainage ditches were observed to be dry during site visits due to good draining soils (moderate permeability) and flat topography of the site. The Rye Water River travels through the south of the MOOR at two points, one located to the west and one located to the east. Watercourse crossings will be constructed at both locations, to include a new single span vehicular bridge at Moyglare Hall and a pedestrian/cycle bridge adjacent to the existing Kildare bridge. The Blackhall Little stream is located to the north and east of the site and travels through the MOOR at two points, one located to the northeast and one located within the centre. A new watercourse crossing, in the form of a signal span vehicular bridge will be constructed as part of the MOOR over the Blackhall Little stream and upgrade works will also be undertaken on an existing crossing will occur in the centre of the site.

Kildare Bridge Application

The site boundary for the proposed Kildare Bridge application is approximately 1.2 hectares (ha). The site includes upgrade works to the R157 Regional Road to the north of the site along with a standalone pedestrian and cycle bridge across the Rye Water River adjacent to the existing Kildare Bridge. The site boundary is bounded by the L1013 Local Road to the south of the site. The wastewater pumping station (WWPS) which is part of the Proposed Development and the associated rising main will cross the Rye Water River before travelling along the public road and footpath to the Maynooth Municipal WWTP. The Kildare Bridge application is located entirely within the Liffey and Dublin Bay (09) Water Framework Directive (WFD) Catchment.

Moyglare Bridge Application

The site boundary for the proposed Moyglare Bridge application is approximately 0.5 hectares (ha). The site includes a single span bridge over the Rye Water River. The Moyglare Close housing estate is located approximately 5m from the site boundary at its closest point. There are no existing buildings or structures within the site boundary. The site is relatively flat ranging from 48m OD at the north of the

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site to 55m OD to the west. The Moyglare Bridge application is located entirely within the Liffey and Dublin Bay (09) Water Framework Directive (WFD) Catchment.

8.4.2 Water Balance

Long term rainfall and evaporation data was sourced from Met Éireann. The 30-year annual average rainfall (AAR) (1981 – 2010) data from the Met Éireann weather station at Casement, Co. Dublin are presented in Table 8-3. The Casement weather station is located approximately 19.3 km southeast of the Proposed Development site and is the closest weather station for which long-term averages are available. The dataset encompasses data from 1981 – 2010, however it is unlikely that there has been any significant change in annual rainfall patters since that time.

Table 8-3: Local Average long-term Rainfall Data (mm)

Station		Easting (IG)		Northing (IG)	Ht (mOD)		Opened	Closed				
Casement		303311		229022	93							
Jan	Feb	Mar		May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	**Mean AAR (mm)**
64	49	51	52	59	62.5	54	72	60	82	74	76	**754**

The closest synoptic weather station[1] where the average potential evapotranspiration (PE) is recorded is also at Casement, Co. Dublin. As mentioned above, this weather station is located 19.3 km southeast of the Proposed Development site. The long-term PE for this station is 530.5 millimetres per year (mm/yr). this value is a best estimate of the site PE. Actual Evaporation (AE) at the site is estimated as 504 mm/yr (which is 0.95 x PE).

The effective rainfall (ER) represents the water available for runoff and groundwater recharge. The ER for the site is calculated as follows:

Effective Rainfall (ER) = AAR – AE

= 754mm/yr – 504 mm/yr

ER = 250 mm/yr

Based on the recharge co-efficient estimates from the GSI (www.gsi.ie), 22.5% recharge is reported for the majority of **Site A** with moderately permeable subsoil, the majority of **Site B** reports a 7.5% recharge for low permeability subsoil, the majority of **Site C** reports a 7.5% recharge for low permeability subsoil, the majority of the **MOOR** reports a 7.5% recharge for low permeability subsoil, the majority, the majority of **the Kildare Bridge** reports a 15% recharge for low permeability subsoil, the majority the majority of **the Moyglare Bridge** reports a 15% recharge for low permeability subsoil.

This means that for **Site A** 22.5% of the effective rainfall in the area infiltrates into the ground and becomes groundwater, with the remaining 77.5% of the effective rainfall becoming runoff as surface water into the nearby Blackhall Little stream and drainage network. Based on the recharge coefficient, the annual recharge and runoff rates for Site Aare estimated to be 56mm/yr and 194 mm/yr respectively.

[1] *Meteorological station at which observations are made for synoptic meteorology and at the standard synoptic hours of 00:00, 06:00, 12:00, and 18:00.*

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For **Site B** 7.5% of the effective rainfall in the area infiltrates into the ground and becomes groundwater, with the remaining 92.5% of the effective rainfall becoming runoff as surface water towards the nearby Rye Water River to the south. Based on the recharge coefficient, the annual recharge and runoff rates for the Site Bare estimated to be 19mm/yr and 231 mm/yr respectively.

For **Site C** 7.5% of the effective rainfall in the area infiltrates into the ground and becomes groundwater, with the remaining 92.5% of the effective rainfall becoming runoff as surface water towards the nearby Rye Water River to the south and the Blackhall Little Stream within the centre of the site. Based on the recharge coefficient, the annual recharge and runoff rates for Site C are estimated to be 19mm/yr and 231 mm/yr respectively.

For the **MOOR** 7.5% of the effective rainfall in the area infiltrates into the ground and becomes groundwater, with the remaining 92.5% of the effective rainfall becoming runoff as surface water towards the nearby Rye Water River to the south and the Blackhall Little Stream within the centre and north east of the site. Based on the recharge coefficient, the annual recharge and runoff rates for the MOOR are estimated to be 19mm/yr and 231 mm/yr respectively.

For the **Kildare Bridge** application 15% of the the effective rainfall in the area infiltrates into the ground and becomes groundwater, with the remaining 85% of the effective rainfall becoming runoff as surface water towards the nearby Rye Water River to the north of the site. Based on the recharge coefficient, the annual recharge and runoff rates for the Proposed Development are estimated to be 38mm/yr and 212 mm/yr respectively.

For the **Moyglare Bridge** application 15% of the effective rainfall in the area infiltrates into the ground and becomes groundwater, with the remaining 85% of the effective rainfall becoming runoff as surface water towards the nearby Rye Water River to the north of the site. Based on the recharge coefficient, the annual recharge and runoff rates for the Proposed Development are estimated to be 38mm/yr and 212 mm/yr respectively.

8.4.3 Surface Water

8.4.3.1 Regional and Local Hydrology

The entire site of the Proposed Development lies within the Eastern River Basin District (RBD). With respect to regional hydrology, under the Water Framework Directive (WFD), the Proposed Development is located entirely within the Liffey and Dublin Bay (09) surface water catchment. Locally the site is located predominantly within the Liffey_SC_080 and the Rye Water_030 sub-basin, whilst the very eastern part of the site is located within the Rye water _040 sub-basin. The south-eastern portion of the site at Kildare Bridge, is situated within the Lyreen_SC_010 sub-catchment and the Lyreen_020 WFD river sub-basin. A regional hydrology map is shown as Figure 8-2.

8.4.3.2 Existing Local and Site Drainage

A visual inspection of the greenfield site where the Proposed Development is located, and the surrounding area, including drainage mapping, was undertaken by MKO on the 5th of August 2021 and 19th August 2022. The purpose of the site investigation was to inspect the site and determine the current state of the environment and to investigate any residual impacts on the hydrology and hydrogeology from the current land use. Water testing was also carried out on this occasion in order to determine a baseline of water quality in the area. A second round of water sampling was undertaken on the 8th of December 2021 to measure any changes to water quality during periods of higher rainfall.

Particular attention was paid to identifying existing site drainage, drainage patterns, watercourses, water flow directions and any other notable hydrological features.

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There are no streams or rivers which pass through the site boundary of either Site A or Site B. However, Site B is bounded by the Rye Water River which is within the Liffey_SC_080 sub catchment. The Blackhall Little Stream runs through the centre of Site C, while the site is bounded by the Rye Water River to the south. The MOOR crosses the Rye Water River at 2 no. locations to the west and south east of the site, and crosses the Blackhall Little Stream at 2 no. locations at the centre and north east of the site. The Kildare Bridge and Moyglare Bridge applications crosses the Rye Water River.

Site A is relatively flat with a topography ranging from approximately 56m OD (Ordnance Datum) in the south of the site to 60m OD in the centre and north of the site. The Blackhall Little stream is located to the northwest of the site, more than 250m north of the proposed office buildings and associated infrastructure. The MOOR will run right up to the boundary of the stream, and no new watercourse crossing will be constructed as part of the Site A development [albeit a watercourse crossing does form part of the MOOR component of the Proposed Development]. Surface water at Site A currently drains into the nearby Blackhall Little stream and local field drain along the southern boundary, parallel to the R157 Regional Road. This drain conveys runoff in a southerly direction, ultimately towards the Rye Water River.

Site B is relatively flat where infrastructure is proposed although the topography slopes gradually down towards the Rye Water River to the south. The topography ranges from approximately 56m OD (Ordnance Datum) in the north of the site to 46m OD at the southern boundary of the site at the Rye Water River. Surface water at Site B currently drains into the nearby Rye Water River which is located more than 45m south of the closest proposed infrastructure.

Site C is relatively flat with a topography ranging from approximately 58m OD (Ordnance Datum) in the west of the site to 47m OD in the south and east of the site. There is an existing drainage ditch around the perimeter of the agricultural field in which the site is located. The drainage ditch was observed to be dry during site visits. The Blackhall Little stream runs from north to south through the centre of the site, approximately 55m east of the proposed housing development.

The **MOOR** is relatively flat with a topography ranging from approximately 48m OD (Ordnance Datum) in the south of the site to 62m OD to the north of the site. There are existing drainage ditches adjacent to the existing roads in which upgrade works will be carried out as part of the MOOR. The drainage ditches were observed to be dry during site visits. The Rye Water River travels through the south of the MOOR at two points, one located to the west and one located to the east. Watercourse crossings will be constructed at both locations. The Blackhall Little stream is located to the north and east of the site and travels through the MOOR at two points, one located to the north east and one located within the centre. A new watercourse crossing will be constructed as part of the MOOR over the Blackhall Little stream and upgrade works on an existing crossing will occur in the centre of the site.

A local hydrology map is presented as Figure 8-2 and the existing site drainage aerial photograph presented as Figure 8-3. At the time of the first round of water sampling (mid-August 2021), Blackhall Little stream was observed to be very low, and dry in places. During the second round of water sampling which took place in December 2021, the Blackhall Little stream was observed to be much faster flowing, with a significant volume of water contained within the banks. The Rye Water River was also observed to be higher during the second round of water sampling in December when compared to the first round in August. Photos of these watercourses during site visits can be seen in Plate 8-2 – Plate 8-5 below.

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Plate 8-1 Typical drainage channel on site

8.4.3.3 Flood Risk Identification

A detailed Flood Risk Assessment has been prepared by JBA Consulting included as Appendix 8-1 to this EIAR. OPW's indicative river and coastal flood map (www.floodinfo.ie), CFRAM Preliminary Flood Risk Assessment (PFRA) maps which can be accessed at the Department of Environment, Community and Local Government on-line planning mapping (www.myplan.ie), and historical mapping (i.e., 6" & 25" base maps) were consulted to identify those areas as being at risk of flooding.

While there are historic flood incidents recorded along the Rye Water River, to the south of the Proposed Development infrastructure, there are no recorded flood incidents within the Proposed Development footprint from the OPW's indicative river and coastal flood map. Please note that not all local flooding issues are recorded on the OPW database.

The Department of Environment, Community and Local Government on-line mapping viewer (www.myplan.ie) shows a fluvial flood zone directly south of the Proposed Development infrastructure, identified on the PFRA mapping, associated with the Rye Water River. The Proposed Development infrastructure is sited within Flood Zone C (where the probability of flooding from rivers and sea is low (less than 0.1%AEP for both fluvial and coastal flooding)), to ensure appropriate land use for the *'Highly Vulnerable Development'* (Healthcare Infrastructure) in accordance with The Planning System and Flood Risk Management Guidelines for Planning Authorities.

The profile of the existing predicted flood extents indicates that the Rye Water River currently floods from its southern bank, as a result of the significant difference in the over-bank levels i.e., the lands to the north of the Rye Water River are significantly higher than to the south. The Proposed Development infrastructure at Site B is located outside the 1% Fluvial AEP Event.

Based on the above information there is a negligible risk of flooding at the Proposed Development.

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Map Legend

- EIAR Site Boundary
- Rye Water River
- Rye Water Tributaries
- Flood Extents

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N

Drawing Title: Local Hydrology

Project Title: Moygaddy Mixed-Use Development

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TM	MW
Project No.	Drawing No.
210414	Figure 8-1
Scale	Date
1:10,000	30.08.2022

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

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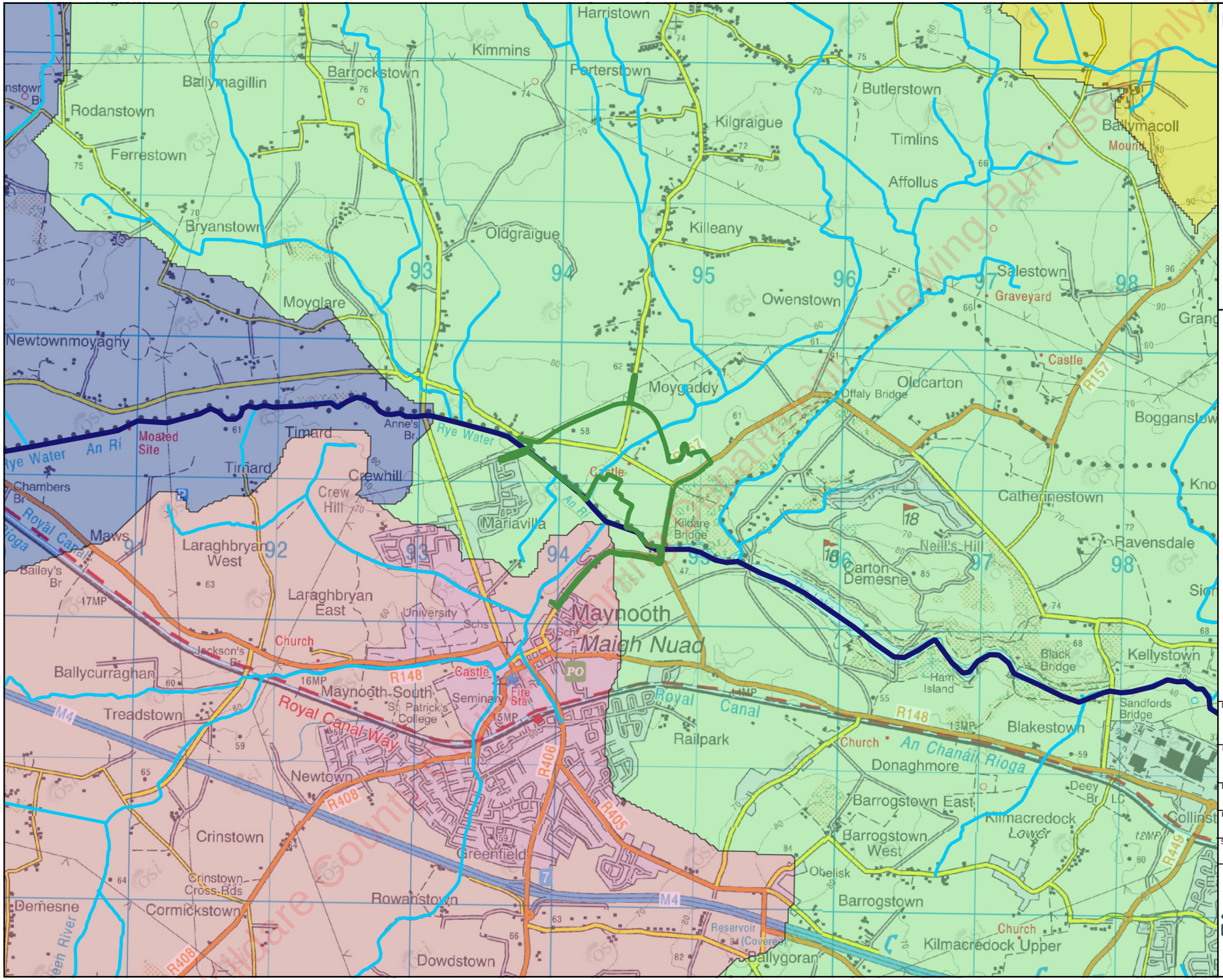

Map Legend

- EIAR Site Boundary
- Rye Water River
- Streams

Water Framework Directive - Subcatchments

- Liffey_SC_080
- Lyreen_SC_010
- RyeWater_SC_010
- Tolka_SC_010

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Drawing Title

Regional Hydrology

Project Title

Moygaddy Mixed-Use Development

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Project No.	Drawing No.
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MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

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Map Legend

- EIAR Site Boundary
- Watercourses
- Flow Direction

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Drawing Title

Existing Site Drainage

Project Title

Moygaddy Mixed-Use Development

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MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

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Surface Water Hydrochemistry

The Environmental Protection Agency's (EPA) Quality Rating System (Q-Rating) is a biotic index used to rate the ecological quality of streams and rivers. The rating system assigns streams a Q-Value of between 1 and 5, with 1 indicating bad ecological quality and 5 indicating the highest ecological quality. The nearest EPA monitoring points to the Proposed Development are located at the Rye Water River, directly to the south of the site. This watercourse is not likely to be affected by the Proposed Development due to the topography of the site. This watercourse currently holds a Q-value of 3.

Surface water sampling was carried out at the Proposed Development site on the 5th of August 2021. The surface water sampling locations are shown on Figure 8-4 below. One of the sampling locations (SW1) was along the Blackhall Little stream which is a tributary of the Rye Water River. The other two sampling locations were located along the Rye Water River, one of which was upstream of the Proposed Development (SW2) while the other was downstream at the Kildare Bridge along the R157 Regional Road (SW3). Surface water levels within the Blackhall Little stream were very low in August 2021, with very little water present in the stream, as can be seen in Plate 8-2 below.

Plate 8-2 Water Levels at SW1 Sample Location (Blackhall Little Stream) on 5th of August 2021

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Plate 8-3 Water Levels at SW3 Sample Location (Kildare Bridge) on 5th of August 2021

A second round of surface water sampling was carried out on the 8th of December 2021 from the same sampling locations in order to get a baseline surface water quality representation during a period of high flow (heavy rainfall). Water levels observed during the second round of water sampling were much higher within both the Blackhall Little stream and the Rye Water River, as can be seen in Plate 8-4 and Plate 8-5 below.

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Plate 8-4 Water Levels at SW1 Sample Location (Blackhall Little Stream) on 8th of December 2021

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Plate 8-5 Water Levels at SW3 Sample Location (Kildare Bridge) on 8th of December 2021

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Results of laboratory analysis of water samples from August 2021 are shown in Table 8-4 below alongside relevant Environmental Quality Standards (EQS) values for surface water, while results from December 2021 samples are shown in Table 8-5. Laboratory reports are attached in Volumes 3a, 3b & 3c(ii) in Appendix 8-3 and in Volumes 3d, 3e & 3f in Appendix 8-2.

Table 8-4 Analytical Results of MKO Surface Water Samples from August 2021

Parameter	EQS	Sample ID		
		SW1	SW2	SW3
Total Suspended Solids (mg/L)	25(+)	112	<10	<10
Ammonia – NH_3 (mg/L)	Good Status: ≤0.065 High Status ≤ 0.04(*)	0.12	0.14	0.08
Nitrite NO_2 (mg/L)	-	0.03	<0.02	0.03
Ortho-Phosphate – P (mg/L)	Good Status ≤ 0.035 to High Status: ≤0.025(*)	0.20	<0.03	0.04
Nitrate - NO_3 (mg/L)	-	2.1	3.8	3.1
pH	-	7.97	8.25	8.30
Chloride (mg/L)	-	27.1	24.4	27.6
BOD	Good Status: ≤ 1.5 High Status: ≤ 1.3(*)	<1	<1	<1

(+) *S.I. No. 293 of 1988: Quality of Salmon Water Regulations, resulting from EU Directive 78/659/EEC on the Quality of Fresh Waters Needing Protection or Improvement in order to Support Fish Life.*
(*) *S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009.*

Total suspended solids were <10mg/L in both samples along the Rye Water River which is well below the standard set out in S.I. 293 of 1988. The relatively high amounts of suspended solids in SW1 (Blackhall Little Stream) can likely be attributed to the low flow rate at the time of survey with very little water present in stream.

Ammonia was detected at levels greater than the lower threshold for Good Status of <0.065mg/L in all three samples which is indicative of poor water quality with respect to the Surface Water Regulations (S.I. 272 of 2009). BOD levels for each of the three samples (<1mg/L) achieved a "High Status", while results for orthophosphate achieved a Good Status for SW2 (<0.03mg/L), but a value slightly lower than Good Status (0.04mg/L) for SW3 at Kildare Bridge along the Rye Water River. Orthophosphate levels at SW1 (Blackhall Little Stream) were much higher than the lower threshold for Good Status at (0.20mg/L).

Table 8-5 Analytical Results of MKO Surface Water Samples from December 2021

Parameter	EQS	Sample ID		
		SW1	SW2	SW3
Total Suspended Solids (mg/L)	25(+)	122	108	75

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Parameter	EQS	Sample ID		
		SW1	SW2	SW3
Ammonia – NH_3 (mg/L)	Good Status: ≤0.065 High Status ≤ 0.04(*)	0.39	0.12	0.17
Nitrite NO_2 (mg/L)	-	0.08	0.04	0.05
Ortho-Phosphate – PO_4 (mg/L)	Good Status ≤ 0.035 to High Status: ≤0.025(*)	0.85	0.30	0.38
Nitrate - NO_3 (mg/L)	-	17.8	16.2	15.7
pH	-	7.82	8.00	8.05
Chloride (mg/L)	-	20.4	33.9	30.6
BOD	Good Status: ≤ 1.5 High Status: ≤ 1.3(*)	5	3	3

(+) *S.I. No. 293 of 1988: Quality of Salmon Water Regulations, resulting from EU Directive 78/659/EEC on the Quality of Fresh Waters Needing Protection or Improvement in order to Support Fish Life.*
(*) *S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009.*

As can be seen from comparison of laboratory analysis from August surface water sampling, the water quality observed during December 2021 was deteriorated, likely due to high levels of rainfall and surface water runoff towards both the Blackhall Little Stream and Rye Water River. The intensive agricultural nature of the site and surrounding areas, coupled with the poor draining soils are likely to lead to temporary negative impacts on water quality for these watercourses during periods of heavy rainfall. None of the parameters recorded at any of three sample locations during December surface water sampling achieved a Good Status.

8.4.4 Groundwater

8.4.4.1 Hydrogeology

Based on the GSI bedrock map of the region, the Proposed Development is underlain by the Lucan Formation (LU) which consists of dark limestone and shale. The Lucan Formation is classified as a moderately productive aquifer in local zones only (Ll). This aquifer classification extends east and west of the Proposed Development, encompassing large swathes of Counties Dublin, Meath, Kildare, Offaly, and Westmeath. A bedrock Aquifer map is shown as Figure 8-5. The Proposed Development is within the poorly productive Dublin Ground Water Body (GWB) catchment area as delineated by the EPA/GSI. A regional groundwater body map is provided as Figure 8-6.

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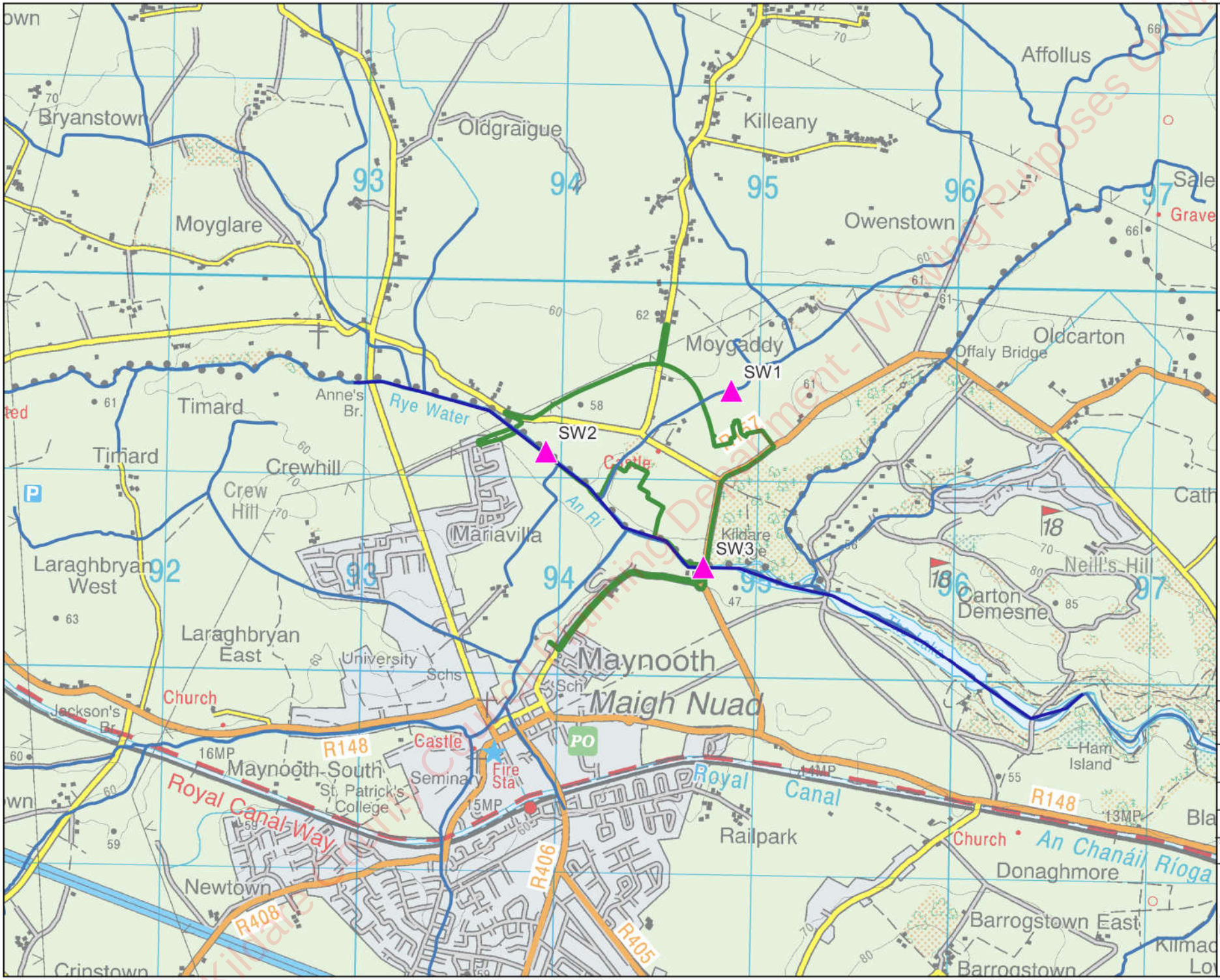

Map Legend

- EIAR Site Boundary
- Watercourse
- SW Sample Locations

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Drawing Title: Surface Water Sampling Locations

Project Title: Moygaddy Mixed-Use Development

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MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

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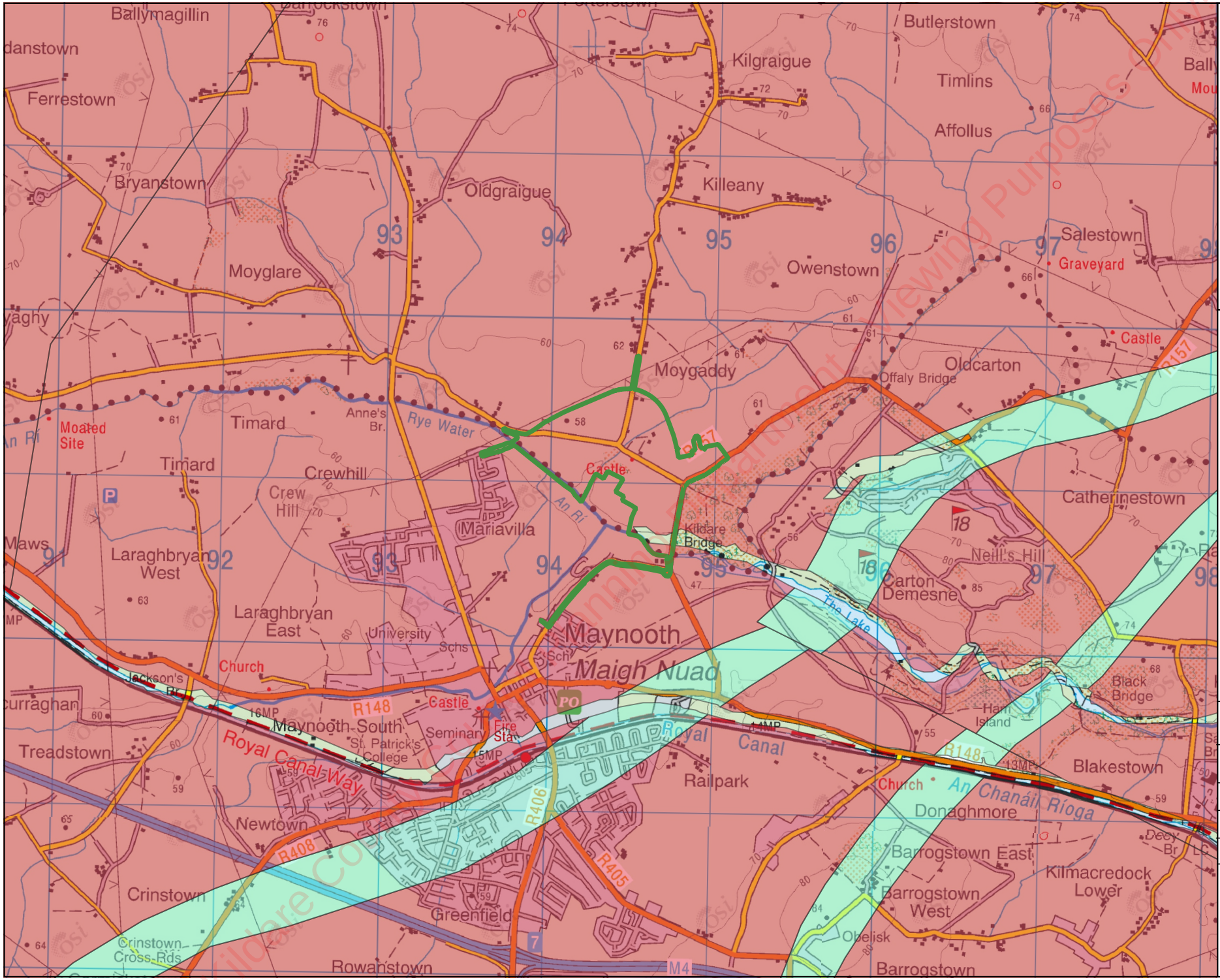

Map Legend

EIAR Site Boundary

Bedrock Aquifer

- Locally Important Aquifer - LI
- Poor Aquifer - Bedrock Which is Generally Unproductive - Pl

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Drawing Title: Bedrock Aquifer Map

Project Title: Moygaddy Mixed-Use Development

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MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

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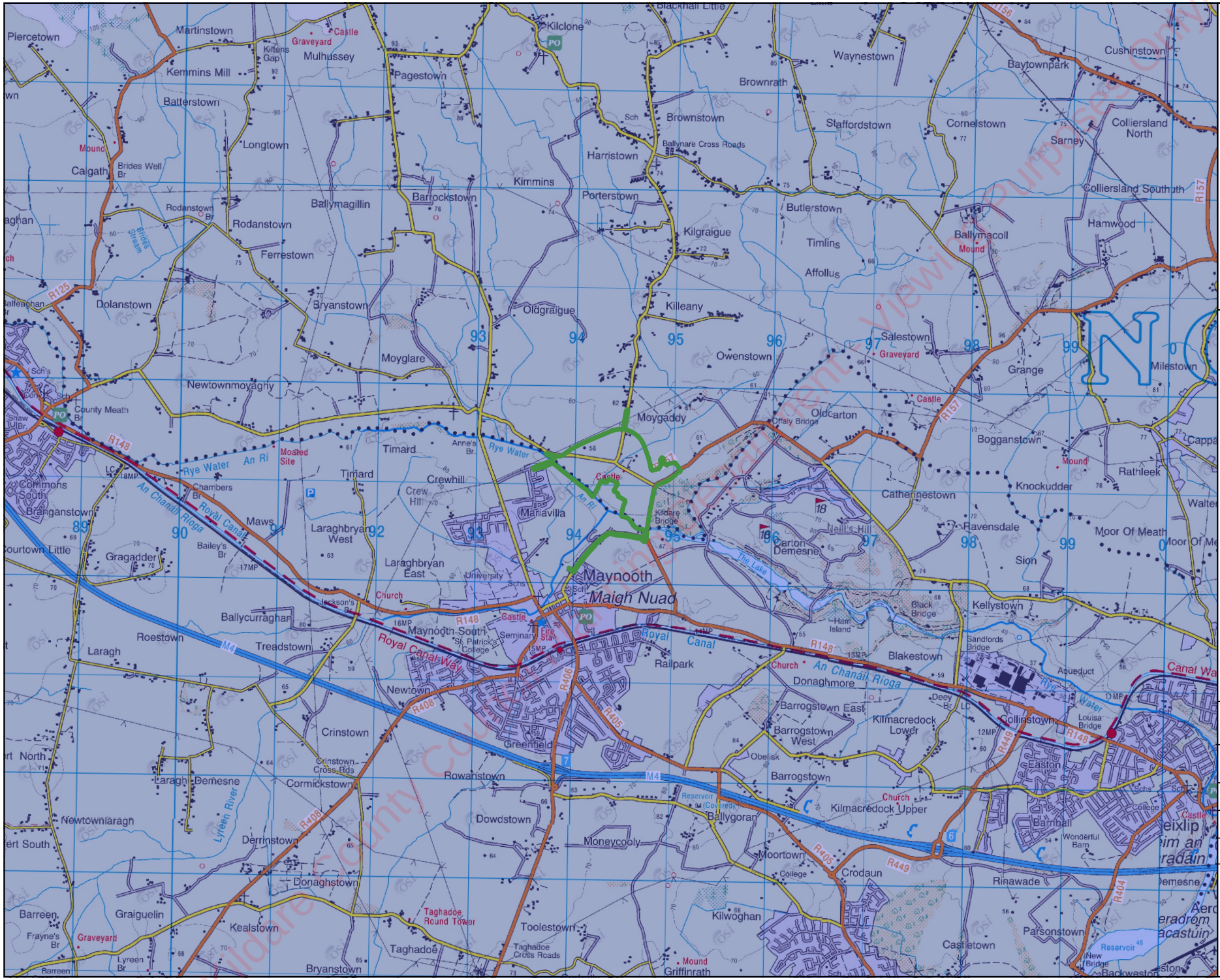

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8.4.4.2 Groundwater Vulnerability

Groundwater vulnerability is mapped as being Low (L) (greater than 10m of subsoils present) across the majority of the Proposed Development. A small area to the southeast of the site is mapped as having Moderate (M) (between 5-10m of subsoil present) vulnerability.

8.4.4.3 Site Investigations

Site Investigations were carried out by Site Investigations Ltd. (SIL) between June and July 2021. The scope of works included cable percussive boreholes, rotary coreholes, trial pits, dynamic probes and laboratory testing of field samples. All fieldwork was carried out in accordance with BS 5930:2015, Engineers Ireland GI Specification and Related Document 2nd Edition 2016 and Eurocode 7: Geotechnical Design. A summary of site investigation works are presented below;

- 18 no. cable percussive boreholes,
- 16 no. rotary coreholes,
- 30 no. trial pits with soakaway tests (21 No),
- 84 no. dynamic probes.

Of the 30 No trial pits completed across the site, 20 No recorded no water seepages or groundwater. Where water was encountered in the remaining trial pits they were predominantly seepages at depths of greater than 1.5m which are not indicative of groundwater levels. Water was not recorded in 13 No of the 18 No Cable percussion boreholes. In general, the information shows that the upper 3-5m of the soils and subsoils are dry. There were water ingresses into 3 No. trial pits within the Proposed Development site, one of which was located within **Site A**, while the remaining two were located within **Site B**. A water ingress was recorded at trial pit no. TP11, located within **Site A** at a depth of 1.80mbgl, with the ingress rate logged as a seepage. Water ingresses were recorded at trial pits no. TP13 and TP21, within **Site B** at a depth of 1.80mbgl and 2.90mbgl respectively, with the ingress rate logged as a seepage at TP13 and at a medium rate at TP21. The photographs in the Site Investigation reports show the nature of the subsoils and the lack of water present in the pits or the soils.

Water was not recorded in 13 No of the 18 No Cable percussion boreholes. What has been described as 'Groundwater' was encountered in five boreholes at depths ranging from 1.50mbgl to 3.60mbgl within the Proposed Development site. Water ingresses were recorded in two boreholes both of which were located within **Site B**, at depths of 3.20mbgl at BH14 and 3.60mbgl at BH17. All ingresses were sealed off by the casing as the drilling advanced and therefore indicates perched water lenses. The remaining boreholes do not record water s

BRE Testing was completed to see if soakaways were an option for the operational phase drainage design. The tests 'failed' as the subsoils are low permeability confirming the information gathered as part of the desk study and the information gathered as part of the Site Investigation. As described previously the hydrological regime comprises shallow subsurface flows to the surface water system locally rather than significant recharge to ground.

A detailed report on Site Investigation works carried out at the Proposed Development site can be found in Volume 3c(i) Appendix 4-9 of this EIAR.

8.4.4.4 Long-term EPA Groundwater Level Monitoring – Carton House

The Environmental Protection Agency record long term groundwater monitoring data at 3 no. monitoring stations based at the nearby Carton House see Figure 8-7 below. These monitoring locations record the elevation of the local shallow groundwater table. The GSI map this region to the north of the river as deep poorly drained mineral soil (BminPD), with a recharge coefficient of 22%.

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Figure 8-8 shows the recorded groundwater levels from May 2019 to February 2021. As expected, the elevation of the shallow groundwater table decreases to the south and is lowest at RW3, less than 200m from the Rye Water River. Therefore, the local groundwater flow regime is southwards, towards the Rye Water River. A similar flow regime exists at the Proposed Development site where the elevation of the shallow groundwater table decreases to the south towards the Rye Water River and locally to tributary streams.

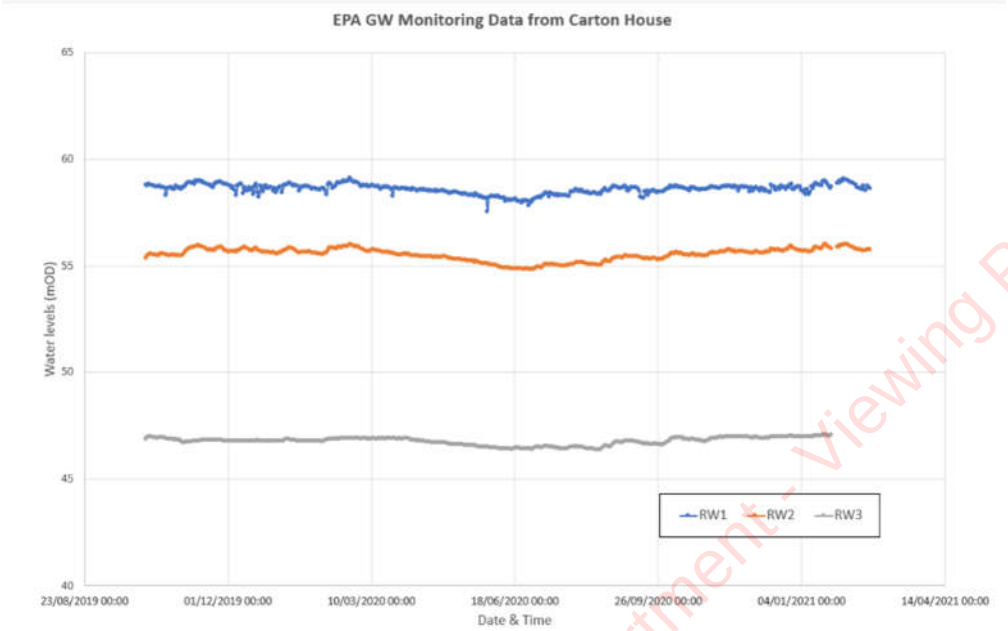

Figure 8-8 EPA Groundwater Monitoring Data from Carton House

Groundwater levels at RW1 – is ranged from 57.55 to 59.08m OD from March 2020 to February 2021. Over the same time period groundwater levels varied from 54.82 to 56.02 at RW2, located less than 50m southeast of the Proposed Development site. Meanwhile groundwater levels ranged between 46.36 and 47.04m OD at EPA monitoring point RW3, located less than 120m east of the Proposed Development site.

Groundwater levels recorded at RW3 are most comparable to the Proposed Development site, (see Figure 8-9). Recorded water levels were greatest in January and February and lowest in June, July and August reflecting seasonal weather changes and level of rainfall. A clear correlation can be identified between groundwater level and precipitation events recorded at Celbridge Mooretown station (www.met.ie), as the shallow groundwater table is quickly recharged. As a consequence of the low permeability soil and subsoil and the poorly permeable bedrock aquifer, a high proportion of recharge will discharge rapidly towards the Rye Water River via surface runoff or shallow groundwater flows. A similar hydrogeological regime exists at the Proposed Development site.

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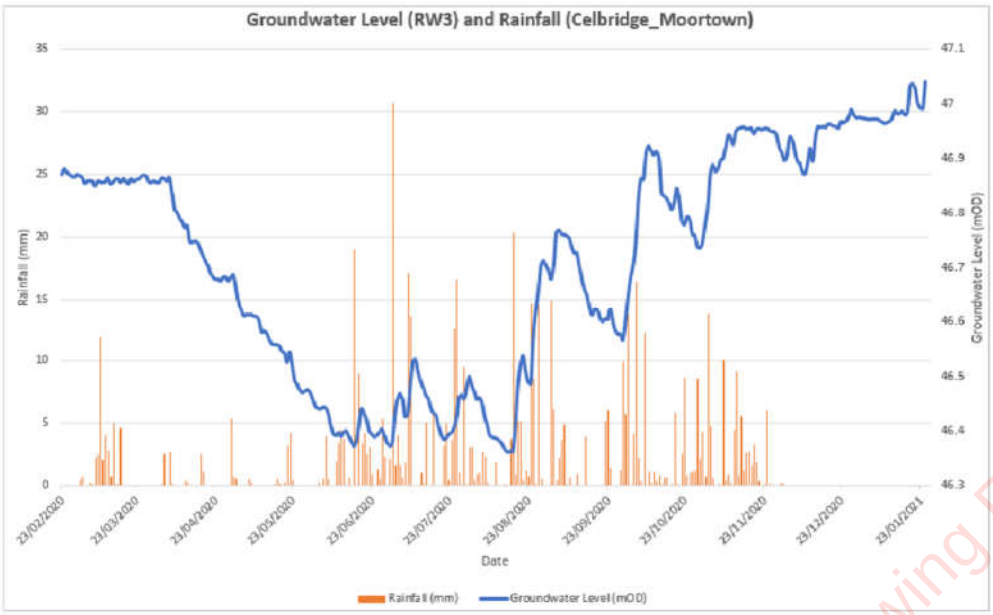

Figure 8-9 Groundwater Levels at Carton House, EPA monitoring point RW3

8.4.4.5 Rye Water Valley/Carton SAC - Louisa Bridge Springs

The Rye Water Valley/Carton SAC is located directly adjacent to the east of the Proposed Development on the eastern side of the R157 Regional Road, see Figure 8-10 below. The SAC is designated for the following qualifying interests, *Petrifying Springs with tufa formation], Narrow mouthed whorl snail (Veritgo angustior) and Desmoulin's whorl snail (Vertigo moulinsiana).* Both species of snail are dependant on the petrifying springs.

While the proposed works are located within close proximity of the SAC site boundary, the only known location of QI habitats and species within the SAC is at Louisa Bridge (north-west of Leixlip), which is approximately 5km east of the Proposed Development.

The Annex I habitat *'petrifying springs with tufa formation'* exists at Louisa Bridge along a series of terraces along the slope from the R148 to the Rye Water River. The flow into the springs comes from the terraces which are further east of the springs themselves. As the proposed Development site is located to the west of the Louisa Bridge springs there is no potential for a contribution from the Proposed Development site to the spring supply.

There are a number of previous hydrological studies of the springs at Louisa Bridge/Leixlip Spa. A hydrological study by Dr Pamela Bartley (Hydro-G, 2008) indicates that the petrifying springs are fed by spring discharges emerging from the underlying bedrock aquifer, and not from overburden or superficial deposits. Dr Bartley states in this report;

> *"The field monitoring and data analysis suggest that water at the Leixlip Spa site originates from a complex groundwater system combining two sources. The main source of water comes from a deeper, older and warmer groundwater system, discharging at the top of the first terrace through the Spa Well. The second is a more recent, shallow groundwater that flows through the karstified limestone bedrock with the main groundwater discharge located in the vicinity of the fen wetland habitat ('filtering ponds') at the most elevated, southern terrace."*

The site specific investigation confirm that rainfall on the Proposed Development site discharges predominantly as overland or shallow sub surface flows to the local surface water drains, streams and rivers. This is consistent with the GSI information, which shows that the subsoils are low permeability and the BRE testing which shows the lack of recharge to groundwater generally. The drainage design for the Proposed Development mimics the existing hydrological regime by directing rainfall runoff to

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the surface water system locally rather than groundwater. The Proposed Development is not designed to alter the existing hydrological regime.

Shallow groundwater flow from the Proposed Development site does and will continue to flow to the south and discharge predominantly as baseflow to the Rye Water near the site. Low percentages of rainfall recharge the groundwater aquifer beneath the Proposed Development site which is described as a *Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones* and as can be seen in Figure 8-5 Bedrock Aquifer there is a *Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones* associated with a different rock group immediately east of the site. This rock group is close to the boundary between the Proposed Development site and the SAC generally. Any potential groundwater flows from the Proposed Development site are intercepted by the presence of the lower transmissivity rock group. There is no real pathway for a hydraulic connection between groundwater at the Proposed Development site and groundwater near Louisa bridge, approximately 5km away. In reality, the groundwater supplying the Louisa Bridge springs originates to the east of the springs themselves.

Due to the proximity of the SAC to the sites boundary and applying a precautionary approach it is considered that there is in theory potential for connectivity to this part of the SAC. Irrespective of the presence of the qualifying interests of the SAC within this section of the SAC it is considered, based on the nature of the works, the results of the site investigation and the subsurface geology that there is an imperceptible impact likely on the local hydrological regime associated with the development of the project. For the avoidance of doubt, MKO ecologists have surveyed the SAC from the site boundary and within Carton House and there are no recorded petrifying springs (or associated protected snail species) within this section of the SAC. On this basis, the Proposed Development has no potential for significant negative or adverse effects on the qualifying interests of the SAC.

Designated sites within proximity to the Proposed Development are discussed and assessed further in Chapter 6: Biodiversity of this EIAR, and in the accompanying Appropriate Assessment Screening Report (AASR) and Natura Impact Statement (NIS).

The NIS found that potential for impacts related to surface water deterioration at adjacent designated sites will be prevented by adhering to the mitigation described in Section 8.6 of this EIAR.

8.4.5 Water Framework Directive Water Body Status & Objectives

The Water Framework Directive (WFD) establishes a framework for the protection of ground and surface waters and their dependent habitats and wildlife. Under the directive the EPA is working to classify all waterbodies in the State and to assign a risk status to each of them. The overall objective of the WFD is for all waterbodies to achieve a minimum of 'Good' water quality status.

Local Groundwater Body and Surface Water Body status and risk result are available from (www.catchments.ie). A separate WFD assessment is completed and included as Appendix 8-4.

8.4.5.1 Groundwater Body Status

Groundwater Body (GWB) status information is available (www.catchments.ie). Please refer to Figure 8-6 for the location and extent of associated groundwater bodies.

In terms of the WFD status of the Dublin GWB (IE_EA_G_008) which underlies the Proposed Development site currently is not a risk. This GWB achieved "Good" status under the WFD 2013-2018 review cycle. This status is based on the quantitative and chemical status of the GWB.

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8.4.5.2 Surface Water Body Status

Local surface water body status and risk result are available from (www.catchments.ie). The Rye Water River (Rye Water_030) forms a boundary to the site on the south side of Site B. The Rye Water River is denoted as having 'At Risk' status.

The WFD sub-catchment assessment report for Liffey_SC_080 (EPA, 2019) identifies the Rye Water River as being 'At Risk' and being of 'Poor' status. This assessment states that as the Rye Water River is a tributary of the Lyreen River which faces significant pressures from elevated P (phosphorous) levels from agricultural practices.

8.4.5.3 Water Framework Directive Assessment

Mitigation for the protection of surface water during the construction and operational phases of the development will ensure the qualitative status of the receiving waters will not be altered by the proposed development.

There is also mitigation proposed to protect groundwater quality within the Proposed Development scheme during the construction and operational phases of the development. These mitigation measures will ensure the qualitative status of the underlying GWB will not be altered by the proposed development.

There will be no change in GWB or SWB status in the underlying GWB or downstream SWBs resulting from the Proposed Development. There will be no change in quantitative (volume) or qualitative (chemical) status, and the underlying GWB and downstream SWBs are protected from any potential deterioration.

The Proposed Development will not prevent the surface water and groundwater receptors from achieving Good Status in the future.

As such, the proposed development will not impact upon any surface water or groundwater body as it will not cause a deterioration of the status of the body and/or it will not jeopardise the attainment of good status. A separate WFD assessment is completed by HES and included as Appendix 8-4.

8.4.6 Water Resources

A search of the Geological Survey of Ireland (GSI) well database (www.gsi.ie) indicates that there is one well mapped within Site B of the Proposed Development. The well in question is a borehole which was created in 1899 with an unknown original source and purpose. This borehole is mapped as overlapping the eastern portion of the site.

There are several other mapped boreholes and wells in the vicinity of the Proposed Development.

The GSI well database is not exhaustive and it is most likely that other private wells exist within the vicinity. Due to aquifer characteristics and topography, it is not likely that groundwater flow towards this well occurs. Based on limited activity proposed during the operational phase of the mixed-use scheme, and the hydrogeological characteristics of the site, no impacts to ground water quality, quantity or flow are likely. Mitigation measures for the construction phase of the Proposed Development are detailed in Section 8.6.3 below.

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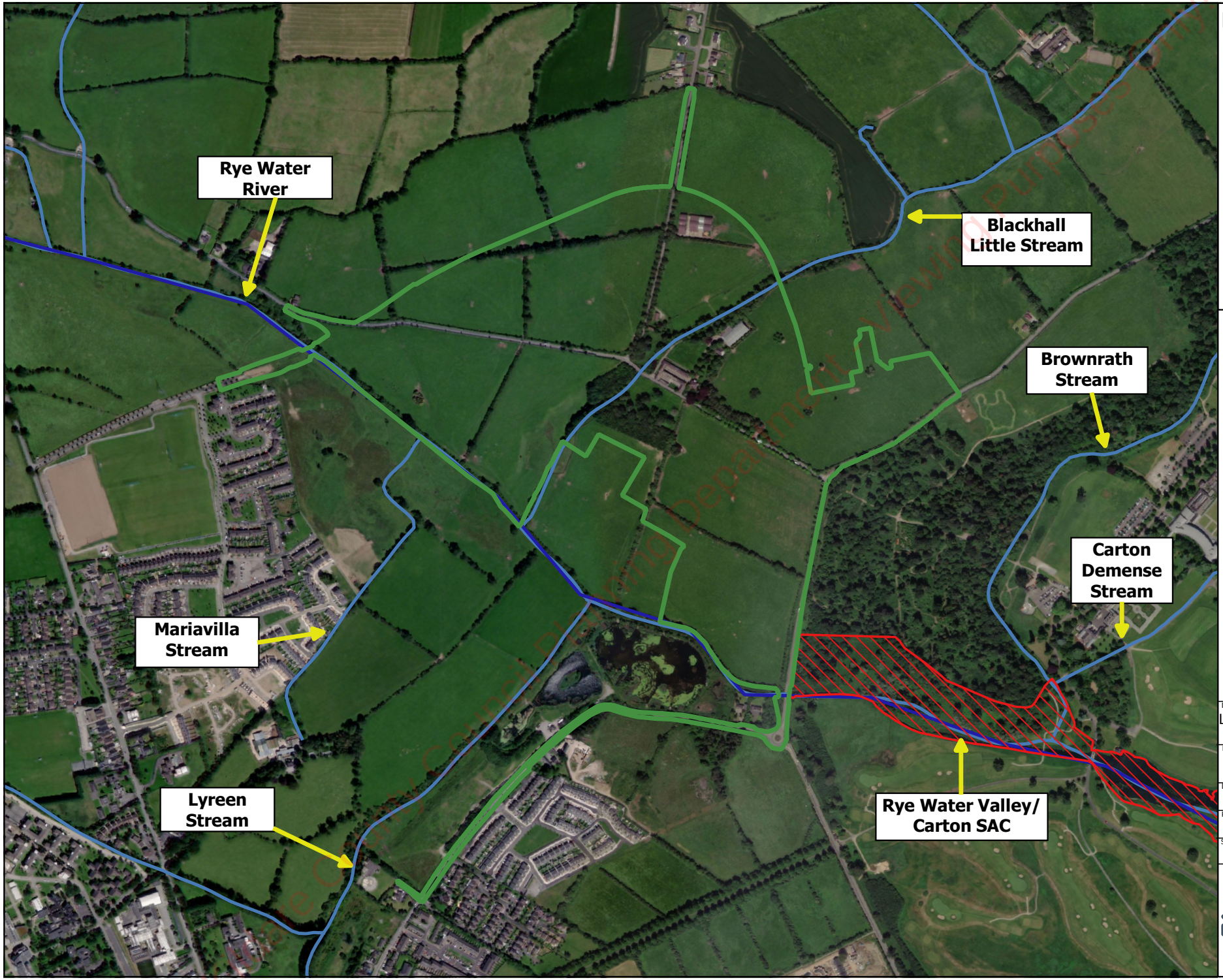

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Map Legend

- EIAR Site Boundary
- Rye Water River
- Watercourses
- Rye Water Valley/Carton SAC

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Drawing Title
Local Hydrology with Nearby SAC

Project Title
Moygaddy Mixed-Use Development

Drawn By	Checked By
TM	MW
Project No.	Drawing No.
210414	Figure 8-10
Scale	Date
1:10,000	31.08.2022

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

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8.4.7 Receptor Sensitivity

Due to the nature of the Proposed Development, being near surface construction activities, combined with the nature of the hydrological regime and bedrock aquifer type, impacts on groundwater are generally negligible and surface water is generally the main sensitive receptor assessed during the impact assessment.

Groundwater

The primary risk to groundwater at the site would be from cementitious materials, hydrocarbon spillage and leakages. No interruption of existing groundwater drainage pathways below the site will occur due to the shallow nature of excavations within the development and the depth of subsoils present at the site.

The above are common potential impacts on all construction sites (such as road works and industrial sites). All potential contamination sources are to be carefully managed at the site during the construction and operational phases of the development and mitigation measures are proposed below to deal with these potential minor impacts.

As previously established, the bedrock aquifer which underlies the majority of the Proposed Development is classified as being moderately productive, in local zones only, with the overlying subsoils having low permeability. The groundwater vulnerability mapping and ground investigations show thick tills derived from limestone beneath the site with Low risk and Medium risk areas mapped. Any contaminants which may be accidently released on-site will predominantly discharge via surface water runoff or shallow groundwater flow paths to nearby streams or rivers. Mitigation measures to protect groundwater and ensure no significant effects on groundwater are proposed and described below.

Surface Water

Comprehensive surface water mitigation and controls are outlined below to ensure protection of all downstream receiving waters during construction and operational phases of the Proposed Development. Mitigation measures will ensure that surface runoff from the developed areas of the site will be of a high quality and will therefore not impact on the quality of downstream surface water bodies. Drainage works at the development site will discharge to storm water sewers via attenuation tanks and via oil interceptors which will discharge at controlled flow rates (greenfield rates) to the Rye Water River.

8.5 Proposed Development Services

8.5.1 Proposed Surface Water Site Drainage

The proposed surface water drainage layout and design details for the Proposed Development is shown on OCSC drawings, Engineering Services Report, See Volumes 3a, 3b & 3c(i) Appendix 4-9 and the MOOR Preliminary Design Report in Volume 3d, Appendix 4-6 of this EIAR.

Surface water management for the Proposed Development is designed to comply with the Greater Dublin Strategic Drainage Study (GDSDS) policies and guidelines and the requirements of Meath County Council. The surface water design includes for a climate change factor of 20%

It is proposed that surface water within Site A (from roads, roofs and hardstanding areas) will drain via gravity, and via hydrocarbon interceptors, and infiltration area/attention storage areas, to an existing ditch along the southern boundary, which is to be replaced by a new filter trench as part of the

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upgraded and re-aligned R157. This drain conveys surface water runoff in a southerly direction, ultimately towards the Rye Water River at the proposed outfall location described below.

It is proposed that surface water within Site B (from roads, roofs and hardstanding areas) will drain via gravity, and via hydrocarbon interceptors, and infiltration area/attention storage (located in the shared carpark at Site B), to an outfall at the Rye Water River, just west of the Kildare Bridge.

It is proposed that surface water within Site C (from roads, roofs and hardstanding areas) will drain via gravity to hydrocarbon interceptors, and infiltration area/attention storage. The surface water network is to be split into a number of catchments in order to best integrate Sustainable drainage Systems. Each sub-catchment will look to provide treatment to surface water runoff at source or through design. All runoff will be directed to the Blackhall Little and the Rye Water River.

The main Site A, Site B and Site C attenuation systems will comprise underground poly-tunnel systems, to be located within the Proposed Development's green spaces in Site A and within the shared car park area of Site B and within the public open spaces in Site C with adequate drainage to maintain functionality.

The discharge rates for both Site A and Site B are to be restricted to a flow rate less than the current greenfield equivalent runoff rate, to ensure that there is no increase in flow rates and volumes to be discharged from the Proposed Development to the receiving infrastructure and waterbodies. Therefore, there will be no adverse impact on adjoining and other downstream properties

The discharge rate for Site C is to be restricted to a maximum flow rate which is less than greenfield equivalent runoff rate, to ensure that there is no increase in flow rates and volumes to be discharged from the Proposed Development to the receiving infrastructure and waterbodies. Therefore, there will be no adverse impact on adjoining and other downstream properties.

It is proposed that surface water run off on the MOOR is to be captured by adequately spaced trapped road gullies, which connect to a main carrier drain under the road. The rainfall runoff on the aligning footpath and cycle track shall be intercepted by the dividing tree-lined grass verge, with excess runoff only being collected by the road's gully network. Surface water attenuation will be used to control runoff from all hard surfaces in accordance with the GDSDS, with these being restricted to a maximum flow rate which is less than the calculated greenfield runoff equivalent.

Various other SuDS (sustainable drainage systems) have been incorporated into the surface water drainage design of the Proposed Development including permeable pavements, swales, hydrocarbon interceptors, rainwater harvesting systems, and downstream attenuation/infiltration.

The surface water network, attenuation storage and site levels are designed to accommodate a 100-year storm event and includes climate change provision. Floor levels of buildings are set above the 100-year flood levels by a minimum of 0.5m for protection.

Run-off rates from the site are controlled by vortex flow control devices. Surface water management proposals for the development also incorporate the following elements to reduce impacts on downstream water quality:

- The proposed drainage systems have been designed in accordance with GDSDS requirements;
- The proposed drainage systems have incorporated
    - SUDS features, e.g. permeable paving in high risk parking areas;
    - Rainwater harvesting systems are also proposed at each office building to re-use the collected rainwater for welfare facilities, or landscaping purposes and reduce the overall volume of rainfall runoff entering the surface water network.

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- On-line attenuation/infiltration facilities with a petrol separator prior to discharge to local watercourses and existing drainage network.

8.5.2 Proposed Wastewater Infrastructure

It is proposed to provide a new underground pumping station constructed to IW standards and specifications to the west of the proposed nursing home building at Site B within the Proposed Development. The Proposed Development (Both Site A to the north and Site B to the east and Site C to the west of the proposed pumping station) will drain by gravity to the new Pumping Station where it will then be pumped to the existing Irish Water network along the L1013 Local Road in County Kildare, approximately 1km south of the proposed pumping station.

It is proposed to provide a gravity wastewater connection from Site C to the new underground wastewater pumping station. Wastewater will cross the Blackhall Little Stream from the proposed residential development and travel to the new underground wastewater pumping station. The wastewater will then travel from the new pumping station via a rising main routed under the Rye Water River to the existing Maynooth WWPS. Refer to Volumes 3a, 3b & 3c(i) Appendix 4-9 for a detailed description on the proposed wastewater infrastructure.

Individual buildings will connect to the 225mm diameter foul drains via individual 100mm diameter connections, as per Irish Water Code of Practice for Wastewater Infrastructure.

The foul sewers are sealed and there will be no discharge of wastewater to ground within the Proposed Development. Wastewater will be pumped from the Proposed Development to the Maynooth pumping station, and onwards from Maynooth pumping station to the Leixlip Wastewater Treatment Plant.

8.5.3 Proposed Water Supply

A proposed new connection to one of the existing watermains local to the site will be made for the Proposed Development. There is a 200mm watermain just south from the Kildare bridge, south of the Proposed Development. An extension from the existing 200mm watermain to be provided along the MOOR road, to the connection point at the site boundaries of Site A & Site B. It is anticipated that a metered 150mm high density polyethylene connection will be required. Internal distribution network of 150mm HDPE watermain will be provided to serve the proposed medical units. It is also proposed to provide an extension to the existing 200mm watermain at Moyglare Close, to serve Site C. Internal distribution networks of 100mm and 150mm watermains will be provided to serve the residential homes, crèche facility and scout den. Further details can be found in Volumes 3a, 3b & 3c Appendix 4-9.

The Proposed Development will be subject to a New Connection Agreement with Irish Water, with all details in accordance with their requirements.

There is no proposed extraction of groundwater at the site for drinking water purposes.

8.5.4 New Bridge Structures as part of the Proposed Development

There will be 5 no. bridge structures constructed as part of the Proposed Development. Further information on construction methodologies can be found in Volumes 3a, 3b & 3c(i) Appendix 4-3 and Volumes 3d, 3e & 3f Appendix 4-2. Further detail can also be found in Volumes 3a, 3b, 3c(i) Appendix 4-6 and Volumes 3d, 3e & 3f Appendix 4-4.

The Proposed Development includes a Road Bridge located to the south west of Site C and forming the Moyglare Bridge application crossing the Rye Water River, and a road bridge located to the north

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of Site A forming part of the MOOR crossing the Blackhall Little Stream. A pedestrian/cycle bridge will be constructed to the south east of Site B forming the Kildare Bridge application adjacent to the existing Kildare Bridge crossing the Rye Water River. A pedestrian/cycle bridge will be constructed adjacent to an existing bridge on the L2214-3 Local Road to the north of Site C crossing the Blackhall Little Stream. A pedestrian/cycle bridge will also be located within Site C providing pedestrian and cycle access across the Blackhall Little Stream to the Scout Den, Creche and Public Park.

All bridges which will be constructed as part of the Proposed Development share a number of key characteristics, including:

- Piled foundations;
- Cast in situ abutments
- Precast deck elements
- On deck cast in situ slabs or screeds;
- Post-fix paraphets

The impact of the proposed road bridge and pedestrian / cycle bridge structure was further assessed by JBA Consulting, as part of a wider flood study of the Moygaddy Environs, with the conclusions indicating that the proposed bridge structures will have 'no impact on flood following its construction'.

8.6 Likely, Significant Impacts and Mitigation Measures Implemented

The potential impacts of the Proposed Development and mitigation measures that will be put in place to eliminate or reduce them are set out below.

8.6.1 Overview of Impact Assessment Process

The conventional source-pathway-target model (see below, top) was applied to assess potential impacts on downstream environmental receptors (see below, bottom as an example) as a result of the Proposed Development.

Where potential impacts are identified, the classification of impacts in the assessment follows the descriptors provided in the Glossary of Impacts contained in the following guidance documents produced by the Environmental Protection Agency (EPA):

- Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2017); and,
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003).

The description process clearly and consistently identifies the key aspects of any potential impact source, namely its character, magnitude, duration, likelihood and whether it is of a direct or indirect nature.

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In order to provide an understanding of the stepwise impact assessment process applied below, we have firstly presented a summary guide that defines the steps (1 to 7) taken in each element of the impact assessment process (refer to Table 8-6). The guide also provides definitions and descriptions of the assessment process and shows how the source-pathway-target model and the EPA impact descriptors are combined.

Using this defined approach, this impact assessment process is then applied to all operation activities which have the potential to generate a source of significant adverse impact on the geological and hydrological/ hydrogeological (including water quality) environments.

Table 8-6: Impact Assessment Steps

Step 1	Identification and Description of Potential Impact Source: This section presents and describes the activity that brings about the potential impact or the potential source of pollution. The significance of effects is briefly described.	
Step 2	Pathway / Mechanism:	The route by which a potential source of impact can transfer or migrate to an identified receptor. In terms of this type of development, surface water and groundwater flows are the primary pathways, or for example, excavation or soil erosion are physical mechanisms by which a potential impact is generated.
Step 3	Receptor:	A receptor is a part of the natural environment which could potentially be impacted upon, e.g. human health, plant / animal species, aquatic habitats, soils/geology, water resources, water sources. The potential impact can only arise as a result of a source and pathway being present.
Step 4	Pre-mitigation Impact:	Impact descriptors which describe the magnitude, likelihood, duration and direct or indirect nature of the potential impact before mitigation is put in place.
Step 5	Proposed Mitigation Measures:	Control measures that will be put in place to prevent or reduce all identified significant adverse impacts. In relation to this type of development, these measures are generally provided in two types: (1) mitigation by avoidance, and (2) mitigation by engineering design.
Step 6	Post Mitigation Residual Impact:	Impact descriptors which describe the magnitude, likelihood, duration and direct or indirect nature of the potential impacts after mitigation is put in place.
Step 7	Significance of Effects:	Describes the likely significant post mitigation effects of the identified potential impact source on the receiving environment.

8.6.2 Do-Nothing Scenario

The 'Do-Nothing Scenario' details what would happen to the site if the Proposed Development were not to be developed. In this scenario, the site would remain as a green-field site for grazing by livestock and the land use would remain as small-scale pastural agriculture. Surface water drainage and infiltration to ground will continue as is occurring currently with no significant impact on either surface or groundwater.

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8.6.3 Construction Phase

8.6.3.1 Site A (Strategic Employment Zone)

8.6.3.2 Earthworks (Removal of Vegetation Cover, Excavations and Stock Piling) Resulting in Suspended Solids Entrainment in Surface Waters

Construction phase activities including site levelling, service trench construction, levelling/construction and building foundation excavation will require earthworks resulting in removal of vegetation cover and excavation of any minor local pockets of organic soil/subsoils, and bedrock. Such excavations will be relatively shallow and temporary. The main risk will be from surface water runoff from bare soil and soil storage areas during construction works.

Much of the surface water generally percolates to shallow ground and discharges via shallow subsurface flow to the Rye Water River and this will likely continue during the construction phase. The construction activities have the potential to result in the release of suspended solids to this local drainage feature and could potentially result in an increase in the suspended sediment load, resulting in increased turbidity which, in turn, could affect the water quality and fish stocks of the Rye Water River and downstream water bodies, such as the Rye Water Valley/ Carton SAC. Potential impacts are potentially significant if not mitigated against.

Pathways: Drainage and surface water discharge routes.

Receptors: Down-gradient watercourses (Rye Water River and Blackhall Little Stream) and dependant ecosystems.

Pre-Mitigation Potential Impact: Direct, negative, moderate, short-term, likely impact.

Proposed Mitigation Measures

Management of surface water runoff and subsequent treatment prior to release off-site will be undertaken during construction work as follows:

- Silt fencing will be constructed around the construction footprint, where there is a surface water receptor, in order to create a defined perimeter for the proposed works, leaving a natural vegetation buffer between the construction footprint (other than operational surface water outfall installations which are described below) and surface water receptors and associated riparian habitats.
- A silt fence will also be attached to solid boundary fencing where it is in place and where there is a surface water receptor. This will protect the stream from any potential sediment laden surface water run-off generated during construction activities.
- The silt fence will comprise a geotextile membrane that will buried beneath the ground to filter any run-off that may occur as a result of the proposed works. The silt fence will be monitored throughout the proposed works and will remain in place after the works are completed and until the exposed earth has re-vegetated.
- As construction advances there may be a requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground;

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- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing;
- A suitably sized detention basin or settlement area will be installed at the lowest point before discharge to ground where excess run- off must leave the site. Silt curtains or earth berms will be used to channel run-off to locations where it can be controlled. These may take the form of an open detention area or, where the need arises, a portable skip/s, or similar, where inflow passes through straw bales, gravel etc.
- Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present;
- Daily monitoring and inspections of site drainage during construction will be completed;
- No instream works will take place outside the period July 1st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland is incorporated into the design of the proposed works.
- Surface water outfalls will be constructed in accordance with the measures described in Chapter 6 and 8.6.3.4.4 and subject to agreement with IFI.
- Good construction practices such wheel washers and dust suppression on site roads, and regular plant maintenance, which will be implemented, will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRIA, 2001), which provides information on these issues. This will ensure that surface water arising during the course of construction activities will contain minimum sediment.
- Preventative measures during construction have been incorporated into the Construction and Environmental Management Plan, which will be updated upon grant of permission and to provide any additional measures required pursuant to planning conditions and agreements with the planning authority.

Residual Impact

The Proposed Development area will be set back from the Rye Water River and Blackhall Little stream (limiting the potential source of sediments) and runoff controls including silt fences will be in place to break the pathway between the works area and the watercourse (receptor). Subject to the implementation of the listed mitigation measures the residual impact will be a negative, indirect, imperceptible and short term.

Significance of Effects

For the reasons outlined above, no significant effects on the surface water quality are anticipated following implementation of proposed mitigation measures.

8.6.3.3 Potential Surface Water Quality Impacts from Shallow Excavation Dewatering

Some minor groundwater seepages may potentially occur in building foundation excavations, however, the likelihood is considered low given the nature of the underlying aquifer and the information from the Site Investigations which show dry shallow subsoils. Dewatering, if undertaken, will create additional volumes of water to be treated by the runoff management system. Inflows will likely require management and treatment to reduce suspended sediments. No contaminated land was noted at the site and therefore historical pollution sources do not arise. Such works will be temporary.

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Pathway: Overland flow and site drainage network.

Receptor: Down-gradient surface water bodies (Rye Water River and Blackhall Little stream).

Pre-Mitigation Potential Impact: Direct, negative, moderate, temporary, medium probability impact to surface water quality.

Proposed Mitigation Measures:

Management of groundwater seepages and subsequent treatment prior to discharge into the drainage network will be undertaken as follows:

- Silt fencing measures as described above will be installed.
- Appropriate temporary interceptor drainage, to prevent upslope surface runoff from entering excavations will be put in place, as required;
- If required, pumping of excavation inflows will prevent build-up of water in the excavation;
- The pumped water volumes will be discharged to ground within the site through a silt bag at a distance of over 30m from nearby watercourses (Rye Water River and Blackhall Little Stream).
- There will be no direct discharge to any water body, and therefore no risk of hydraulic loading or contamination will occur;

Residual Impact

The potential for the release of suspended solids to watercourse receptors is a risk to water quality and the aquatic quality of the receptor. Proven and effective measures to mitigate the risk of releases of sediment have been proposed above and will break the pathway between the potential sources and the receptor. The residual effect is considered to be – Negative, imperceptible, indirect, short-term, low probability impact on local surface water quality.

Significance of the Effects

For the reasons outlined above, no significant effects on the surface water quality are anticipated. No impact on groundwater levels or groundwater quality will occur.

8.6.3.4 Potential Release of Hydrocarbons During Construction Phase

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk to groundwater, surface water and associated ecosystems, and to terrestrial ecology. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in death of aquatic organisms.

The procedures and infrastructure required for the storage and handling of hydrocarbons or other chemicals on construction sites is well established. There is proven and employed specifically for the handling of hydrocarbons and chemicals in the context of soil and water pollution. In this context, all hydrocarbon and chemical storage and handling will be carried out by trained personnel with appropriate control measures in place at site.

Pathway: Groundwater and surface water flowpaths.

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Receptor: Groundwater and surface water (Rye Water River and Blackhall Little Stream).

Pre-Mitigation Potential Impact: Direct, negative, slight, short term, likely impact to local groundwater quality.

Direct, negative, moderate, short term, unlikely impact to surface water quality.

Proposed Mitigation Measures

Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows:

- All plant and machinery will be serviced before being mobilised to site;
- No plant maintenance will be completed on site, any broken down plant will be removed from site to be fixed;
- Refuelling will be completed in a controlled manner using drip trays at all times;
- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water;
- Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores;
- Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored;
- Ancillary equipment such as hoses and pipes will be contained within the bund;
- Taps, nozzles or valves will be fitted with a lock system;
- Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Drip-trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills;
- Only designated trained operators will be authorised to refuel plant on site;
- Procedures and contingency plans will be set up to deal with emergency accidents or spills; and,
- An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment.

Highest standards of site management will be maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A suitably qualified individual will be given the task of overseeing the pollution prevention measures agreed for the site to ensure that they are operating safely and effectively as well as having responsibility for the implementation of Emergency Procedures for spill control measures.

Residual Impact

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction sites. Proven and effective measures to mitigate the risk of spills and leaks, will be applied during the construction phase. The residual effect is assessed as - Negative, imperceptible, indirect, short-term, low probability effect on groundwater and surface water.

Significance of Effects

For the reasons outlined above, no significant effects on surface water or groundwater quality are anticipated.

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8.6.3.4.2 Potential Groundwater and Surface Water Contamination from Wastewater Disposal

Release of effluent from on-site wastewater systems during the construction phase has the potential to impact on groundwater and surface waters.

Pathway: Groundwater flowpaths and site drainage network.

Receptor: Down-gradient well supplies, groundwater quality and surface water quality.

Pre-mitigation Impact: Indirect, negative, significant, temporary, unlikely impact to surface water quality. Indirect, negative, slight, temporary, unlikely impact to local groundwater.

Proposed Mitigation Measures

- A self-contained port-a-loo with an integrated waste holding tank will be used at the site compounds, maintained by the providing contractor, and removed from site on completion of the construction works; and,
- No wastewater will be discharged on-site during either the construction or operational phase.

Residual Impact: No impact.

8.6.3.4.3 Release of Cement-Based Products

Concrete and other cement-based products are highly alkaline and corrosive and can have significant negative impacts on water quality. They generate very fine, highly alkaline silt (pH 11.5) that can physically damage fish by burning their skin and blocking their gills. A pH range of $\geq 6 \leq 9$ is set in S.I. No. 293 of 1988 Quality of Salmonid Water Regulations, with artificial variations not in excess of ± 0.5 of a pH unit. Entry of cement-based products into the site drainage system, into surface water runoff, and hence to surface watercourses or directly into watercourses represents a risk to the aquatic environment. Batching of wet concrete on site and washing out of transport and placement machinery are the activities most likely to generate a risk of cement-based pollution.

Pathway: Site drainage network.

Receptor: Surface water and transitional water hydrochemistry.

Pre-Mitigation Impact: Indirect, negative, moderate, short term, likely impact to surface water (Rye River and Blackhall Little stream).

Proposed Mitigation Measures

- No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place.
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site;
- Where possible pre-cast elements for culverts and concrete works will be used.
- Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be undertaken at lined cement washout ponds.
- Weather forecasting will be used to plan dry days for pouring concrete.

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- The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event.

Residual Impact

Proven and effective measures to mitigate the risk of releases of cement-based products or cement truck wash water have been proposed above and will break the pathway between the potential source and each receptor. The residual effect is considered to be - Negative, imperceptible, indirect, short term, unlikely impact to surface water quality.

Significance of the Effect

For the reasons outlined above, no significant effects on surface water quality are anticipated.

8.6.3.4.4 *Morphological Changes to Surface Water Courses & Drainage Patterns & Water Quality*

Diversion, culverting and bridge crossing of surface watercourses can result in morphological changes, changes to drainage patterns and alteration of aquatic habitats. Construction of structures over water courses has the potential to significantly interfere with water quality and flows during the construction phase. Mitigation by design is the key factor in minimising the potential for effects on water course morphology. It is not proposed to alter or redirect the existing streams and rivers.

As detailed in Section 8.4.3 above, a new pedestrian / cycle bridge structure is proposed adjacent to the existing Kildare Bridge, the proposed additional infrastructure at the bridge will required construction activity along the Rye Water River.

Furthermore, Site A will require stormwater discharge to a filter trench along an existing ditch on the R157 where it'll discharge to the Rye Water River at one proposed outfall adjacent to Kildare Bridge. To prevent any potential for significant effects on the Rye Water River during construction, a silt fence will be erected to form a solid barrier between the proposed pipe laying works and the stream. To construct the surface water outfall, the installation of a small precast concrete headwall will be required along the Rye Water River. A non-return valve will be positioned at the outfall. Further information can be found in Volume 3a Appendix 4-9.

Pathway: Drainage Patterns and surface water discharge routes.

Receptors: Surface water flows (Rye Water River), stream morphology and water quality.

Pre-Mitigation Potential Impact: Negative, direct, slight, long term, high probability impact.

Proposed Mitigation Measures

- The proposed design for water course crossings and culverts, which minimises interactions with water courses, ensures that there will be no perceptible effects on the morphology of those watercourses.
- Prior to the outset of these works, small defined works areas will be fenced off at the location of the storm water outfall (between the main construction site and both water courses). Silt fences will be attached to these fences. The silt fence will provide a solid barrier between the proposed pipelaying works and the Rye Water River
- The necessary pipelaying works will be undertaken within this defined area.
- Following the installation of the pipework and reinstatement of the ground, the small section of the silt fence that protects the Rye Water River will be removed to facilitate the construction of the outfall.

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- No instream works will take place outside the period July 31st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- Cofferdams will be constructed using one tonne sandbags at the edge of the Rye Water River at the outfall point to create dry working areas.
- A submersible pump will be used to dewater inside the coffer-dammed area and will discharge any waters to land at a location of over 30m from the rivers. The pumped waters will discharge through a silt bag.
- The bankside will be excavated and a small pre-cast concrete headwall installed (with outfall pipe included).
- The banks and channel bed will be reinstated to avoid erosion or run off of silt. Following this the dams will be removed.
- The surface water discharge point is likely to take less than one day to install
- During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas; and,
- The Kildare Bridge upgrade works will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will all be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent, where considered necessary by the designer.

Residual Impact

With the application of the best practice mitigation outlined above, the residual effect will be – Imperceptible, direct, negative, short-term, high probability impact on stream flows, stream morphology and surface water quality.

Significance of Effects

For the reasons outlined above, no significant effects on stream morphology or stream water quality are anticipated at Site A and the proposed outfall location.

8.6.3.4.5 *Potential Water Impacts on Designated Sites and Habitats*

Site A drains into the Rye Water River to the south. The Rye Water Valley/Carton SAC is downstream of Site A, to the southeast, directly adjacent to the site boundary on the opposite side of the R157 Regional Road.

The qualifying interests of the SAC is linked to groundwater flows (calcareous tufa springs). There is no connection between groundwater at the development site, and that discharging to any known tufa springs within the SAC (including the mapped spring located approximately 5km from Site A at Louisa Bridge).

Groundwater below Site A will flow to the south and discharge as baseflow to the Rye Water River and/or the Blackhall Little stream to the northwest. Groundwater flow from the site will, therefore, have no impact on the Louisa Bridge (spring) groundwater flow (Rye Water Valley/Carton SAC) as previous site investigations and hydrological assessments (c.f. Section 2.4, (Hydro-G, 2008)) have shown that the flow to these springs is not derived from the Rye Water River and are in fact fed from a source further east of Louisa Bridge.

Two of the qualifying interests of the SAC are two species of vertigo snail (*Vertigo angustior* and *Vertigo moulinsiana*), with both species' dependant on the calcareous march habitat which is provided by the tufa formation. The known range of both species within the SAC is also restricted to Louisa Bridge (spring). While there are no known petrifying springs or qualifying interests of the Rye Water

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Valley/Carton SAC within proximity of Site A i.e. Louisa Bridge. An ecological walkover survey of the SAC by MKO to identify any additional tufa springs or potential habitat for vertigo snails downstream of the Proposed Development site has not identified petrifying springs nor their associated qualifying interests in this area of the SAC. Irrespective of this the potential for the occurrence of unmapped petrifying springs within the SAC has also been considered below.

Although there is no potential for effects on the known QI of the SAC the following mitigation will ensure no impact on the SAC generally. Standard mitigation and SuDS drainage controls are proposed during the construction and operational phase of Site A (e.g., silt traps/road gullies, hydrocarbon interceptors, attenuation storage and infiltration, and hydro-brake flow limiters) which have been proven through widespread use in housing and commercial developments across the country. The proposed SuDs drainage system incorporated into the engineering design of the site are common drainage systems that are used in development sites. They are proposed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS, 2005) and the objectives outlined in the Meath County Development Plan 2021-2027.

These standard drainage design controls and construction phase mitigation measures will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the proposed development.

The project design ensures that there will be no dewatering of the bedrock aquifer during the construction phase and so there will be no obstruction or alteration of existing groundwater flows.

There will be no significant alteration to groundwater recharge. The majority of rainfall will continue to percolate to shallow subsurface and discharge to the surface water systems locally with low levels of recharge to ground, in particular for Site A with is underlain with low permeability subsoils. During the construction phase, the recharge rates won't change materially.

With the implementation of the project as designed and the standard drainage control measures outlined above the potential for Site A to cause any groundwater drawdown or groundwater quality impacts in the SAC is imperceptible.

Groundwater flowpaths will be maintained during the construction phase as any excavation proposed will be shallow. The SI data shows that dewatering of groundwater from the bedrock aquifer will not occur and so there is no potential for significant effects on the calcareous tufa springs and associated species.

Following an extremely precautionary principle, the potential for other downstream designated sites to be impacted by the proposed works was also considered. On the basis of the Proposed Development design and the mitigation measures proposed to protect the immediate water receptors there will be no impacts on designated sites.

Pathway: Site drainage network and groundwater flowpaths.

Receptor: Rye Water Valley/Carton SAC and any associated Tufa Springs and vertigo snail populations (including the known spring 5km downstream at Louisa Bridge and the SAC downstream of the Proposed Development site).

Pre-Mitigation Impact

Indirect, negative, slight, short term, likely impact to water quality and hydrology regime.

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Proposed Mitigation Measures

The proposed mitigation measures for protection of surface water and groundwater quality which will include on site drainage control measures (i.e., silt fences, silt bags etc.) will ensure that the quality of runoff from Site A areas will be good. All mitigation measures outlined throughout Section 8.6.3.1 above provides controls which will be put in place to manage risks associated with sediment, hydrocarbons/chemicals and cement-based products used during construction phase.

The standard drainage design controls will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by Site A.

Residual Impact

With the application of the best practice mitigation outlined above, the residual effect will be – Imperceptible, direct, negative, short-term, high probability impact on surface and ground water receptors.

Significance of Effects

For the reasons outlined above, no significant effects will occur on the designated site.

8.6.3.5 Site B (Healthcare Facilities)

8.6.3.5.1 *Earthworks (Removal of Vegetation Cover, Excavations and Stock Piling) Resulting in Suspended Solids Entrainment in Surface Waters*

Construction phase activities including site levelling, service trench construction, levelling/construction and building foundation excavation will require earthworks resulting in removal of vegetation cover and excavation of any minor local pockets of organic soil/subsoils, and bedrock. Such excavations will be relatively shallow and temporary. The main risk will be from surface water runoff from bare soil and soil storage areas during construction works.

Much of the surface water generally percolates to shallow ground and discharges via shallow subsurface flow to the Rye Water River and this will likely continue during the construction phase. The construction activities have the potential to result in the release of suspended solids to this local drainage feature and could potentially result in an increase in the suspended sediment load, resulting in increased turbidity which, in turn, could affect the water quality and fish stocks of the Rye Water River and downstream water bodies, such as the Rye Water Valley/ Carton SAC. Potential impacts are potentially significant if not mitigated against.

Pathways: Drainage and surface water discharge routes.

Receptors: Down-gradient watercourses (Rye Water River and Blackhall Little Stream) and dependant ecosystems.

Pre-Mitigation Potential Impact: Direct, negative, moderate, short-term, likely impact.

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Proposed Mitigation Measures

Management of surface water runoff and subsequent treatment prior to release off-site will be undertaken during construction work as follows:

- Silt fencing will be constructed around the construction footprint, where there is a surface water receptor, in order to create a defined perimeter for the proposed works, leaving a natural vegetation buffer between the construction footprint (other than operational surface water outfall installations which are described below) and surface water receptors and associated riparian habitats.
- A silt fence will also be attached to solid boundary fencing where it is in place and where there is a surface water receptor. This will protect the stream from any potential sediment laden surface water run-off generated during construction activities.
- The silt fence will comprise a geotextile membrane that will buried beneath the ground to filter any run-off that may occur as a result of the proposed works. The silt fence will be monitored throughout the proposed works and will remain in place after the works are completed and until the exposed earth has re-vegetated.
- As construction advances there may be a requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground;
- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing;
- A suitably sized detention basin or settlement area will be installed at the lowest point before discharge to ground where excess run- off must leave the site. Silt curtains or earth berms will be used to channel run-off to locations where it can be controlled. These may take the form of an open detention area or, where the need arises, a portable skip/s, or similar, where inflow passes through straw bales, gravel etc.
- Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present;
- Daily monitoring and inspections of site drainage during construction will be completed;
- No instream works will take place outside the period July 1st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland is incorporated into the design of the proposed works.
- Surface water outfalls will be constructed in accordance with the measures described in Chapter 6 and 8.6.3.4.4 and subject to agreement with IFI.
- Good construction practices such wheel washers and dust suppression on site roads, and regular plant maintenance, which will be implemented, will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRIA, 2001), which provides information on these issues. This will ensure that surface water arising during the course of construction activities will contain minimum sediment.
- Preventative measures during construction have been incorporated into the Construction and Environmental Management Plan, which will be updated upon grant of permission and to provide any additional measures required pursuant to planning conditions and agreements with the planning authority.

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Residual Impact

The Proposed Development area will be set back from the Rye Water River and Blackhall Little stream (limiting the potential source of sediments) and a silt fence will be in place to break the pathway between the works area and the watercourse (receptor). Subject to the implementation of the listed mitigation measures the residual impact will be a negative, indirect, imperceptible and short term.

Significance of Effects

For the reasons outlined above, no significant effects on the surface water quality are anticipated following implementation of proposed mitigation measures.

8.6.3.5.2 *Potential Surface Water Quality Impacts from Shallow Excavation Dewatering*

Some minor groundwater seepages may potentially occur in building foundation excavations, however, the likelihood is considered low given the nature of the underlying aquifer and the information from the Site Investigations which show dry shallow subsoils. Dewatering, if undertaken, will create additional volumes of water to be treated by the runoff management system. Inflows will likely require management and treatment to reduce suspended sediments. No contaminated land was noted at the site and therefore historical pollution sources do not arise. Such works will be temporary.

Pathway: Overland flow and site drainage network.

Receptor: Down-gradient surface water bodies (Rye Water River and Blackhall Little stream).

Pre-Mitigation Potential Impact: Direct, negative, moderate, temporary, medium probability impact to surface water quality.

Proposed Mitigation Measures:

Management of groundwater seepages and subsequent treatment prior to discharge into the drainage network will be undertaken as follows:

- Silt fencing measures as described above will be installed.
- Appropriate temporary interceptor drainage, to prevent upslope surface runoff from entering excavations will be put in place, as required;
- If required, pumping of excavation inflows will prevent build-up of water in the excavation;
- The pumped water volumes will be discharged to ground within the site through a silt bag at a distance of over 30m from nearby watercourses (Rye Water River and Blackhall Little Stream).
- There will be no direct discharge to any water body, and therefore no risk of hydraulic loading or contamination will occur;

Residual Impact

The potential for the release of suspended solids to watercourse receptors is a risk to water quality and the aquatic quality of the receptor. Proven and effective measures to mitigate the risk of releases of sediment have been proposed above and will break the pathway between the potential sources and the receptor. The residual effect is considered to be – Negative, imperceptible, indirect, short-term, low probability impact on local surface water quality.

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Significance of the Effects

For the reasons outlined above, no significant effects on the surface water quality are anticipated. No impact on groundwater levels or groundwater quality will occur.

8.6.3.5.3 *Potential Release of Hydrocarbons During Construction Phase*

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk to groundwater, surface water and associated ecosystems, and to terrestrial ecology. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in death of aquatic organisms.

The procedures and infrastructure required for the storage and handling of hydrocarbons or other chemicals on construction sites is well established. There is proven and employed specifically for the handling of hydrocarbons and chemicals in the context of soil and water pollution. In this context, all hydrocarbon and chemical storage and handling will be carried out by trained personnel with appropriate control measures in place at site.

Pathway: Groundwater and surface water flowpaths.

Receptor: Groundwater and surface water (Rye Water River and Blackhall Little Stream).

Pre-Mitigation Potential Impact: Direct, negative, slight, short term, likely impact to local groundwater quality.

Direct, negative, moderate, short term, unlikely impact to surface water quality.

Proposed Mitigation Measures

Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows:

- All plant and machinery will be serviced before being mobilised to site;
- No plant maintenance will be completed on site, any broken down plant will be removed from site to be fixed;
- Refuelling will be completed in a controlled manner using drip trays at all times;
- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water;
- Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores;
- Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored;
- Ancillary equipment such as hoses and pipes will be contained within the bund;
- Taps, nozzles or valves will be fitted with a lock system;
- Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Drip-trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills;
- Only designated trained operators will be authorised to refuel plant on site;
- Procedures and contingency plans will be set up to deal with emergency accidents or spills; and,
- An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment.

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Highest standards of site management will be maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A suitably qualified individual will be given the task of overseeing the pollution prevention measures agreed for the site to ensure that they are operating safely and effectively as well as having responsibility for the implementation of Emergency Procedures for spill control measures.

Residual Impact

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction sites. Proven and effective measures to mitigate the risk of spills and leaks, will be applied during the construction phase. The residual effect is assessed as – Negative, imperceptible, indirect, short-term, low probability effect on groundwater and surface water.

Significance of Effects

For the reasons outlined above, no significant effects on surface water or groundwater quality are anticipated.

8.6.3.5.4 *Potential Groundwater and Surface Water Contamination from Wastewater Disposal*

Release of effluent from on-site wastewater systems during the construction phase has the potential to impact on groundwater and surface waters.

Pathway: Groundwater flowpaths and site drainage network.

Receptor: Down-gradient well supplies, groundwater quality and surface water quality.

Pre-mitigation Impact: Indirect, negative, significant, temporary, unlikely impact to surface water quality. Indirect, negative, slight, temporary, unlikely impact to local groundwater.

Proposed Mitigation Measures

- A self-contained port-a-loo with an integrated waste holding tank will be used at the site compounds, maintained by the providing contractor, and removed from site on completion of the construction works; and,
- No wastewater will be discharged on-site during either the construction or operational phase.

Residual Impact: No impact.

8.6.3.5.5 *Release of Cement-Based Products*

Concrete and other cement-based products are highly alkaline and corrosive and can have significant negative impacts on water quality. They generate very fine, highly alkaline silt (pH 11.5) that can physically damage fish by burning their skin and blocking their gills. A pH range of $\geq 6 \leq 9$ is set in S.I. No. 293 of 1988 Quality of Salmonid Water Regulations, with artificial variations not in excess of ± 0.5 of a pH unit. Entry of cement-based products into the site drainage system, into surface water runoff, and hence to surface watercourses or directly into watercourses represents a risk to the aquatic environment. Batching of wet concrete on site and washing out of transport and placement machinery are the activities most likely to generate a risk of cement-based pollution.

Pathway: Site drainage network.

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Receptor: Surface water and transitional water hydrochemistry.

Pre-Mitigation Impact: Indirect, negative, moderate, short term, likely impact to surface water (Rye Water River and Blackhall Little stream).

Proposed Mitigation Measures

- No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place.
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site;
- Where possible pre-cast elements for culverts and concrete works will be used.
- Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be undertaken at lined cement washout ponds.
- Weather forecasting will be used to plan dry days for pouring concrete.
- The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event.

Residual Impact

Proven and effective measures to mitigate the risk of releases of cement-based products or cement truck wash water have been proposed above and will break the pathway between the potential source and each receptor. The residual effect is considered to be – Negative, imperceptible, indirect, short term, unlikely impact to surface water quality.

Significance of the Effect

For the reasons outlined above, no significant effects on surface water quality are anticipated.

8.6.3.5.6 *Morphological Changes to Surface Water Courses & Drainage Patterns*

Diversion, culverting and bridge crossing of surface watercourses can result in morphological changes, changes to drainage patterns and alteration of aquatic habitats. Construction of structures over water courses has the potential to significantly interfere with water quality and flows during the construction phase. Mitigation by design is the key factor in minimising the potential for effects on water course morphology. It is not proposed to alter or redirect the existing streams and rivers.

As detailed in Section 8.4.3 above, a new pedestrian / cycle bridge structure is proposed adjacent to the existing Kildare Bridge, the proposed additional infrastructure at the bridge will required construction activity along the Rye Water River.

Furthermore, Site B will require stormwater discharge to a filter trench along an existing ditch on the R157 where it'll discharge to the Rye Water River at one proposed outfall adjacent to Kildare Bridge. To prevent any potential for significant effects on the Rye Water River during construction, a silt fence will be erected to form a solid barrier between the proposed pipe laying works and the stream. To construct the surface water outfall, the installation of a small precast concrete headwall will be required along the Rye Water River. A non-return valve will be positioned at the outfall. Further information can be found in Volume 3b Appendix 4-9.

Pathway: Drainage Patterns and surface water discharge routes.

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Receptors: Surface water flows (Rye Water River), stream morphology and water quality.

Pre-Mitigation Potential Impact: Negative, direct, slight, long term, high probability impact.

Proposed Mitigation Measures

- The proposed design for water course crossings and culverts, which minimises interactions with water courses, ensures that there will be no perceptible effects on the morphology of those watercourses.
- Prior to the outset of these works, small defined works areas will be fenced off at the location of the storm water outfall (between the main construction site and both water courses). Silt fences will be attached to these fences. The silt fence will provide a solid barrier between the proposed pipelaying works and the Rye Water River
- The necessary pipelaying works will be undertaken within this defined area.
- Following the installation of the pipework and reinstatement of the ground, the small section of the silt fence that protects the Rye Water River will be removed to facilitate the construction of the outfall.
- No instream works will take place outside the period July 31st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- Cofferdams will be constructed using one tonne sandbags at the edge of the Rye Water River at the outfall point to create dry working areas.
- A submersible pump will be used to dewater inside the coffer-dammed area and will discharge any waters to land at a location of over 30m from the rivers. The pumped waters will discharge through a silt bag.
- The bankside will be excavated and a small pre-cast concrete headwall installed (with outfall pipe included).
- The banks and channel bed will be reinstated to avoid erosion or run off of silt. Following this the dams will be removed.
- The surface water discharge point is likely to take less than one day to install
- During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas; and,
- The Kildare Bridge upgrade works will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will all be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent, where considered necessary by the designer.

Residual Impact

With the application of the best practice mitigation outlined above, the residual effect will be – Imperceptible, direct, negative, short-term, high probability impact on stream flows, stream morphology and surface water quality.

Significance of Effects

For the reasons outlined above, no significant effects on stream morphology or stream water quality are anticipated at Site B and the proposed outfall location.

8.6.3.5.7 *Potential Water Impacts on Designated Sites and Habitats*

Site B drains into the Rye Water River to the south. The Rye Water Valley/Carton SAC is downstream of Site B, to the east, directly adjacent to the site boundary on the opposite side of the R157 Regional Road.

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The qualifying interests of the SAC is linked to groundwater flows (calcareous tufa springs) There is no connection between groundwater at the development site, and that discharging to any known tufa springs within the SAC (including the mapped spring located approximately 5km from Site B at Louisa Bridge).

Groundwater below Site B will flow to the south and discharge as baseflow to the Rye Water River and/or the Blackhall Little stream to the west. Groundwater flow from the site will, therefore, have no impact on the Louisa Bridge (spring) groundwater flow (Rye Water Valley/Carton SAC) as previous site investigations and hydrological assessments (c.f. Section 2.4, (Hydro-G, 2008)) have shown that the flow to these springs is not derived from the Rye Water River and are in fact fed from a source further east of Louisa Bridge.

Two of the qualifying interests of the SAC are two species of vertigo snail (Vertigo angustior and Vertigo moulinsiana), with both species' dependant on the calcareous march habitat which is provided by the tufa formation. The known range of both species within the SAC is also restricted to Louisa Bridge (spring). While there are no known petrifying springs or qualifying interests of the Rye Water Valley/Carton SAC within proximity of Site B i.e. Louisa Bridge. An ecological walkover survey of the SAC by MKO to identify any additional tufa springs or potential habitat for vertigo snails downstream of the Proposed Development site has not identified petrifying springs nor their associated qualifying interests in this area of the SAC. Irrespective of this the potential for the occurrence of unmapped petrifying springs within the SAC has also been considered below.

Although there is no potential for effects on the known QI of the SAC the following mitigation will ensure no impact on the SAC generally. Standard mitigation and SuDS drainage controls are proposed during the construction and operational phase of Site B (e.g., silt traps/road gullies, hydrocarbon interceptors, attenuation storage and infiltration, and hydro-brake flow limiters) which have been proven through widespread use in housing and commercial developments across the country. The proposed SuDs drainage system incorporated into the engineering design of the site are common drainage systems that are used in development sites. They are proposed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS, 2005) and the objectives outlined in the Meath County Development Plan 2021-2027.

These standard drainage design controls and construction phase mitigation measures will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at less than the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the proposed development.

The project design ensures that there will be no dewatering of the bedrock aquifer during the construction phase and so there will be no obstruction or alteration of existing groundwater flows.

There will be no significant alteration to groundwater recharge. The majority of rainfall will continue to percolate to shallow subsurface and discharge to the surface water systems locally with low levels of recharge to ground, in particular for Site B with is underlain with low permeability subsoils. During the construction phase, the recharge rates won't change materially.

With the implementation of the project as designed and the standard drainage control measures outlined above the potential for Site B to cause any groundwater drawdown or groundwater quality impacts in the SAC is imperceptible.

Groundwater flowpaths will be maintained during the construction phase as any excavation proposed will be shallow. The SI data shows that dewatering of groundwater from the bedrock aquifer will not occur and so there is no potential for significant effects on the calcareous tufa springs and associated species.

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Following an extremely precautionary principle, the potential for other downstream designated sites to be impacted by the proposed works was also considered. On the basis of the Proposed Development design and the mitigation measures proposed to protect the immediate water receptors there will be no impacts on designated sites.

Pathway: Site drainage network and groundwater flowpaths.

Receptor: Rye Water Valley/Carton SAC and any associated Tufa Springs and vertigo snail populations (including the known spring 5km downstream at Louisa Bridge and the SAC downstream of the Proposed Development site).

Pre-Mitigation Impact

Indirect, negative, slight, short term, likely impact to water quality and hydrology regime.

Proposed Mitigation Measures

The proposed mitigation measures for protection of surface water and groundwater quality which will include on site drainage control measures (i.e., silt fences, silt bags etc.) will ensure that the quality of runoff from Site B areas will be good. All mitigation measures outlined throughout Section 8.6.3.1 above provides controls which will be put in place to manage risks associated with sediment, hydrocarbons/chemicals and cement-based products used during construction phase.

The standard drainage design controls will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at less than the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by Site B.

Residual Impact

With the application of the best practice mitigation outlined above, the residual effect will be – Imperceptible, direct, negative, short-term, high probability impact on surface and ground water receptors.

Significance of Effects

For the reasons outlined above, no significant effects will occur on the designated site.

8.6.3.6 Site C (Strategic Housing Development)

8.6.3.6.1 *Earthworks (Removal of Vegetation Cover, Excavations and Stock Piling) Resulting in Suspended Solids Entrainment in Surface Waters*

Construction phase activities including site levelling, service trench construction, levelling/construction and building foundation excavation will require earthworks resulting in removal of vegetation cover and excavation of any minor local pockets of organic soil/subsoils, and bedrock. Such excavations will be relatively shallow and temporary. The main risk will be from surface water runoff from bare soil and soil storage areas during construction works.

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Much of the surface water generally percolates to shallow ground and discharges via shallow subsurface flow to the Rye Water River and this will likely continue during the construction phase. The construction activities have the potential to result in the release of suspended solids to this local drainage feature and could potentially result in an increase in the suspended sediment load, resulting in increased turbidity which, in turn, could affect the water quality and fish stocks of the Rye Water River and downstream water bodies, such as the Rye Water Valley/ Carton SAC. Potential impacts are potentially significant if not mitigated against.

Pathways: Drainage and surface water discharge routes.

Receptors: Down-gradient watercourses (Rye Water River and Blackhall Little Stream) and dependant ecosystems.

Pre-Mitigation Potential Impact: Direct, negative, moderate, short-term, likely impact.

Proposed Mitigation Measures

Management of surface water runoff and subsequent treatment prior to release off-site will be undertaken during construction work as follows:

- Silt fencing will be constructed around the construction footprint, where there is a surface water receptor, in order to create a defined perimeter for the proposed works, leaving a natural vegetation buffer between the construction footprint (other than operational surface water outfall installations which are described below) and surface water receptors and associated riparian habitats.
- A silt fence will also be attached to solid boundary fencing where it is in place and where there is a surface water receptor. This will protect the stream from any potential sediment laden surface water run-off generated during construction activities.
- The silt fence will comprise a geotextile membrane that will buried beneath the ground to filter any run-off that may occur as a result of the proposed works. The silt fence will be monitored throughout the proposed works and will remain in place after the works are completed and until the exposed earth has re-vegetated.
- As construction advances there may be a requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground;
- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing;
- A suitably sized detention basin or settlement area will be installed at the lowest point before discharge to ground where excess run- off must leave the site. Silt curtains or earth berms will be used to channel run-off to locations where it can be controlled. These may take the form of an open detention area or, where the need arises, a portable skip/s, or similar, where inflow passes through straw bales, gravel etc.
- Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present;
- Daily monitoring and inspections of site drainage during construction will be completed;
- No instream works will take place outside the period July 1st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland is incorporated into the design of the proposed works.

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- Surface water outfalls will be constructed in accordance with the measures described in Chapter 6 and 8.6.3.4.4 and subject to agreement with IFI.
- Good construction practices such wheel washers and dust suppression on site roads, and regular plant maintenance, which will be implemented, will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRlA, 2001), which provides information on these issues. This will ensure that surface water arising during the course of construction activities will contain minimum sediment.
- Preventative measures during construction have been incorporated into the Construction and Environmental Management Plan, which will be updated upon grant of permission and to provide any additional measures required pursuant to planning conditions and agreements with the planning authority.

Residual Impact

Site C infrastructure will be set back from the Rye Water River and Blackhall Little stream (limiting the potential source of sediments) and a silt fence will be in place to break the pathway between the works area and the watercourse (receptor). Subject to the implementation of the listed mitigation measures the residual impact will be a negative, indirect, imperceptible and short term.

Significance of Effects

For the reasons outlined above, no significant effects on the surface water quality are anticipated following implementation of proposed mitigation measures.

8.6.3.6.2 *Potential Surface Water Quality Impacts from Shallow Excavation Dewatering*

Some minor groundwater seepages may potentially occur in building foundation excavations, however, the likelihood is considered low given the nature of the underlying aquifer and the information from the Site Investigations which show dry shallow subsoils. Dewatering, if undertaken, will create additional volumes of water to be treated by the runoff management system. Inflows will likely require management and treatment to reduce suspended sediments. No contaminated land was noted at the site and therefore historical pollution sources do not arise. Such works will be temporary.

Pathway: Overland flow and site drainage network.

Receptor: Down-gradient surface water bodies (Rye Water River and Blackhall Little stream).

Pre-Mitigation Potential Impact: Direct, negative, moderate, temporary, medium probability impact to surface water quality.

Proposed Mitigation Measures:

Management of groundwater seepages and subsequent treatment prior to discharge into the drainage network will be undertaken as follows:

- Silt fencing measures as described above will be installed.
- Appropriate temporary interceptor drainage, to prevent upslope surface runoff from entering excavations will be put in place, as required;

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- If required, pumping of excavation inflows will prevent build-up of water in the excavation;
- The pumped water volumes will be discharged to ground within the site through a silt bag at a distance of over 30m from nearby watercourses (Rye Water River and Blackhall Little Stream).
- There will be no direct discharge to any water body, and therefore no risk of hydraulic loading or contamination will occur;

Residual Impact

The potential for the release of suspended solids to watercourse receptors is a risk to water quality and the aquatic quality of the receptor. Proven and effective measures to mitigate the risk of releases of sediment have been proposed above and will break the pathway between the potential sources and the receptor. The residual effect is considered to be – Negative, imperceptible, indirect, short-term, low probability impact on local surface water quality.

Significance of the Effects

For the reasons outlined above, no significant effects on the surface water quality are anticipated. No impact on groundwater levels or groundwater quality will occur.

8.6.3.6.3 *Potential Release of Hydrocarbons During Construction Phase*

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk to groundwater, surface water and associated ecosystems, and to terrestrial ecology. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in death of aquatic organisms.

The procedures and infrastructure required for the storage and handling of hydrocarbons or other chemicals on construction sites is well established. There is proven and employed specifically for the handling of hydrocarbons and chemicals in the context of soil and water pollution. In this context, all hydrocarbon and chemical storage and handling will be carried out by trained personnel with appropriate control measures in place at site.

Pathway: Groundwater and surface water flowpaths.

Receptor: Groundwater and surface water (Rye Water River and Blackhall Little Stream).

Pre-Mitigation Potential Impact: Direct, negative, slight, short term, likely impact to local groundwater quality.

Direct, negative, moderate, short term, unlikely impact to surface water quality.

Proposed Mitigation Measures

Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows:

- All plant and machinery will be serviced before being mobilised to site;
- No plant maintenance will be completed on site, any broken down plant will be removed from site to be fixed;
- Refuelling will be completed in a controlled manner using drip trays at all times;
- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water;

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- Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores;
- Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored;
- Ancillary equipment such as hoses and pipes will be contained within the bund;
- Taps, nozzles or valves will be fitted with a lock system;
- Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Drip-trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills;
- Only designated trained operators will be authorised to refuel plant on site;
- Procedures and contingency plans will be set up to deal with emergency accidents or spills; and,
- An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment.

Highest standards of site management will be maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A suitably qualified individual will be given the task of overseeing the pollution prevention measures agreed for the site to ensure that they are operating safely and effectively as well as having responsibility for the implementation of Emergency Procedures for spill control measures.

Residual Impact

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction sites. Proven and effective measures to mitigate the risk of spills and leaks, will be applied during the construction phase. The residual effect is assessed as – Negative, imperceptible, indirect, short-term, low probability effect on groundwater and surface water.

Significance of Effects

For the reasons outlined above, no significant effects on surface water or groundwater quality are anticipated.

8.6.3.6.4 *Potential Groundwater and Surface Water Contamination from Wastewater Disposal*

Release of effluent from on-site wastewater systems during the construction phase has the potential to impact on groundwater and surface waters.

Pathway: Groundwater flowpaths and site drainage network.

Receptor: Down-gradient well supplies, groundwater quality and surface water quality.

Pre-mitigation Impact: Indirect, negative, significant, temporary, unlikely impact to surface water quality. Indirect, negative, slight, temporary, unlikely impact to local groundwater.

Proposed Mitigation Measures

- A self-contained port-a-loo with an integrated waste holding tank will be used at the site compounds, maintained by the providing contractor, and removed from site on completion of the construction works; and,

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- No wastewater will be discharged on-site during either the construction or operational phase.

Residual Impact: No impact.

8.6.3.6.5 *Release of Cement-Based Products*

Concrete and other cement-based products are highly alkaline and corrosive and can have significant negative impacts on water quality. They generate very fine, highly alkaline silt (Ph 11.5) that can physically damage fish by burning their skin and blocking their gills. A Ph range of ≥ 6 ≤ 9 is set in S.I. No. 293 of 1988 Quality of Salmonid Water Regulations, with artificial variations not in excess of ± 0.5 of a Ph unit. Entry of cement-based products into the site drainage system, into surface water runoff, and hence to surface watercourses or directly into watercourses represents a risk to the aquatic environment. Batching of wet concrete on site and washing out of transport and placement machinery are the activities most likely to generate a risk of cement-based pollution.

Pathway: Site drainage network.

Receptor: Surface water and transitional water hydrochemistry.

Pre-Mitigation Impact: Indirect, negative, moderate, short term, likely impact to surface water (Rye Water River and Blackhall Little stream).

Proposed Mitigation Measures

- No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place.
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site;
- Where possible pre-cast elements for culverts and concrete works will be used.
- Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be undertaken at lined cement washout ponds.
- Weather forecasting will be used to plan dry days for pouring concrete.
- The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event.

Residual Impact

Proven and effective measures to mitigate the risk of releases of cement-based products or cement truck wash water have been proposed above and will break the pathway between the potential source and each receptor. The residual effect is considered to be – Negative, imperceptible, indirect, short term, unlikely impact to surface water quality.

Significance of the Effect

For the reasons outlined above, no significant effects on surface water quality are anticipated.

8.6.3.6.6 *Morphological Changes to Surface Water Courses & Drainage Patterns*

Diversion, culverting and bridge crossing of surface watercourses can result in morphological changes, changes to drainage patterns and alteration of aquatic habitats. Construction of structures over water

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courses has the potential to significantly interfere with water quality and flows during the construction phase. Mitigation by design is the key factor in minimising the potential for effects on water course morphology. It is not proposed to alter or redirect the existing streams and rivers.

As detailed in Section 8.4.3 above, 3 no. new pedestrian / cycle bridge structures are proposed throughout the development. A road bridge is also proposed at the southwest of the site. The proposed additional infrastructure will require construction activity along the Rye Water River and Blackhall Little Stream

Furthermore, Site C will require stormwater discharge to the Rye Water River at one proposed outfall south of the site and another proposed outfall to the Blackhall Little Stream within the centre of the site. To prevent any potential for significant effects on the Rye Water River or the Blackhall Little Stream during construction, a silt fence will be erected to form a solid barrier between the proposed pipe laying works and the stream. To construct the surface water outfall, the installation of a small precast concrete headwall will be required along the Rye Water River and the Blackhall Little Stream. A non-return valve will be positioned at the outfall. Further information can be found in Volume 3c Appendix 4-9.

Pathway: Drainage Patterns and surface water discharge routes.

Receptors: Surface water flows (Rye Water River & Blackhall Little Stream), stream morphology and water quality.

Pre-Mitigation Potential Impact: Negative, direct, slight, long term, high probability impact.

Proposed Mitigation Measures

- The proposed design for water course crossings and culverts, which minimises interactions with water courses, ensures that there will be no perceptible effects on the morphology of those watercourses.
- Prior to the outset of these works, small defined works areas will be fenced off at the location of the storm water outfall (between the main construction site and both water courses). Silt fences will be attached to these fences. The silt fence will provide a solid barrier between the proposed pipelaying works and the Rye Water River/Blackhall Little
- The necessary pipelaying works will be undertaken within this defined area.
- Following the installation of the pipework and reinstatement of the ground, the small section of the silt fence that protects the Rye Water River/Blackhall Little will be removed to facilitate the construction of the outfall.
- No instream works will take place outside the period July 31st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- Cofferdams will be constructed using one tonne sandbags at the edge of the Rye Water River/Blackhall Little at the outfall point to create dry working areas.
- A submersible pump will be used to dewater inside the cofferdammed area and will discharge any waters to land at a location of over 30m from the rivers. The pumped waters will discharge through a silt bag.
- The bankside will be excavated and a small pre-cast concrete headwall installed (with outfall pipe included).
- The banks and channel bed will be reinstated to avoid erosion or run off of silt. Following this the dams will be removed.
- The surface water discharge point is likely to take less than one day to install. During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas; and,

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- All Bridge works will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will all be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent, where considered necessary by the designer.

Residual Impact

With the application of the best practice mitigation outlined above, the residual effect will be – Imperceptible, direct, negative, short-term, high probability impact on stream flows, stream morphology and surface water quality.

Significance of Effects

For the reasons outlined above, no significant effects on stream morphology or stream water quality are anticipated at Site C and the proposed outfall location.

8.6.3.6.7 *Potential Water Impacts on Designated Sites and Habitats*

Site C drains into the Rye Water River to the south and the Blackhall Little within the centre of the site. The Rye Water Valley/Carton SAC is downstream of Site C, to the southeast, directly adjacent to the site boundary on the opposite side of the R157 Regional Road.

The qualifying interests of the SAC is linked to groundwater flows (calcareous tufa springs) There is no connection between groundwater at the development site, and that discharging to any known tufa springs within the SAC (including the mapped spring located approximately 5km from Site Cat Louisa Bridge).

Groundwater below Site C will flow to the south and discharge as baseflow to the Rye Water River and/or the Blackhall Little stream to the east of the housing units. Groundwater flow from the site will, therefore, have no impact on the Louisa Bridge (spring) groundwater flow (Rye Water Valley/Carton SAC) as previous site investigations and hydrological assessments (c.f. Section 2.4, (Hydro-G, 2008)) have shown that the flow to these springs is not derived from the Rye Water River and are in fact fed from a source further east of Louisa Bridge.

Two of the qualifying interests of the SAC are two species of vertigo snail (Vertigo angustior and Vertigo moulinsiana), with both species' dependant on the calcareous march habitat which is provided by the tufa formation. The known range of both species within the SAC is also restricted to Louisa Bridge (spring). While there are no known petrifying springs or qualifying interests of the Rye Water Valley/Carton SAC within proximity of Site A i.e. Louisa Bridge. An ecological walkover survey of the SAC by MKO to identify any additional tufa springs or potential habitat for vertigo snails downstream of the Proposed Development site has not identified petrifying springs nor their associated qualifying interests in this area of the SAC. Irrespective of this the potential for the occurrence of unmapped petrifying springs within the SAC has also been considered below.

Although there is no potential for effects on the known QI of the SAC the following mitigation will ensure no impact on the SAC generally. Standard mitigation and SuDS drainage controls are proposed during the construction and operational phase of Site C (e.g., silt traps/road gullies, hydrocarbon interceptors, attenuation storage and infiltration, and hydro-brake flow limiters) which have been proven through widespread use in housing and commercial developments across the country. The proposed SuDs drainage system incorporated into the engineering design of the site are common drainage systems that are used in development sites. They are proposed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS, 2005) and the objectives outlined in the Meath County Development Plan 2021-2027.

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These standard drainage design controls and construction phase mitigation measures will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at less than the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the proposed development.

The project design ensures that there will be no dewatering of the bedrock aquifer during the construction phase and so there will be no obstruction or alteration of existing groundwater flows.

There will be no significant alteration to groundwater recharge. The majority of rainfall will continue to percolate to shallow subsurface and discharge to the surface water systems locally with low levels of recharge to ground, in particular for Site C with is underlain with low permeability subsoils. During the construction phase, the recharge rates won't change materially.

With the implementation of the project as designed and the standard drainage control measures outlined above the potential for Site C to cause any groundwater drawdown or groundwater quality impacts in the SAC is imperceptible.

Groundwater flowpaths will be maintained during the construction phase as any excavation proposed will be shallow. The SI data shows that dewatering of groundwater from the bedrock aquifer will not occur and so there is no potential for significant effects on the calcareous tufa springs and associated species.

Following an extremely precautionary principle, the potential for other downstream designated sites to be impacted by the proposed works was also considered. On the basis of the Proposed Development design and the mitigation measures proposed to protect the immediate water receptors there will be no impacts on designated sites.

Pathway: Site drainage network and groundwater flowpaths.

Receptor: Rye Water Valley/Carton SAC and any associated Tufa Springs and vertigo snail populations (including the known spring 5km downstream at Louisa Bridge and the SAC downstream of the Proposed Development site).

Pre-Mitigation Impact

Indirect, negative, slight, short term, likely impact to water quality and hydrology regime.

Proposed Mitigation Measures

The proposed mitigation measures for protection of surface water and groundwater quality which will include on site drainage control measures (i.e., silt fences, silt bags etc.) will ensure that the quality of runoff from Site C areas will be good. All mitigation measures outlined throughout Section 8.6.3.3 above provides controls which will be put in place to manage risks associated with sediment, hydrocarbons/chemicals and cement-based products used during construction phase.

The standard drainage design controls will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at less than the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by Site C.

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Residual Impact

With the application of the best practice mitigation outlined above, the residual effect will be – Imperceptible, direct, negative, short-term, high probability impact on surface and ground water receptors.

Significance of Effects

For the reasons outlined above, no significant effects will occur on the designated site.

8.6.3.7 MOOR (Maynooth Outer Orbital Road)

8.6.3.7.1 *Earthworks (Removal of Vegetation Cover, Excavations and Stock Piling) Resulting in Suspended Solids Entrainment in Surface Waters*

Construction phase activities including site levelling, service trench construction, levelling/construction and foundation excavation will require earthworks resulting in removal of vegetation cover and excavation of any minor local pockets of organic soil/subsoils, and bedrock. Such excavations will be relatively shallow and temporary. The main risk will be from surface water runoff from bare soil and soil storage areas during construction works.

Much of the surface water generally percolates to shallow ground and discharges via shallow subsurface flow to the Rye Water River and Blackhall Little Stream and this will likely continue during the construction phase. The construction activities have the potential to result in the release of suspended solids to this local drainage feature and could potentially result in an increase in the suspended sediment load, resulting in increased turbidity which, in turn, could affect the water quality and fish stocks of the Rye Water River, Blackhall Little Stream and downstream water bodies, such as the Rye Water Valley/ Carton SAC.

Pathways: Drainage and surface water discharge routes.

Receptors: Down-gradient watercourses (Rye Water River and Blackhall Little Stream) and dependant ecosystems.

Pre-Mitigation Potential Impact: Direct, negative, moderate, short-term, likely impact.

Proposed Mitigation Measures

Management of surface water runoff and subsequent treatment prior to release off-site will be undertaken during construction work as follows:

- Silt fencing will be constructed around the construction footprint, where there is a surface water receptor, in order to create a defined perimeter for the proposed works, leaving a natural vegetation buffer between the construction footprint (other than operational surface water outfall installations which are described below) and surface water receptors and associated riparian habitats.
- A silt fence will also be attached to solid boundary fencing where it is in place and where there is a surface water receptor. This will protect the stream from any potential sediment laden surface water run-off generated during construction activities.
- The silt fence will comprise a geotextile membrane that will buried beneath the ground to filter any run-off that may occur as a result of the proposed works. The silt fence will be monitored throughout the proposed works and will remain in place after the works are completed and until the exposed earth has re-vegetated.

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- As construction advances there may be a requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground;
- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing;
- A suitably sized detention basin or settlement area will be installed at the lowest point before discharge to ground where excess run- off must leave the site. Silt curtains or earth berms will be used to channel run-off to locations where it can be controlled. These may take the form of an open detention area or, where the need arises, a portable skip/s, or similar, where inflow passes through straw bales, gravel etc.
- Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present;
- Daily monitoring and inspections of site drainage during construction will be completed;
- No instream works will take place outside the period July 1st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland is incorporated into the design of the proposed Kildare Bridge pedestrian/cycle structure upgrade works, the Blackhall Little Bridge and the Moyglare Bridge;
- Surface water outfalls will be constructed in accordance with the measures described in Chapter 6 and 8.6.3.4.4 and subject to agreement with IFI.
- Good construction practices such wheel washers and dust suppression on site roads, and regular plant maintenance, which will be implemented, will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRlA, 2001), which provides information on these issues. This will ensure that surface water arising during the course of construction activities will contain minimum sediment.
- During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas; and,
- The MOOR crossing of the Blackhall Little stream, the Moyglare Bridge and the Kildare Bridge Works and all pedestrian/cycle bridges will all require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will all be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent, where considered necessary by the designer.
- Preventative measures during construction have been incorporated into the Construction and Environmental Management Plan, which will be updated upon grant of permission and to provide any additional measures required pursuant to planning conditions and agreements with the planning authority.

Residual Impact

The MOOR will be set back from the Rye Water River and Blackhall Little stream where possible (limiting the potential source of sediments) and various controls including silt fence will be in place to break the pathway between the works area and the watercourse (receptor). Subject to the implementation of the listed mitigation measures the residual impact will be a negative, indirect, imperceptible and short term.

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Significance of Effects

For the reasons outlined above, no significant effects on the surface water quality are anticipated following implementation of proposed mitigation measures.

8.6.3.7.2 *Potential Surface Water Quality Impacts from Shallow Excavation Dewatering*

Some minor groundwater seepages may potentially occur in foundation excavations, however, the likelihood is considered low given the nature of the underlying aquifer and the information from the Site Investigations which show dry shallow subsoils. Dewatering, if undertaken, will create additional volumes of water to be treated by the runoff management system. Inflows will likely require management and treatment to reduce suspended sediments. No contaminated land was noted at the site and therefore historical pollution sources do not arise. Such works will be temporary.

Pathway: Overland flow and site drainage network.

Receptor: Down-gradient surface water bodies (Rye Water River and Blackhall Little stream).

Pre-Mitigation Potential Impact: Direct, negative, moderate, temporary, medium probability impact to surface water quality.

Proposed Mitigation Measures:

Management of groundwater seepages and subsequent treatment prior to discharge into the drainage network will be undertaken as follows:

- Silt fencing measures as described above will be installed.
- Appropriate temporary interceptor drainage, to prevent upslope surface runoff from entering excavations will be put in place, as required;
- If required, pumping of excavation inflows will prevent build-up of water in the excavation;
- The pumped water volumes will be discharged to ground within the site through a silt bag at a distance of over 30m from nearby watercourses (Rye Water River and Blackhall Little Stream).
- There will be no direct discharge to any water body, and therefore no risk of hydraulic loading or contamination will occur;

Residual Impact

The potential for the release of suspended solids to watercourse receptors is a risk to water quality and the aquatic quality of the receptor. Proven and effective measures to mitigate the risk of releases of sediment have been proposed above and will break the pathway between the potential sources and the receptor. The residual effect is considered to be – Negative, imperceptible, indirect, short-term, low probability impact on local surface water quality.

Significance of the Effects

For the reasons outlined above, no significant effects on the surface water quality are anticipated. No impact on groundwater levels or groundwater quality will occur.

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8.6.3.7.3 Potential Release of Hydrocarbons During Construction Phase

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk to groundwater, surface water and associated ecosystems, and to terrestrial ecology. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in death of aquatic organisms.

The procedures and infrastructure required for the storage and handling of hydrocarbons or other chemicals on construction sites is well established. There is proven and employed specifically for the handling of hydrocarbons and chemicals in the context of soil and water pollution. In this context, all hydrocarbon and chemical storage and handling will be carried out by trained personnel with appropriate control measures in place at site.

Pathway: Groundwater and surface water flowpaths.

Receptor: Groundwater and surface water (Rye Water River and Blackhall Little Stream).

Pre-Mitigation Potential Impact: Direct, negative, slight, short term, likely impact to local groundwater quality.

Direct, negative, moderate, short term, unlikely impact to surface water quality.

Proposed Mitigation Measures

Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows:

- All plant and machinery will be serviced before being mobilised to site;
- No plant maintenance will be completed on site, any broken down plant will be removed from site to be fixed;
- Refuelling will be completed in a controlled manner using drip trays at all times;
- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water;
- Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores;
- Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored;
- Ancillary equipment such as hoses and pipes will be contained within the bund;
- Taps, nozzles or valves will be fitted with a lock system;
- Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Drip-trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills;
- Only designated trained operators will be authorised to refuel plant on site;
- Procedures and contingency plans will be set up to deal with emergency accidents or spills; and,
- An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment.

Highest standards of site management will be maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A suitably qualified individual will be given the task of overseeing the pollution

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prevention measures agreed for the site to ensure that they are operating safely and effectively as well as having responsibility for the implementation of Emergency Procedures for spill control measures.

Residual Impact

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction sites. Proven and effective measures to mitigate the risk of spills and leaks, will be applied during the construction phase. The residual effect is assessed as – Negative, imperceptible, indirect, short-term, low probability effect on groundwater and surface water.

Significance of Effects

For the reasons outlined above, no significant effects on surface water or groundwater quality are anticipated.

8.6.3.7.4 *Potential Groundwater and Surface Water Contamination from Wastewater Disposal*

Release of effluent from on-site wastewater systems during the construction phase has the potential to impact on groundwater and surface waters.

Pathway: Groundwater flowpaths and site drainage network.

Receptor: Down-gradient well supplies, groundwater quality and surface water quality.

Pre-mitigation Impact: Indirect, negative, significant, temporary, unlikely impact to surface water quality. Indirect, negative, slight, temporary, unlikely impact to local groundwater.

Proposed Mitigation Measures

- A self-contained port-a-loo with an integrated waste holding tank will be used at the site compounds, maintained by the providing contractor, and removed from site on completion of the construction works; and,
- No wastewater will be discharged on-site during either the construction or operational phase.

Residual Impact: No impact.

8.6.3.7.5 *Release of Cement-Based Products*

Concrete and other cement-based products are highly alkaline and corrosive and can have significant negative impacts on water quality. They generate very fine, highly alkaline silt (Ph 11.5) that can physically damage fish by burning their skin and blocking their gills. A Ph range of $\geq 6 \leq 9$ is set in S.I. No. 293 of 1988 Quality of Salmonid Water Regulations, with artificial variations not in excess of ± 0.5 of a Ph unit. Entry of cement-based products into the site drainage system, into surface water runoff, and hence to surface watercourses or directly into watercourses represents a risk to the aquatic environment. Batching of wet concrete on site and washing out of transport and placement machinery are the activities most likely to generate a risk of cement-based pollution.

Pathway: Site drainage network.

Receptor: Surface water and transitional water hydrochemistry.

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Pre-Mitigation Impact: Indirect, negative, moderate, short term, likely impact to surface water (Rye Water River and Blackhall Little stream).

Proposed Mitigation Measures

- No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place.
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site;
- Where possible pre-cast elements for culverts and concrete works will be used.
- Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be undertaken at lined cement washout ponds.
- Weather forecasting will be used to plan dry days for pouring concrete.
- The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event.

Residual Impact

Proven and effective measures to mitigate the risk of releases of cement-based products or cement truck wash water have been proposed above and will break the pathway between the potential source and each receptor. The residual effect is considered to be – Negative, imperceptible, indirect, short term, unlikely impact to surface water quality.

Significance of the Effect

For the reasons outlined above, no significant effects on surface water quality are anticipated.

8.6.3.7.6 *Morphological Changes to Surface Water Courses & Drainage Patterns*

Diversion, culverting and bridge crossing of surface watercourses can result in morphological changes, changes to drainage patterns and alteration of aquatic habitats. Construction of structures over water courses has the potential to significantly interfere with water quality and flows during the construction phase. Mitigation by design is the key factor in minimising the potential for effects on water course morphology. It is not proposed to alter or redirect the existing streams and rivers.

As detailed in Section 8.5.4 above, 4 no. bridges are to be constructed as part of the MOOR. A pedestrian/cycle bridge adjacent to the existing Kildare Bridge, a pedestrian/cycle bridge located along the L22143 and 2 no. new road bridges, one located to the north of Site A crossing the Blackhall Little Stream and another located to the southwest of Site C crossing the Rye Water River. The proposed bridges will require construction activity along the Rye water River and the Blackhall Little Stream.

All bridges are clear span and have been designed to ensure no alteration of water course morphology or drainage patterns.

Pathway: Drainage Patterns and surface water discharge routes.

Receptors: Surface water flows (Rye Water River & Blackhall Little Stream), stream morphology and water quality.

Pre-Mitigation Potential Impact: Negative, direct, slight, long term, high probability impact.

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Proposed Mitigation Measures

- The proposed design for water course crossings and culverts, which minimises interactions with water courses, ensures that there will be no perceptible effects on the morphology of those watercourses.
- Prior to the outset of these works, small defined works areas will be fenced off at the location of the storm water outfall (between the main construction site and both water courses). Silt fences will be attached to these fences. The silt fence will provide a solid barrier between the proposed pipelaying works and the Rye Water River/Blackhall Little
- The necessary pipelaying works will be undertaken within this defined area.
- Following the installation of the pipework and reinstatement of the ground, the small section of the silt fence that protects the Rye Water River/Blackhall Little will be removed to facilitate the construction of the outfall.
- No instream works will take place outside the period July 31st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- Cofferdams will be constructed using one tonne sandbags at the edge of the Rye Water River/Blackhall Little at the outfall point to create dry working areas.
- A submersible pump will be used to dewater inside the cofferdammed area and will discharge any waters to land at a location of over 30m from the rivers. The pumped waters will discharge through a silt bag.
- The bankside will be excavated and a small pre-cast concrete headwall installed (with outfall pipe included).
- The banks and channel bed will be reinstated to avoid erosion or run off of silt. Following this the dams will be removed.
- The surface water discharge point is likely to take less than one day to install
- The bridge works will all require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will all be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent, where considered necessary by the designer.

Residual Impact

With the application of the best practice mitigation outlined above, the residual effect will be – Imperceptible, direct, negative, short-term, high probability impact on stream flows, stream morphology and surface water quality.

Significance of Effects

For the reasons outlined above, no significant effects on stream morphology or stream water quality are anticipated at the MOOR and the proposed outfall location.

8.6.3.8 Potential Water Impacts on Designated Sites and Habitats

The MOOR drains into the Rye Water River to the south and along the Blackhall Little Stream. The Rye Water Valley/Carton SAC is downstream of the MOOR, to the southeast, directly adjacent to the site boundary on the opposite side of the R157 Regional Road.

The qualifying interests of the SAC is linked to groundwater flows (calcareous tufa springs) There is no connection between groundwater at the development site, and that discharging to any known tufa springs within the SAC (including the mapped spring located approximately 5km from the MOOR at Louisa Bridge).

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Groundwater below the MOOR will flow to the south and discharge as baseflow to the Rye Water River and/or the Blackhall Little stream to the centre of the site. Groundwater flow from the site will, therefore, have no impact on the Louisa Bridge (spring) groundwater flow (Rye Water Valley/Carton SAC) as previous site investigations and hydrological assessments (c.f. Section 2.4, (Hydro-G, 2008)) have shown that the flow to these springs is not derived from the Rye Water River and are in fact fed from a source further east of Louisa Bridge.

Two of the qualifying interests of the SAC are two species of vertigo snail (Vertigo angustior and Vertigo moulinsiana), with both species' dependant on the calcareous march habitat which is provided by the tufa formation. The known range of both species within the SAC is also restricted to Louisa Bridge (spring). While there are no known petrifying springs or qualifying interests of the Rye Water Valley/Carton SAC within proximity of Site A i.e. Louisa Bridge. An ecological walkover survey of the SAC by MKO to identify any additional tufa springs or potential habitat for vertigo snails downstream of the Proposed Development site has not identified petrifying springs nor their associated qualifying interests in this area of the SAC. Irrespective of this the potential for the occurrence of unmapped petrifying springs within the SAC has also been considered below.

Although there is no potential for effects on the known QI of the SAC the following mitigation will ensure no impact on the SAC generally. Standard mitigation and SuDS drainage controls are proposed during the construction and operational phase of the MOOR (e.g., silt traps/road gullies, hydrocarbon interceptors, attenuation storage and infiltration, and hydro-brake flow limiters) which have been proven through widespread use in housing and commercial developments across the country. The proposed SuDs drainage system incorporated into the engineering design of the site are common drainage systems that are used in development sites. They are proposed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS, 2005) and the objectives outlined in the Meath County Development Plan 2021-2027.

These standard drainage design controls and construction phase mitigation measures will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at less than the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the proposed development.

The project design ensures that there will be no dewatering of the bedrock aquifer during the construction phase and so there will be no obstruction or alteration of existing groundwater flows.

There will be no significant alteration to groundwater recharge. The majority of rainfall will continue to percolate to shallow subsurface and discharge to the surface water systems locally with low levels of recharge to ground, in particular for the MOOR with is underlain with low permeability subsoils. During the construction phase, the recharge rates won't change materially.

With the implementation of the project as designed and the standard drainage control measures outlined above the potential for the MOOR to cause any groundwater drawdown or groundwater quality impacts in the SAC is imperceptible.

Groundwater flowpaths will be maintained during the construction phase as any excavation proposed will be shallow. The SI data shows that dewatering of groundwater from the bedrock aquifer will not occur and so there is no potential for significant effects on the calcareous tufa springs and associated species.

Following an extremely precautionary principle, the potential for other downstream designated sites to be impacted by the proposed works was also considered. On the basis of the Proposed Development design and the mitigation measures proposed to protect the immediate water receptors there will be no impacts on designated sites.

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Pathway: Site drainage network and groundwater flowpaths.

Receptor: Rye Water Valley/Carton SAC and any associated Tufa Springs and vertigo snail populations (including the known spring 5km downstream at Louisa Bridge and the SAC downstream of the Proposed Development site).

Pre-Mitigation Impact

Indirect, negative, slight, short term, likely impact to water quality and hydrology regime.

Proposed Mitigation Measures

The proposed mitigation measures for protection of surface water and groundwater quality which will include on site drainage control measures (i.e., silt fences, silt bags etc.) will ensure that the quality of runoff from the MOOR will be good. All mitigation measures outlined throughout Section 8.6.3.4 above provides controls which will be put in place to manage risks associated with sediment, hydrocarbons/chemicals and cement-based products used during construction phase.

The standard drainage design controls will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at less than the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the MOOR.

Residual Impact

With the application of the best practice mitigation outlined above, the residual effect will be – Imperceptible, direct, negative, short-term, high probability impact on surface and ground water receptors.

Significance of Effects

For the reasons outlined above, no significant effects will occur on the QI of the designated site.

8.6.3.9 Kildare Bridge

8.6.3.9.1 *Earthworks (Removal of Vegetation Cover, Excavations and Stock Piling) Resulting in Suspended Solids Entrainment in Surface Waters*

Construction phase activities including service trench construction, levelling/construction and bridge foundation excavation as well as directional drilling which will require earthworks resulting in removal of vegetation cover and excavation of any minor local pockets of organic soil/subsoils, and bedrock. Such excavations will be relatively shallow and temporary. The main risk will be from surface water runoff from bare soil and soil storage areas during construction works and frac-out from directional drilling.

Much of the surface water generally percolates to shallow ground and discharges via shallow subsurface flow to the Rye Water River and this will likely continue during the construction phase. The construction activities have the potential to result in the release of suspended solids to this local drainage feature and could potentially result in an increase in the suspended sediment load, resulting in increased turbidity which, in turn, could affect the water quality and fish stocks of the Rye Water River and downstream water bodies, such as the Rye Water Valley/ Carton SAC. Potential impacts are potentially significant if not mitigated against.

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Pathways: Drainage and surface water discharge routes.

Receptors: Down-gradient watercourses (Rye Water River) and dependant ecosystems.

Pre-Mitigation Potential Impact: Direct, negative, moderate, short-term, likely impact.

Proposed Mitigation Measures

Management of surface water runoff and subsequent treatment prior to release off-site will be undertaken during construction work as follows:

- Silt fencing will be constructed around the construction footprint, where there is a surface water receptor, in order to create a defined perimeter for the proposed works, leaving a natural vegetation buffer between the construction footprint (other than operational surface water outfall installations which are described below) and surface water receptors and associated riparian habitats.
- A silt fence will also be attached to solid boundary fencing where it is in place and where there is a surface water receptor. This will protect the stream from any potential sediment laden surface water run-off generated during construction activities.
- The silt fence will comprise a geotextile membrane that will buried beneath the ground to filter any run-off that may occur as a result of the proposed works. The silt fence will be monitored throughout the proposed works and will remain in place after the works are completed and until the exposed earth has re-vegetated.
- As construction advances there may be a requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground;
- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing;
- A suitably sized detention basin or settlement area will be installed at the lowest point before discharge to ground where excess run- off must leave the site. Silt curtains or earth berms will be used to channel run-off to locations where it can be controlled. These may take the form of an open detention area or, where the need arises, a portable skip/s, or similar, where inflow passes through straw bales, gravel etc.
- Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present;
- Daily monitoring and inspections of site drainage during construction will be completed;
- No instream works will take place outside the period July 1st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland is incorporated into the design of the proposed Kildare Bridge pedestrian/cycle structure upgrade works;
- Surface water outfalls will be constructed in accordance with the measures described in Chapter 6 and 8.6.3.4.4 and subject to agreement with IFI.
- Good construction practices such wheel washers and dust suppression on site roads, and regular plant maintenance, which will be implemented, will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRIA, 2001), which provides information on these issues. This will

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ensure that surface water arising during the course of construction activities will contain minimum sediment.

- Preventative measures during construction have been incorporated into the Construction and Environmental Management Plan, which will be updated upon grant of permission and to provide any additional measures required pursuant to planning conditions and agreements with the planning authority.
- For directional drilling the area around the bentonite batching, pumping and recycling plant will be bunded using terram (as it will clog) and sandbags in order to contain any spillages.
- Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area;
- Spills of drilling fluid will be clean up immediately and stored in an adequately sized skip before been taken off-site;
- The drilling fluid/bentonite will be non-toxic and naturally biodegradable (i.e., Clear Bore Drilling Fluid or similar will be used);
- The drilling process / pressure will be constantly monitored to detect any possible leaks or breakouts into the surrounding geology or local watercourse;
- This will be gauged by observation and by monitoring the pumping rates and pressures. If any signs of breakout occur then drilling will be immediately stopped;
- Any frac-out material will be contained and removed off-site;

Residual Impact

The works area will be set back from the Rye Water River whereever possible (limiting the potential source of sediments) and a silt fence will be in place to break the pathway between the works area and the watercourse (receptor). Subject to the implementation of the listed mitigation measures the residual impact will be a negative, indirect, imperceptible and short term.

Significance of Effects

For the reasons outlined above, no significant effects on the surface water quality are anticipated following implementation of proposed mitigation measures.

8.6.3.10 Potential Surface Water Quality Impacts from Shallow Excavation Dewatering

Some minor groundwater seepages may potentially occur in building foundation excavations, however, the likelihood is considered low given the nature of the underlying aquifer and the information from the Site Investigations which show dry shallow subsoils. Dewatering, if undertaken, will create additional volumes of water to be treated by the runoff management system. Inflows will likely require management and treatment to reduce suspended sediments. No contaminated land was noted at the site and therefore historical pollution sources do not arise. Such works will be temporary.

Pathway: Overland flow and site drainage network.

Receptor: Down-gradient surface water bodies (Rye Water River).

Pre-Mitigation Potential Impact: Direct, negative, moderate, temporary, medium probability impact to surface water quality.

Proposed Mitigation Measures:

Management of groundwater seepages and subsequent treatment prior to discharge into the drainage network will be undertaken as follows:

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- Silt fencing measures as described above will be installed.
- Appropriate temporary interceptor drainage, to prevent upslope surface runoff from entering excavations will be put in place, as required;
- If required, pumping of excavation inflows will prevent build-up of water in the excavation;
- The pumped water volumes will be discharged to ground within the site through a silt bag at a distance of over 30m from nearby watercourses (Rye Water River).
- There will be no direct discharge to any water body, and therefore no risk of hydraulic loading or contamination will occur;

Residual Impact

The potential for the release of suspended solids to watercourse receptors is a risk to water quality and the aquatic quality of the receptor. Proven and effective measures to mitigate the risk of releases of sediment have been proposed above and will break the pathway between the potential sources and the receptor. The residual effect is considered to be – Negative, imperceptible, indirect, short-term, low probability impact on local surface water quality.

Significance of the Effects

For the reasons outlined above, no significant effects on the surface water quality are anticipated. No impact on groundwater levels or groundwater quality will occur.

8.6.3.10.2 *Potential Release of Hydrocarbons During Construction Phase*

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk to groundwater, surface water and associated ecosystems, and to terrestrial ecology. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in death of aquatic organisms.

The procedures and infrastructure required for the storage and handling of hydrocarbons or other chemicals on construction sites is well established. There is proven and employed specifically for the handling of hydrocarbons and chemicals in the context of soil and water pollution. In this context, all hydrocarbon and chemical storage and handling will be carried out by trained personnel with appropriate control measures in place at site.

Pathway: Groundwater and surface water flowpaths.

Receptor: Groundwater and surface water (Rye Water River).

Pre-Mitigation Potential Impact: Direct, negative, slight, short term, likely impact to local groundwater quality.

Direct, negative, moderate, short term, unlikely impact to surface water quality.

Proposed Mitigation Measures

Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows:

- All plant and machinery will be serviced before being mobilised to site;
- No plant maintenance will be completed on site, any broken down plant will be removed from site to be fixed;
- Refuelling will be completed in a controlled manner using drip trays at all times;

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- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water;
- Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores;
- Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored;
- Ancillary equipment such as hoses and pipes will be contained within the bund;
- Taps, nozzles or valves will be fitted with a lock system;
- Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Drip-trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills;
- Only designated trained operators will be authorised to refuel plant on site;
- Procedures and contingency plans will be set up to deal with emergency accidents or spills; and,
- An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment.

Highest standards of site management will be maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A suitably qualified individual will be given the task of overseeing the pollution prevention measures agreed for the site to ensure that they are operating safely and effectively as well as having responsibility for the implementation of Emergency Procedures for spill control measures.

Residual Impact

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction sites. Proven and effective measures to mitigate the risk of spills and leaks, will be applied during the construction phase. The residual effect is assessed as - Negative, imperceptible, indirect, short-term, low probability effect on groundwater and surface water.

Significance of Effects

For the reasons outlined above, no significant effects on surface water or groundwater quality are anticipated.

8.6.3.10.3 *Potential Groundwater and Surface Water Contamination from Wastewater Disposal*

Release of effluent from on-site wastewater systems during the construction phase has the potential to impact on groundwater and surface waters.

Pathway: Groundwater flowpaths and site drainage network.

Receptor: Down-gradient well supplies, groundwater quality and surface water quality.

Pre-mitigation Impact: Indirect, negative, significant, temporary, unlikely impact to surface water quality. Indirect, negative, slight, temporary, unlikely impact to local groundwater.

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Proposed Mitigation Measures

- A self-contained port-a-loo with an integrated waste holding tank will be used at the site compounds, maintained by the providing contractor, and removed from site on completion of the construction works; and,
- No wastewater will be discharged on-site during either the construction or operational phase.

Residual Impact: No impact.

8.6.3.10.4 *Release of Cement-Based Products*

Concrete and other cement-based products are highly alkaline and corrosive and can have significant negative impacts on water quality. They generate very fine, highly alkaline silt (pH 11.5) that can physically damage fish by burning their skin and blocking their gills. A pH range of $\geq 6 \leq 9$ is set in S.I. No. 293 of 1988 Quality of Salmonid Water Regulations, with artificial variations not in excess of ± 0.5 of a pH unit. Entry of cement-based products into the site drainage system, into surface water runoff, and hence to surface watercourses or directly into watercourses represents a risk to the aquatic environment. Batching of wet concrete on site and washing out of transport and placement machinery are the activities most likely to generate a risk of cement-based pollution.

Pathway: Site drainage network.

Receptor: Surface water and transitional water hydrochemistry.

Pre-Mitigation Impact: Indirect, negative, moderate, short term, likely impact to surface water (Rye Water River).

Proposed Mitigation Measures

- No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place.
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site;
- Where possible pre-cast elements for culverts and concrete works will be used.
- Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be undertaken at lined cement washout ponds.
- Weather forecasting will be used to plan dry days for pouring concrete.
- The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event.

Residual Impact

Proven and effective measures to mitigate the risk of releases of cement-based products or cement truck wash water have been proposed above and will break the pathway between the potential source and each receptor. The residual effect is considered to be - Negative, imperceptible, indirect, short term, unlikely impact to surface water quality.

Significance of the Effect

For the reasons outlined above, no significant effects on surface water quality are anticipated.

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8.6.3.10.5 Morphological Changes to Surface Water Courses & Drainage Patterns

Diversion, culverting and bridge crossing of surface watercourses can result in morphological changes, changes to drainage patterns and alteration of aquatic habitats. Construction of structures over water courses has the potential to significantly interfere with water quality and flows during the construction phase. Mitigation by design is the key factor in minimising the potential for effects on water course morphology. It is not proposed to alter or redirect the existing streams and rivers.

As detailed in Section 8.4.3 above, a new pedestrian / cycle bridge structure is proposed adjacent to the existing Kildare Bridge, the proposed additional infrastructure at the bridge will required construction activity along the Rye Water River.

Furthermore, the Kildare Bridge works will require stormwater discharge to a filter trench along an existing ditch on the R157 where it'll discharge to the Rye Water River at one proposed outfall adjacent to Kildare Bridge. To prevent any potential for significant effects on the Rye Water River during construction, a silt fence will be erected to form a solid barrier between the proposed pipe laying works and the stream. To construct the surface water outfall, the installation of a small precast concrete headwall will be required along the Rye Water River. A non-return valve will be positioned at the outfall. Further information can be found in Volume 3a Appendix 4-9.

Pathway: Drainage Patterns and surface water discharge routes.

Receptors: Surface water flows (Rye Water River), stream morphology and water quality.

Pre-Mitigation Potential Impact: Negative, direct, slight, long term, high probability impact.

Proposed Mitigation Measures

- The proposed design for water course crossings and culverts, which minimises interactions with water courses, ensures that there will be no perceptible effects on the morphology of those watercourses.
- Prior to the outset of these works, small defined works areas will be fenced off at the location of the storm water outfall (between the main construction site and both water courses). Silt fences will be attached to these fences. The silt fence will provide a solid barrier between the proposed pipelaying works and the Rye Water River
- The necessary pipelaying works will be undertaken within this defined area.
- Following the installation of the pipework and reinstatement of the ground, the small section of the silt fence that protects the Rye Water River will be removed to facilitate the construction of the outfall.
- No instream works will take place outside the period July 31st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- Cofferdams will be constructed using one tonne sandbags at the edge of the Rye Water River at the outfall point to create dry working areas.
- A submersible pump will be used to dewater inside the cofferdammed area and will discharge any waters to land at a location of over 30m from the rivers. The pumped waters will discharge through a silt bag.
- The bankside will be excavated and a small pre-cast concrete headwall installed (with outfall pipe included).
- The banks and channel bed will be reinstated to avoid erosion or run off of silt. Following this the dams will be removed.
- The surface water discharge point is likely to take less than one day to install
- During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the

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construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas; and,

- The Kildare Bridge upgrade works will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent, where considered necessary by the designer.

Residual Impact

With the application of the best practice mitigation outlined above, the residual effect will be – Imperceptible, direct, negative, short-term, high probability impact on stream flows, stream morphology and surface water quality.

Significance of Effects

For the reasons outlined above, no significant effects on stream morphology or stream water quality are anticipated at Kildare Bridge works area.

8.6.3.10.6 *Potential Water Impacts on Designated Sites and Habitats*

The qualifying interests of the SAC is linked to groundwater flows (calcareous tufa springs) There is no connection between groundwater at the development site, and that discharging to any known tufa springs within the SAC (including the mapped spring located approximately 5km from Kildare Bridge at Louisa Bridge).

Groundwater below Kildare Bridge will discharge as baseflow to the Rye Water River, flow from the site will, therefore, have no impact on the Louisa Bridge (spring) groundwater flow (Rye Water Valley/Carton SAC) as previous site investigations and hydrological assessments (c.f. Section 2.4, (Hydro-G, 2008)) have shown that the flow to these springs is not derived from the Rye Water River and are in fact fed from a source further east of Louisa Bridge.

Two of the qualifying interests of the SAC are two species of vertigo snail (Vertigo angustior and Vertigo moulinsiana), with both species' dependant on the calcareous march habitat which is provided by the tufa formation. The known range of both species within the SAC is also restricted to Louisa Bridge (spring). While there are no known petrifying springs or qualifying interests of the Rye Water Valley/Carton SAC within proximity of Site A i.e. Louisa Bridge. An ecological walkover survey of the SAC by MKO to identify any additional tufa springs or potential habitat for vertigo snails downstream of the Proposed Development site has not identified petrifying springs nor their associated qualifying interests in this area of the SAC. Irrespective of this the potential for the occurrence of unmapped petrifying springs within the SAC has also been considered below.

Although there is no potential for effects on the known QI of the SAC the following mitigation will ensure no impact on the SAC generally. Standard mitigation and SuDS drainage controls are proposed during the construction and operational phase of the Kildare Bridge works areas which have been proven through widespread use in bridge and pipelaying developments across the country. The proposed SuDs drainage system incorporated into the engineering design of the site are common drainage systems that are used in development sites. They are proposed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS, 2005) and the objectives outlined in the Meath County Development Plan 2021-2027.

These standard drainage design controls and construction phase mitigation measures will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing

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greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the proposed development.

The project design ensures that there will be no dewatering of the bedrock aquifer during the construction phase and so there will be no obstruction or alteration of existing groundwater flows.

There will be no significant alteration to groundwater recharge. The majority of rainfall will continue to percolate to shallow subsurface and discharge to the surface water systems locally with low levels of recharge to ground, in particular for Kildare Bridge with is underlain with low permeability subsoils. During the construction phase, the recharge rates won't change materially.

With the implementation of the project as designed and the standard drainage control measures outlined above the potential for Kildare Bridge to cause any groundwater drawdown or groundwater quality impacts in the SAC is imperceptible.

Groundwater flowpaths will be maintained during the construction phase as any excavation proposed will be shallow. The SI data shows that dewatering of groundwater from the bedrock aquifer will not occur and so there is no potential for significant effects on the calcareous tufa springs and associated species.

Following an extremely precautionary principle, the potential for other downstream designated sites to be impacted by the proposed works was also considered. On the basis of the Proposed Development design and the mitigation measures proposed to protect the immediate water receptors there will be no impacts on designated sites.

Pathway: Site drainage network and groundwater flowpaths.

Receptor: Rye Water Valley/Carton SAC and any associated Tufa Springs and vertigo snail populations (including the known spring 5km downstream at Louisa Bridge and the SAC downstream of the Proposed Development site).

Pre-Mitigation Impact

Indirect, negative, slight, short term, likely impact to water quality and hydrology regime.

Proposed Mitigation Measures

The proposed mitigation measures for protection of surface water and groundwater quality which will include on site drainage control measures (i.e., silt fences, silt bags etc.) will ensure that the quality of runoff from the Kildare Bridge areas will be good. All mitigation measures outlined throughout Section 8.6.3.5 above provides controls which will be put in place to manage risks associated with sediment, hydrocarbons/chemicals and cement-based products used during construction phase.

The standard drainage design controls will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the Kildare Bridge works.

Residual Impact

With the application of the best practice mitigation outlined above, the residual effect will be – Imperceptible, direct, negative, short-term, high probability impact on surface and ground water receptors.

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Significance of Effects

For the reasons outlined above, no significant effects will occur on the designated site.

8.6.3.11 Moyglare Bridge

8.6.3.11.1 *Earthworks (Removal of Vegetation Cover, Excavations and Stock Piling) Resulting in Suspended Solids Entrainment in Surface Waters*

Construction phase activities including service trench construction, levelling/construction and bridge foundation excavation will require earthworks resulting in removal of vegetation cover and excavation of any minor local pockets of organic soil/subsoils, and bedrock. Such excavations will be relatively shallow and temporary. The main risk will be from surface water runoff from bare soil and soil storage areas during construction works.

Much of the surface water generally percolates to shallow ground and discharges via shallow subsurface flow to the Rye Water River and this will likely continue during the construction phase. The construction activities have the potential to result in the release of suspended solids to this local drainage feature and could potentially result in an increase in the suspended sediment load, resulting in increased turbidity which, in turn, could affect the water quality and fish stocks of the Rye Water River and downstream water bodies, such as the Rye Water Valley/ Carton SAC. Potential impacts are potentially significant if not mitigated against.

Pathways: Drainage and surface water discharge routes.

Receptors: Down-gradient watercourses (Rye Water River) and dependant ecosystems.

Pre-Mitigation Potential Impact: Direct, negative, moderate, short-term, likely impact.

Proposed Mitigation Measures

Management of surface water runoff and subsequent treatment prior to release off-site will be undertaken during construction work as follows:

- At surface water crossings silt fencing will be constructed around the construction footprint in order to create a defined perimeter for the proposed works, leaving a natural vegetation buffer between the construction footprint and surface water receptors and associated riparian habitats.
- The silt fence will comprise a geotextile membrane that will buried beneath the ground to filter any run-off that may occur as a result of the proposed works. The silt fence will be monitored throughout the proposed works and will remain in place after the works are completed and until the exposed earth has re-vegetated.
- As construction advances there may be a requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground;
- Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing;
- A suitably sized detention basin or settlement area will be installed at the lowest point before discharge to ground where excess run- off must leave the site. Silt curtains or earth berms will be used to channel run-off to locations where it can be controlled.

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These may take the form of an open detention area or, where the need arises, a portable skip/s, or similar, where inflow passes through straw bales, gravel etc.
- Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present;
- Daily monitoring and inspections of site drainage during construction will be completed;
- No instream works will take place outside the period July 1st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.
- All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland is incorporated into the design of the proposed Moyglare Bridge;
- Surface water outfalls will be constructed in accordance with the measures described in Chapter 6 and subject to agreement with IFI.
- Good construction practices such wheel washers and dust suppression on site roads, and regular plant maintenance, which will be implemented, will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRlA, 2001), which provides information on these issues. This will ensure that surface water arising during the course of construction activities will contain minimum sediment.
- During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas; and,
- The Moyglare Bridge and all other watercourse crossings will all require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent, where considered necessary by the designer.
- Preventative measures during construction have been incorporated into the Construction and Environmental Management Plan, which will be updated upon grant of permission and to provide any additional measures required pursuant to planning conditions and agreements with the planning authority.

Residual Impact

The works area will be set back from the Rye Water River where ever possible (limiting the potential source of sediments) and a silt fence will be in place to break the pathway between the works area and the watercourse (receptor). Subject to the implementation of the listed mitigation measures the residual impact will be a negative, indirect, imperceptible and short term.

Significance of Effects

For the reasons outlined above, no significant effects on the surface water quality are anticipated following implementation of proposed mitigation measures.

8.6.3.11.2 *Potential Surface Water Quality Impacts from Shallow Excavation Dewatering*

Some minor groundwater seepages may potentially occur in building foundation excavations, however, the likelihood is considered low given the nature of the underlying aquifer and the information from the Site Investigations which show dry shallow subsoils. Dewatering, if undertaken, will create additional volumes of water to be treated by the runoff management system. Inflows will likely require management and treatment to reduce suspended sediments. No contaminated land was noted at the site and therefore historical pollution sources do not arise. Such works will be temporary.

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Pathway: Overland flow and site drainage network.

Receptor: Down-gradient surface water bodies (Rye Water River).

Pre-Mitigation Potential Impact: Direct, negative, moderate, temporary, medium probability impact to surface water quality.

Proposed Mitigation Measures:

Management of groundwater seepages and subsequent treatment prior to discharge into the drainage network will be undertaken as follows:

- Silt fencing measures as described above will be installed.
- Appropriate temporary interceptor drainage, to prevent upslope surface runoff from entering excavations will be put in place, as required;
- If required, pumping of excavation inflows will prevent build-up of water in the excavation;
- The pumped water volumes will be discharged to ground within the site through a silt bag at a distance of over 30m from nearby watercourses (Rye Water River).
- There will be no direct discharge to any water body, and therefore no risk of hydraulic loading or contamination will occur;

Residual Impact

The potential for the release of suspended solids to watercourse receptors is a risk to water quality and the aquatic quality of the receptor. Proven and effective measures to mitigate the risk of releases of sediment have been proposed above and will break the pathway between the potential sources and the receptor. The residual effect is considered to be – Negative, imperceptible, indirect, short-term, low probability impact on local surface water quality.

Significance of the Effects

For the reasons outlined above, no significant effects on the surface water quality are anticipated. No impact on groundwater levels or groundwater quality will occur.

8.6.3.11.3 *Potential Release of Hydrocarbons During Construction Phase*

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk to groundwater, surface water and associated ecosystems, and to terrestrial ecology. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in death of aquatic organisms.

The procedures and infrastructure required for the storage and handling of hydrocarbons or other chemicals on construction sites is well established. There is proven and employed specifically for the handling of hydrocarbons and chemicals in the context of soil and water pollution. In this context, all hydrocarbon and chemical storage and handling will be carried out by trained personnel with appropriate control measures in place at site.

Pathway: Groundwater and surface water flowpaths.

Receptor: Groundwater and surface water (Rye Water River).

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Pre-Mitigation Potential Impact: Direct, negative, slight, short term, likely impact to local groundwater quality.

Direct, negative, moderate, short term, unlikely impact to surface water quality.

Proposed Mitigation Measures

Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows:

- All plant and machinery will be serviced before being mobilised to site;
- No plant maintenance will be completed on site, any broken down plant will be removed from site to be fixed;
- Refuelling will be completed in a controlled manner using drip trays at all times;
- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water;
- Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores;
- Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored;
- Ancillary equipment such as hoses and pipes will be contained within the bund;
- Taps, nozzles or valves will be fitted with a lock system;
- Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Drip-trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills;
- Only designated trained operators will be authorised to refuel plant on site;
- Procedures and contingency plans will be set up to deal with emergency accidents or spills; and,
- An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment.

Highest standards of site management will be maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A suitably qualified individual will be given the task of overseeing the pollution prevention measures agreed for the site to ensure that they are operating safely and effectively as well as having responsibility for the implementation of Emergency Procedures for spill control measures.

Residual Impact

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction sites. Proven and effective measures to mitigate the risk of spills and leaks, will be applied during the construction phase. The residual effect is assessed as – Negative, imperceptible, indirect, short-term, low probability effect on groundwater and surface water.

Significance of Effects

For the reasons outlined above, no significant effects on surface water or groundwater quality are anticipated.

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8.6.3.11.4 Potential Groundwater and Surface Water Contamination from Wastewater Disposal

Release of effluent from on-site wastewater systems during the construction phase has the potential to impact on groundwater and surface waters.

Pathway: Groundwater flowpaths and site drainage network.

Receptor: Down-gradient well supplies, groundwater quality and surface water quality.

Pre-mitigation Impact: Indirect, negative, significant, temporary, unlikely impact to surface water quality. Indirect, negative, slight, temporary, unlikely impact to local groundwater.

Proposed Mitigation Measures

- A self-contained port-a-loo with an integrated waste holding tank will be used at the site compounds, maintained by the providing contractor, and removed from site on completion of the construction works; and,
- No wastewater will be discharged on-site during either the construction or operational phase.

Residual Impact: No impact.

8.6.3.11.5 Release of Cement-Based Products

Concrete and other cement-based products are highly alkaline and corrosive and can have significant negative impacts on water quality. They generate very fine, highly alkaline silt (Ph 11.5) that can physically damage fish by burning their skin and blocking their gills. A Ph range of $\geq 6 \leq 9$ is set in S.I. No. 293 of 1988 Quality of Salmonid Water Regulations, with artificial variations not in excess of ± 0.5 of a Ph unit. Entry of cement-based products into the site drainage system, into surface water runoff, and hence to surface watercourses or directly into watercourses represents a risk to the aquatic environment. Batching of wet concrete on site and washing out of transport and placement machinery are the activities most likely to generate a risk of cement-based pollution.

Pathway: Site drainage network.

Receptor: Surface water and transitional water hydrochemistry.

Pre-Mitigation Impact: Indirect, negative, moderate, short term, likely impact to surface water (Rye Water River).

Proposed Mitigation Measures

- No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place.
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site;
- Where possible pre-cast elements for culverts and concrete works will be used.
- Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be undertaken at lined cement washout ponds.
- Weather forecasting will be used to plan dry days for pouring concrete.

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- The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event.

Residual Impact

Proven and effective measures to mitigate the risk of releases of cement-based products or cement truck wash water have been proposed above and will break the pathway between the potential source and each receptor. The residual effect is considered to be – Negative, imperceptible, indirect, short term, unlikely impact to surface water quality.

Significance of the Effect

For the reasons outlined above, no significant effects on surface water quality are anticipated.

8.6.3.11.6 *Morphological Changes to Surface Water Courses & Drainage Patterns*

Diversion, culverting and bridge crossing of surface watercourses can result in morphological changes, changes to drainage patterns and alteration of aquatic habitats. Construction of structures over water courses has the potential to significantly interfere with water quality and flows during the construction phase. Mitigation by design is the key factor in minimising the potential for effects on water course morphology. It is not proposed to alter or redirect the existing streams and rivers.

As detailed in Section 8.4.3 above, a new road bridge is proposed, the proposed additional infrastructure at the bridge will required construction activity along the Rye Water River.

To prevent any potential for significant effects on the Rye Water River during construction, a silt fence will be erected to form a solid barrier between the road surface construction and the stream. Further information can be found in Volume 3a, 3b & 3c(i) Appendix 4-3 and in Volume 3d, 3e & 3f Appendix 4-2.

Pathway: Drainage Patterns and surface water discharge routes.

Receptors: Surface water flows (Rye Water River), stream morphology and water quality.

Pre-Mitigation Potential Impact: Negative, direct, slight, long term, high probability impact.

Proposed Mitigation Measures

- The proposed design for water course crossings and culverts, which minimises interactions with water courses, ensures that there will be no perceptible effects on the morphology of those watercourses.
- Subject to agreement with IFI, short sections of the Rye Water River may be temporarily dammed with sandbags at times of low water. One dam will be constructed immediately downstream of the outfall point and the other, immediately upstream.
- Machinery will not enter the water, the construction of the outfall will only occur after the dry working area is created.
- The bankside will be excavated and a small pre-cast concrete headwall installed (with outfall pipe included).
- The surface water discharge point is likely to take less than one day to install.
- Biosecurity measures will be strictly adhered to throughout the proposed works. Measures will be in accordance with IFI (2010) Biosecurity Protocol for Field Survey Work. Where staff are working instream, staff footwear and PPE will be inspected on

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daily completion of the works and vegetation or debris removed. Footwear will be dipped in or scrubbed with a disinfectant solution (e.g. 1% solution of Virkron Aquatic or another proprietary disinfection product) and thoroughly dried afterwards. Sand bags placed instream will not be re-used in other watercourses.

- All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland[2] will be incorporated into the proposed works.
- As a further precaution, near stream construction work, will only be carried out during the period permitted by Inland Fisheries Ireland for in-stream works according to the Eastern Regional Fisheries Board (2004) guidance document "Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites", i.e., May to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI);
- During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas; and,
- The Moyglare Bridge upgrade works will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent, where considered necessary by the designer.

Residual Impact

With the application of the best practice mitigation outlined above, the residual effect will be – Imperceptible, direct, negative, short-term, high probability impact on stream flows, stream morphology and surface water quality.

Significance of Effects

For the reasons outlined above, no significant effects on stream morphology or stream water quality are anticipated at Moyglare Bridge

8.6.3.12 Potential Water Impacts on Designated Sites and Habitats

The qualifying interests of the SAC is linked to groundwater flows (calcareous tufa springs) There is no connection between groundwater at the development site, and that discharging to any known tufa springs within the SAC (including the mapped spring located approximately 5km from Moyglare Bridge at Louisa Bridge).

Groundwater below Moyglare Bridge will discharge as baseflow to the Rye Water River, flow from the site will, therefore, have no impact on the Louisa Bridge (spring) groundwater flow (Rye Water Valley/Carton SAC) as previous site investigations and hydrological assessments (c.f. Section 2.4, (Hydro-G, 2008)) have shown that the flow to these springs is not derived from the Rye Water River and are in fact fed from a source further east of Louisa Bridge.

Two of the qualifying interests of the SAC are two species of vertigo snail (Vertigo angustior and Vertigo moulinsiana), with both species' dependant on the calcareous march habitat which is provided by the tufa formation. The known range of both species within the SAC is also restricted to Louisa

[2] *Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters*

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Bridge (spring). While there are no known petrifying springs or qualifying interests of the Rye Water Valley/Carton SAC within proximity of Site A i.e. Louisa Bridge. An ecological walkover survey of the SAC by MKO to identify any additional tufa springs or potential habitat for vertigo snails downstream of the Proposed Development site has not identified petrifying springs nor their associated qualifying interests in this area of the SAC. Irrespective of this the potential for the occurrence of unmapped petrifying springs within the SAC has also been considered below.

Although there is no potential for effects on the known QI of the SAC the following mitigation will ensure no impact on the SAC generally. Standard mitigation and SuDS drainage controls are proposed during the construction and operational phase of Moyglare Bridge (e.g., silt traps/road gullies, hydrocarbon interceptors, attenuation storage and infiltration, and hydro-brake flow limiters) which have been proven through widespread use in road developments across the country. The proposed SuDs drainage system incorporated into the engineering design of the site are common drainage systems that are used in development sites. They are proposed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS, 2005) and the objectives outlined in the Meath County Development Plan 2021-2027.

These standard drainage design controls and construction phase mitigation measures will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the proposed development.

The project design ensures that there will be no dewatering of the bedrock aquifer during the construction phase and so there will be no obstruction or alteration of existing groundwater flows.

There will be no significant alteration to groundwater recharge. The majority of rainfall will continue to percolate to shallow subsurface and discharge to the surface water systems locally with low levels of recharge to ground, in particular for Kildare Bridge with is underlain with low permeability subsoils. During the construction phase, the recharge rates won't change materially.

With the implementation of the project as designed and the standard drainage control measures outlined above the potential for Moyglare Bridge to cause any groundwater drawdown or groundwater quality impacts in the SAC is imperceptible.

Groundwater flowpaths will be maintained during the construction phase as any excavation proposed will be shallow. The SI data shows that dewatering of groundwater from the bedrock aquifer will not occur and so there is no potential for significant effects on the calcareous tufa springs and associated species.

Following an extremely precautionary principle, the potential for other downstream designated sites to be impacted by the proposed works was also considered. On the basis of the Proposed Development design and the mitigation measures proposed to protect the immediate water receptors there will be no impacts on designated sites.

Pathway: Site drainage network and groundwater flowpaths.

Receptor: Rye Water Valley/Carton SAC and any associated Tufa Springs and vertigo snail populations (including the known spring 5km downstream at Louisa Bridge and the SAC downstream of the Proposed Development site).

Pre-Mitigation Impact

Indirect, negative, not significant, short term, likely impact to water quality and hydrology regime.

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Proposed Mitigation Measures

The proposed mitigation measures for protection of surface water and groundwater quality which will include on site drainage control measures (i.e., silt fences, silt bags etc.) will ensure that the quality of runoff from the Moyglare Bridge areas will be good. All mitigation measures outlined throughout Section 8.6.3.5 above provides controls which will be put in place to manage risks associated with sediment, hydrocarbons/chemicals and cement-based products used during construction phase.

The standard drainage design controls will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the Moyglare Bridge works.

Residual Impact

With the application of the best practice mitigation outlined above, the residual effect will be – Imperceptible, direct, negative, short-term, high probability impact on surface and ground water receptors.

Significance of Effects

For the reasons outlined above, no significant effects will occur on the designated site.

8.6.4 Operational Phase

8.6.4.1 Site A (Strategic Employment Zone)

8.6.4.2 Potential Increased Downstream Flood Risk due to Increased Hardstanding Area

In the absence of mitigation, replacement of the greenfield surface with hardstand surfaces would result in an increased risk of pluvial flooding due to low permeability surfaces which will inhibit any downward percolation of rainwater. Furthermore, in the absence of mitigation measures the uncontrolled discharge of water to the Rye Water River could result in an increased risk of downstream fluvial flooding due to increased peak discharges in the river.

Site A has been designed and will be constructed such that all surface water arising on site will drain via the proposed gravity sewer network that will convey runoff from the roofs and paved areas of the development to outfall manholes, which will discharge via a filter drain at controlled flow rates to the Rye Water River at a newly proposed outfall located adjacent to Kildare bridge along the southeast boundary of Site A. The outflow will be set to equate to less than pre-development green-field run-off rates. The engineering design for proposed drainage system is included in Volume 3a Appendix 4-9.

The Flood Risk Assessment of the green field run-off rates conclude that the development is not at risk of flooding due to pluvial or groundwater flood events.

Pathway: Site Surface water drainage network.

Receptor: Site, adjacent lands and nearby infrastructure.

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Pre-Mitigation Impact

If Site A design did not include mitigation measures to minimise the risk of increased flooding there would be a direct, negative, slight, long term, low probability impact.

Proposed Mitigation Measures

The risk of pluvial and or fluvial flooding is minimised by the incorporation of a properly designed surface drainage and gravity sewer network, and by using underground attenuation tanks for drainage management which will control discharge to the Rye Water River at less than the pre-development greenfield rates.

Water quality risks are mitigated by the use of hydrocarbon interceptors and silt traps as described in Chapter 4.

Residual Impact

Direct, neutral, imperceptible, long term, low probability impact in relation to flood risk.

Significance of Effects

No significant impacts in terms of flooding are expected due to the Proposed Development.

8.6.4.3 Potential Operational Phase Water Quality Impacts

Once the construction phase is completed potential emissions to ground and / or surface water include storm water run-off and wastewater. In relation to storm water run-off, the surface water drainage system will consist of a gravity sewer network that will convey runoff from the roofs and paved areas of the development to outfall manholes, which will discharge at controlled flow rates to the Rye Water River. Discharge will be limited to less than the greenfield equivalent runoff rate. Temporary underground attenuation will also be provided at separate locations in the form of underground cellular storage units. Silt traps will be provided for upstream of the attenuation tanks. Surface water will pass through oil interceptors prior to discharging from the site.

Wastewater from the development will discharge to the proposed onsite underground wastewater pumping station, which will ultimately link up to the existing Maynooth town wastewater network prior to discharging to Leixlip Wastewater Treatment Plant. The wastewater treatment plant is regulated and operates under an EPA licence which controls emissions to acceptable levels.

Rainfall allowed to percolate to ground and/or flow via subsurface flow to the Rye Water River will be within the green/ landscaped areas of Site A and so there is no significant source of pollution related to these areas.

Pathway: Site surface water and foul water drainage network.

Receptor: On-Site, adjacent and downstream water courses and foul water infrastructure

Pre-Mitigation Impact: If the measures described above had not been incorporated into the development design there would be potential for direct, negative, slight, long term, low probability impact on water quality

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Proposed Mitigation Measures

The risk of uncontrolled emissions is minimized by the collection, treatment and discharge of storm water to the Rye Water River via, attenuation tanks, filter drain and petrol/oil interceptors as described above. It is also proposed to retain the existing riparian zone which will act as a buffer between the development and the Rye Water.

Wastewater from Site A will be directed to an EPA regulated wastewater treatment plant via a proposed onsite pumping station.

Residual Impact

The potential source of pollution can be readily controlled and standard procedures will ensure no significant releases will occur. Mitigation measures, in particular the attenuation tank, filter drain and petrol/oil interceptor will break the pathway from the proposed works areas to the watercourse. The residual impacts are indirect, neutral, imperceptible, long term, unlikely impact.

Foul water discharges will be directed to the municipal sewer and regulated wastewater treatment plant and so the residual impacts are neutral, indirect, imperceptible, long term, unlikely impact.

Therefore, significant effects on surface water or ground water quality will not occur.

8.6.4.4 Potential Impacts on Hydrologically Connected Designated Sites

Surface water runoff from roads and car parking areas can potentially contain elevated levels of contaminants such as hydrocarbons and suspended solids. These contaminants have the potential to impact on local downstream groundwater and surface water quality. This is somewhat relevant to this site, due to its proximity to the Rye Water River and the Rye Water Valley/Carton SAC however the QI's for this site relate to ground water dependant species rather than surface water. Ecological surveys also show that there are no mapped petrifying springs or QI's downstream of the site and there is no potential for impacts on the Louisa Bridge Springs.

Possible effects during the operational phase continue to include water quality impacts which could occur if ongoing mitigation is not put in place.

There will be no impacts on the local surface water hydrological regime during the operational phase of the development for the following reasons:

- During the operational phase all surface water arising on site will drain to attenuation tanks before discharge to a local watercourse and a connection to a storm water sewer will be installed.
- All road and car parking gullies are designed to intercept and trap road grit and silt. All footpath and road drainage water will pass through hydrocarbon interceptors and attenuation systems, prior to controlled/flow limited outfall. Groundwater quality risks are reduced during the operational phase by use of hydrocarbon interceptors and filter drain prior to discharge to the watercourse.
- As one of the qualifying interests of the SAC is linked to groundwater flows (calcareous tufa springs), the distance between them is seen as a significant factor, and there is no connection between groundwater at the Proposed Development site, and that discharging to any tufa springs within the SAC (including the mapped spring located approximately 5km from the Proposed Development at Louisa Bridge).
- No dewatering will occur during the operational phase of the development.
- All building works will be complete and will have been installed at or very near existing ground levels with minimal ground disturbance having occurred.

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- No extensive areas of deep foundations, such as basements, underground carparks etc, will have been installed. As such there will be no interruption or blocking of shallow or deep groundwater pathways below the site during the operational phase.

While there are no known petrifying springs or qualifying interests of the Rye Water Valley/Carton SAC within proximity of Site A, the potential for the occurrence of unmapped petrifying springs within the SAC has been considered below.

These standard drainage design controls and construction phase mitigation measures will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at less than the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the proposed development.

The project design ensures that there will be no dewatering of the bedrock aquifer during the construction phase and so there will be no obstruction or alteration of existing groundwater flows.

There will be no significant alteration to groundwater recharge. The majority of rainfall will continue to percolate to shallow subsurface and discharge to the surface water systems locally with low levels of recharge to ground. Rainfall allowed to percolate to ground and/or flow via subsurface flow to the Rye Water River will be within the green/ landscaped areas of Site A and so there is no significant source of pollution related to these areas. Rainfall will be directed to the surface water drainage system there by mimicking the existing hydrological regime and so the impact of this is considered to be imperceptible.

With the implementation of the project as designed and the standard drainage control measures outlined above and throughout Section 8.6.4.1 above, the potential for Site A to cause any groundwater drawdown or groundwater quality impacts in the SAC is imperceptible.

Groundwater below Site A will flow to the south and discharge as baseflow to the Rye Water River and/or the Blackhall Little stream to the north. Groundwater flow from the site will, therefore, have no impact on the Louisa Bridge (spring) groundwater flow (Rye Water Valley/Carton SAC) as previous site investigations and hydrological assessments (c.f. Section 2.4, (Hydro-G, 2008)) have shown that the flow to these springs is not derived from the Rye Water River.

Groundwater flowpaths will be maintained during the operational phase as existing building foundations and any previous excavation will be shallow. Groundwater flowpaths during the operational phase will be unaltered by Site A. The SI data shows that dewatering of groundwater from the bedrock aquifer will not occur and so there is no potential for significant effects on the calcareous tufa springs and associated species.

Following an extremely precautionary principle, the potential for other downstream designated sites to be impacted by the proposed works was also considered. On the basis of the Proposed Development design and the mitigation measures proposed to protect the immediate water receptors there will be no impacts on designated sites.

Pathway: Site drainage network and groundwater flowpaths.

Receptor: Rye Water Valley/Carton SAC and any associated Tufa Springs and vertigo snail populations (including the known spring 5km downstream at Louisa Bridge).

Pre-Mitigation Impact

Indirect, negative, not significant, long term, likely impact to surface water quality.

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Imperceptible impacts on groundwater levels or existing hydrological regime or flowpaths due to operation of Site A.

Proposed Mitigation Measures

During the operational phase all surface water arising on site will drain to attenuation tanks, hydrocarbon interceptor and filter drain before discharge to Rye Water River at less than the controlled greenfield rates. Groundwater quality risks are reduced during the operational phase by use of hydrocarbon interceptors and silt traps prior to discharge to the watercourse.

Residual Impact

No impacts on water quality or downstream designated sites are anticipated.

Imperceptible impacts on groundwater levels or existing hydrological regime or groundwater flowpaths relating to the Rye Water Valley/ Carton SAC.

Significance of Effects

No significant impacts on groundwater or surface water quality and downstream designated sites are anticipated.

No significant impacts on groundwater levels, existing hydrological regime, or groundwater flowpaths relating to the Rye Water Valley/Carton SAC, the Rye Water River or the Blackhall Little Stream.

8.6.4.5 Site B (Healthcare Facilities)

8.6.4.5.1 *Potential Increased Downstream Flood Risk due to Increased Hardstanding Area*

In the absence of mitigation, replacement of the greenfield surface with hardstand surfaces would result in an increased risk of pluvial flooding due to low permeability surfaces which will inhibit any downward percolation of rainwater. Furthermore, in the absence of mitigation measures the uncontrolled discharge of water to the Rye Water River could result in an increased risk of downstream fluvial flooding due to increased peak discharges in the river.

Site B has been designed and will be constructed such that all surface water arising on site will drain via the proposed gravity sewer network that will convey runoff from the roofs and paved areas of the development to outfall manholes, which will discharge via a filter drain at controlled flow rates to the Rye Water River at a newly proposed outfall located adjacent to Kildare bridge along the southeast boundary of Site B. The outflow will be set to equate to pre-development green-field run-off rates. The engineering design for proposed drainage system is included in Volume 3b Appendix 4-9.

The Flood Risk Assessment of the green field run-off rates conclude that the development is not at risk of flooding due to pluvial or groundwater flood events.

Pathway: Site Surface water drainage network.

Receptor: Site, adjacent lands and nearby infrastructure.

Pre-Mitigation Impact

If Site B design did not include mitigation measures to minimise the risk of increased flooding there would be a direct, negative, slight, long term, low probability impact.

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Proposed Mitigation Measures

The risk of pluvial and or fluvial flooding is minimised by the incorporation of a properly designed surface drainage and gravity sewer network, and by using underground attenuation tanks for drainage management which will control discharge to the Rye Water River at pre-development greenfield rates.

Water quality risks are mitigated by the use of hydrocarbon interceptors and silt traps as described in Chapter 4.

Residual Impact

Direct, neutral, imperceptible, long term, low probability impact in relation to flood risk.

Significance of Effects

No significant impacts in terms of flooding are expected due to the Proposed Development.

8.6.4.5.2 *Potential Operational Phase Water Quality Impacts*

Once the construction phase is completed potential emissions to ground and / or surface water include storm water run-off and wastewater. In relation to storm water run-off, the surface water drainage system will consist of a gravity sewer network that will convey runoff from the roofs and paved areas of the development to outfall manholes, which will discharge at controlled flow rates to the Rye Water River. Discharge will be limited to the greenfield equivalent runoff rate. Temporary underground attenuation will also be provided at separate locations in the form of underground cellular storage units. Silt traps will be provided for upstream of the attenuation tanks. Surface water will pass through oil interceptors prior to discharging from the site.

Wastewater from the development will discharge to the proposed onsite underground wastewater pumping station, which will ultimately link up to the existing Maynooth town wastewater network prior to discharging to Leixlip Wastewater Treatment Plant. The wastewater treatment plant is regulated and operates under an EPA licence which controls emissions to acceptable levels.

Rainfall allowed to percolate to ground and/or flow via subsurface flow to the Rye Water River will be within the green/ landscaped areas of Site B and so there is no significant source of pollution related to these areas.

Pathway: Site surface water and foul water drainage network.

Receptor: On-Site, adjacent and downstream water courses and foul water infrastructure

Pre-Mitigation Impact: If the measures described above had not been incorporated into the development design there would be potential for direct, negative, slight, long term, low probability impact on water quality

Proposed Mitigation Measures

The risk of uncontrolled emissions is minimized by the collection, treatment and discharge of storm water to the Rye Water River via, attenuation tanks, filter drain and petrol/oil interceptors as described above. It is also proposed to retain the existing riparian zone which will act as a buffer between the development and the Rye Water.

Wastewater from Site B will be directed to an EPA regulated wastewater treatment plant via a proposed onsite pumping station.

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Residual Impact

The potential source of pollution can be readily controlled and standard procedures will ensure no significant releases will occur. Mitigation measures, in particular the attenuation tank, filter drain and petrol/oil interceptor will break the pathway from the proposed works areas to the watercourse. The residual impacts are indirect, neutral, imperceptible, long term, unlikely impact.

Foul water discharges will be directed to the municipal sewer and regulated wastewater treatment plant and so the residual impacts are neutral, indirect, imperceptible, long term, unlikely impact.

Therefore, significant effects on surface water or ground water quality will not occur.

8.6.4.6 Potential Impacts on Hydrologically Connected Designated Sites

Surface water runoff from roads and car parking areas can potentially contain elevated levels of contaminants such as hydrocarbons and suspended solids. These contaminants have the potential to impact on local downstream groundwater and surface water quality. This is somewhat relevant to this site, due to its proximity to the Rye Water River and the Rye Water Valley/Carton SAC however the QI's for this site relate to ground water dependant species rather than surface water. Ecological surveys also show that there are no mapped petrifying springs or QI's downstream of the site and there is no potential for impacts on the Louisa Bridge Springs.

Possible effects during the operational phase continue to include water quality impacts which could occur if ongoing mitigation is not put in place.

There will be no impacts on the local surface water hydrological regime during the operational phase of the development for the following reasons:

- During the operational phase all surface water arising on site will drain to attenuation tanks before discharge to a local watercourse and a connection to a storm water sewer will be installed.
- All road and car parking gullies are designed to intercept and trap road grit and silt. All footpath and road drainage water will pass through hydrocarbon interceptors and attenuation systems, prior to controlled/flow limited outfall. Groundwater quality risks are reduced during the operational phase by use of hydrocarbon interceptors and filter drain prior to discharge to the watercourse.
- As one of the qualifying interests of the SAC is linked to groundwater flows (calcareous tufa springs), the distance between them is seen as a significant factor, and there is no connection between groundwater at the Proposed Development site, and that discharging to any tufa springs within the SAC (including the mapped spring located approximately 5km from the Proposed Development at Louisa Bridge).
- No dewatering will occur during the operational phase of the development.
- All building works will be complete and will have been installed at or very near existing ground levels with minimal ground disturbance having occurred.
- No extensive areas of deep foundations, such as basements, underground carparks etc, will have been installed. As such there will be no interruption or blocking of shallow or deep groundwater pathways below the site during the operational phase.

While there are no known petrifying springs or qualifying interests of the Rye Water Valley/Carton SAC within proximity of Site B (following ecological surveys in 2022), the potential for the occurrence of unmapped petrifying springs within the SAC has been considered below.

These standard drainage design controls and construction phase mitigation measures will ensure the development will not give rise to any significant surface water or groundwater impacts at or

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downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at less than the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the proposed development.

The project design ensures that there will be no dewatering of the bedrock aquifer during the construction phase and so there will be no obstruction or alteration of existing groundwater flows.

There will be no significant alteration to groundwater recharge. The majority of rainfall will continue to percolate to shallow subsurface and discharge to the surface water systems locally with low levels of recharge to ground. Rainfall allowed to percolate to ground and/or flow via subsurface flow to the Rye Water River will be within the green/ landscaped areas of Site B and so there is no significant source of pollution related to these areas. Rainfall will be directed to the surface water drainage system there by mimicking the existing hydrological regime and so the impact of this is considered to be imperceptible.

With the implementation of the project as designed and the standard drainage control measures outlined above and throughout Section 8.6.4.2 above, the potential for Site B to cause any groundwater drawdown or groundwater quality impacts in the SAC is imperceptible.

Groundwater below Site B will flow to the south and discharge as baseflow to the Rye Water River. Groundwater flow from the site will, therefore, have no impact on the Louisa Bridge (spring) groundwater flow (Rye Water Valley/Carton SAC) as previous site investigations and hydrological assessments (c.f. Section 2.4, (Hydro-G, 2008)) have shown that the flow to these springs is not derived from the Rye Water River.

Groundwater flowpaths will be maintained during the operational phase as existing building foundations and any previous excavation will be shallow. Groundwater flowpaths during the operational phase will be unaltered by Site B. The SI data shows that dewatering of groundwater from the bedrock aquifer will not occur and so there is no potential for significant effects on the calcareous tufa springs and associated species.

Following an extremely precautionary principle, the potential for other downstream designated sites to be impacted by the proposed works was also considered. On the basis of the Proposed Development design and the mitigation measures proposed to protect the immediate water receptors there will be no impacts on designated sites.

Pathway: Site drainage network and groundwater flowpaths.

Receptor: Rye Water Valley/Carton SAC and any associated Tufa Springs and vertigo snail populations (including the known spring 5km downstream at Louisa Bridge).

Pre-Mitigation Impact

Indirect, negative, slight, long term, likely impact to surface water quality.

Imperceptible impacts on groundwater levels or existing hydrological regime or flowpaths due to operation of Site B.

Proposed Mitigation Measures

During the operational phase all surface water arising on site will drain to attenuation tanks, hydrocarbon interceptor and filter drain before discharge to Rye Water River at controlled greenfield rates. Groundwater quality risks are reduced during the operational phase by use of hydrocarbon interceptors and silt traps prior to discharge to the watercourse.

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Residual Impact

No impacts on water quality or downstream designated sites are anticipated.

Imperceptible impacts on groundwater levels or existing hydrological regime or groundwater flowpaths relating to the Rye Water Valley/ Carton SAC.

Significance of Effects

No significant impacts on groundwater or surface water quality and downstream designated sites are anticipated.

No significant impacts on groundwater levels, existing hydrological regime, or groundwater flowpaths relating to the Rye Water Valley/Carton SAC or the Rye Water River.

8.6.4.7 Site C (Strategic Housing Development)

8.6.4.8 Potential Increased Downstream Flood Risk due to Increased Hardstanding Area

In the absence of mitigation, replacement of the greenfield surface with hardstand surfaces would result in an increased risk of pluvial flooding due to low permeability surfaces which will inhibit any downward percolation of rainwater. Furthermore, in the absence of mitigation measures the uncontrolled discharge of water to the Rye Water River and Blackhall Little Stream could result in an increased risk of downstream fluvial flooding due to increased peak discharges in the river.

Site C has been designed and will be constructed such that all surface water arising on site will drain via the proposed gravity sewer network that will convey runoff from the roofs and paved areas of the development to outfall manholes, which will discharge via a filter drain at controlled flow rates to the Rye Water River at a newly proposed outfall located along the southern boundary of Site C, along with another proposed outfall in the centre of the site at the Blackhall Little Stream. The outflow will be set to equate to less than the pre-development green-field run-off rates. The engineering design for proposed drainage system is included in Volume 3c(i) Appendix 4-9.

The Flood Risk Assessment of the green field run-off rates conclude that the development is not at risk of flooding due to pluvial or groundwater flood events.

Pathway: Site Surface water drainage network.

Receptor: Site, adjacent lands and nearby infrastructure.

Pre-Mitigation Impact

If Site C design did not include mitigation measures to minimise the risk of increased flooding there would be a direct, negative, slight, long term, low probability impact.

Proposed Mitigation Measures

The risk of pluvial and or fluvial flooding is minimised by the incorporation of a properly designed surface drainage and gravity sewer network, and by using underground attenuation tanks for drainage management which will control discharge to the Rye Water River/Blackhall Little at less than the pre-development greenfield rates.

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Water quality risks are mitigated by the use of hydrocarbon interceptors and silt traps as described in Chapter 4.

Residual Impact

Direct, neutral, imperceptible, long term, low probability impact in relation to flood risk.

Significance of Effects

No significant impacts in terms of flooding are expected due to the Proposed Development.

8.6.4.9 Potential Operational Phase Water Quality Impacts

Once the construction phase is completed potential emissions to ground and / or surface water include storm water run-off and wastewater. In relation to storm water run-off, the surface water drainage system will consist of a gravity sewer network that will convey runoff from the roofs and paved areas of the development to outfall manholes, which will discharge at controlled flow rates to the Rye Water River and Blackhall Little Stream. Discharge will be limited to less than the greenfield equivalent runoff rate. Temporary underground attenuation will also be provided at separate locations in the form of swales and underground cellular storage units. Silt traps will be provided for upstream of the attenuation tanks. Surface water will pass through oil interceptors prior to discharging from the site.

Wastewater from the development will discharge to the proposed onsite underground wastewater pumping station, which will ultimately link up to the existing Maynooth town wastewater network prior to discharging to Leixlip Wastewater Treatment Plant. The wastewater treatment plant is regulated and operates under an EPA licence which controls emissions to acceptable levels.

Rainfall allowed to percolate to ground and/or flow via subsurface flow to the Rye Water River and Blackhall Little stream will be within the green/ landscaped areas of Site C and so there is no significant source of pollution related to these areas.

Pathway: Site surface water and foul water drainage network.

Receptor: On-Site, adjacent and downstream water courses and foul water infrastructure

Pre-Mitigation Impact: If the measures described above had not been incorporated into the development design there would be potential for direct, negative, slight, long term, low probability impact on water quality

Proposed Mitigation Measures

The risk of uncontrolled emissions is minimized by the collection, treatment and discharge of storm water to the Rye Water River via, attenuation tanks, filter drain and petrol/oil interceptors as described above. It is also proposed to retain the existing riparian zone which will act as a buffer between the development and that stream.

Wastewater from Site C will be directed to an EPA regulated wastewater treatment plant via a proposed onsite pumping station.

Residual Impact

The potential source of pollution can be readily controlled and standard procedures will ensure no significant releases will occur. Mitigation measures, in particular the attenuation tank, filter drain and

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petrol/oil interceptor will break the pathway from the proposed works areas to the watercourse. The residual impacts are indirect, neutral, imperceptible, long term, unlikely impact.

Foul water discharges will be directed to the municipal sewer and regulated wastewater treatment plant and so the residual impacts are neutral, indirect, imperceptible, long term, unlikely impact.

Therefore, significant effects on surface water or ground water quality will not occur.

8.6.4.10 Potential Impacts on Hydrologically Connected Designated Sites

Surface water runoff from roads and car parking areas can potentially contain elevated levels of contaminants such as hydrocarbons and suspended solids. These contaminants have the potential to impact on local downstream groundwater and surface water quality. This is somewhat relevant to this site, due to its proximity to the Rye Water River and the Rye Water Valley/Carton SAC however the QI's for this site relate to ground water dependant species rather than surface water. Ecological surveys also show that there are no mapped petrifying springs or QI's downstream of the site and there is no potential for impacts on the Louisa Bridge Springs

Possible effects during the operational phase continue to include water quality impacts which could occur if ongoing mitigation is not put in place.

There will be no impacts on the local surface water hydrological regime during the operational phase of the development for the following reasons:

- During the operational phase all surface water arising on site will drain to attenuation tanks before discharge to a local watercourse and a connection to a storm water sewer will be installed.
- All road and car parking gullies are designed to intercept and trap road grit and silt. All footpath and road drainage water will pass through hydrocarbon interceptors and attenuation systems, prior to controlled/flow limited outfall. Groundwater quality risks are reduced during the operational phase by use of hydrocarbon interceptors and filter drain prior to discharge to the watercourse.
- As one of the qualifying interests of the SAC is linked to groundwater flows (calcareous tufa springs), the distance between them is seen as a significant factor, and there is no connection between groundwater at the Proposed Development site, and that discharging to any tufa springs within the SAC (including the mapped spring located approximately 5km from the Proposed Development at Louisa Bridge).
- No dewatering will occur during the operational phase of the development.
- All building works will be complete and will have been installed at or very near existing ground levels with minimal ground disturbance having occurred.

No extensive areas of deep foundations, such as basements, underground carparks etc, will have been installed. As such there will be no interruption or blocking of shallow or deep groundwater pathways below the site during the operational phaseWhile there are no known petrifying springs or qualifying interests of the Rye Water Valley/Carton SAC within proximity of Site C (following ecological surveys in 2022), the potential for the occurrence of unmapped petrifying springs within the SAC has been considered below.

These standard drainage design controls and construction phase mitigation measures will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at less than the

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existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the proposed development.

The project design ensures that there will be no dewatering of the bedrock aquifer during the construction phase and so there will be no obstruction or alteration of existing groundwater flows.

There will be no significant alteration to groundwater recharge. The majority of rainfall will continue to percolate to shallow subsurface and discharge to the surface water systems locally with low levels of recharge to ground. Rainfall allowed to percolate to ground and/or flow via subsurface flow to the Blackhall Little/Rye Water River will be within the green/ landscaped areas of Site C and so there is no significant source of pollution related to these areas. Rainfall will be directed to the surface water drainage system there by mimicking the existing hydrological regime and so the impact of this is considered to be imperceptible.

With the implementation of the project as designed and the standard drainage control measures outlined above and throughout Section 8.6.4.3 above, the potential for Site C to cause any groundwater drawdown or groundwater quality impacts in the SAC is imperceptible.

Groundwater below Site C will flow to the south and discharge as baseflow to the Rye Water River and/or the Blackhall Little stream to the centre of the site. Groundwater flow from the site will, therefore, have no impact on the Louisa Bridge (spring) groundwater flow (Rye Water Valley/Carton SAC) as previous site investigations and hydrological assessments (c.f. Section 2.4, (Hydro-G, 2008)) have shown that the flow to these springs is not derived from the Rye Water River.

Groundwater flowpaths will be maintained during the operational phase as existing building foundations and any previous excavation will be shallow. Groundwater flowpaths during the operational phase will be unaltered by Site C. The SI data shows that dewatering of groundwater from the bedrock aquifer will not occur and so there is no potential for significant effects on the calcareous tufa springs and associated species.

Following an extremely precautionary principle, the potential for other downstream designated sites to be impacted by the proposed works was also considered. On the basis of the Proposed Development design and the mitigation measures proposed to protect the immediate water receptors there will be no impacts on designated sites.

Pathway: Site drainage network and groundwater flowpaths.

Receptor: Rye Water Valley/Carton SAC and any associated Tufa Springs and vertigo snail populations (including the known spring 5km downstream at Louisa Bridge).

Pre-Mitigation Impact

Indirect, negative, not significant, long term, likely impact to surface water quality.

Imperceptible impacts on groundwater levels or existing hydrological regime or flowpaths due to operation of Site C.

Proposed Mitigation Measures

During the operational phase all surface water arising on site will drain to attenuation tanks, hydrocarbon interceptor and filter drain before discharge to Rye Water River/Blackhall Little at less than the controlled greenfield rates. Groundwater quality risks are reduced during the operational phase by use of hydrocarbon interceptors and silt traps prior to discharge to the watercourse.

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Residual Impact

No impacts on water quality or downstream designated sites are anticipated.

Imperceptible impacts on groundwater levels or existing hydrological regime or groundwater flowpaths relating to the Rye Water Valley/ Carton SAC.

Significance of Effects

No significant impacts on groundwater or surface water quality and downstream designated sites are anticipated.

No significant impacts on groundwater levels, existing hydrological regime, or groundwater flowpaths relating to the Rye Water Valley/Carton SAC, the River Rye or the Blackhall Little Stream.

8.6.4.11 MOOR (Maynooth Outer Orbital Road)

8.6.4.11.1 *Potential Increased Downstream Flood Risk due to Increased Hardstanding Area*

In the absence of mitigation, replacement of the greenfield surface with hardstand surfaces would result in an increased risk of pluvial flooding due to low permeability surfaces which will inhibit any downward percolation of rainwater. Furthermore, in the absence of mitigation measures the uncontrolled discharge of water to the Rye Water River and Blackhall Little Stream could result in an increased risk of downstream fluvial flooding due to increased peak discharges in the river.

The drainage of the proposed road will be designed such that surface water drainage and sub-grade drainage will be provided for the mainline carriageway and all new sections of minor roads. This discharge will be directed to the existing watercourses and discharged, following attenuation and treatment through fuel separators.

The road drainage for the scheme has been designed in accordance with the GDSDS. The elements of the drainage to be constructed will be constructed in accordance with the Greater Dublin Region Code of Practice for Drainage Works. Any SuDS elements incorporated into the scheme will be designed in accordance with The SuDS Manual, C753 (published by CIRIA, 2007). All drainage designs have been carried out with regard to both Meath and Kildare County Council's respective Development Plans and Frameworks.

The engineering design for proposed drainage system is included in Volume 3d Appendix 4-6.

The Flood Risk Assessment of the green field run-off rates conclude that the development is not at risk of flooding due to pluvial or groundwater flood events.

Pathway: Site Surface water drainage network.

Receptor: Site, adjacent lands and nearby infrastructure.

Pre-Mitigation Impact

If the MOOR design did not include mitigation measures to minimise the risk of increased flooding there would be a direct, negative, slight, long term, low probability impact.

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Proposed Mitigation Measures

The risk of pluvial and or fluvial flooding is minimised by the incorporation of a properly designed surface drainage network, and by using attenuation areas and flow restrictors for drainage management which will control discharges to pre-development greenfield rates.

Water quality risks are mitigated by the use of hydrocarbon interceptors and silt traps as described in Chapter 4.

Residual Impact

Direct, neutral, imperceptible, long term, low probability impact in relation to flood risk.

Significance of Effects

No significant impacts in terms of flooding are expected due to the MOOR.

8.6.4.12 Potential Operational Phase Water Quality Impacts

Once the construction phase is completed potential emissions to ground and / or surface water include storm water run-off. All rainfall runoff on the new MOOR is to be captured by adequately spaced trapped road gullies, which connect to a main carrier drain under the road. The rainfall runoff on the aligning footpath and cycle-track shall be intercepted by the dividing treelined grass verge, with excess runoff only being collected by the road's gully network.

Surface water attenuation will be used to control surface water runoff rates from all hard surfaces in accordance with the GDSDS, with these being restricted to a maximum flow rate of 5.5 l/s/ha, which is less than the calculated greenfield runoff equivalent. The attenuation systems are to largely comprise enclosed vegetated ponds, and shall be preceded by a Class 1 bypass fuel separator.

Rainfall allowed to percolate to ground and/or flow via subsurface flow to the Rye Water River and Blackhall Little stream within the green/ landscaped areas of the MOOR are not a significant source of pollution related to these areas.

Pathway: Site surface water drainage network.

Receptor: On-Site, adjacent and downstream water courses.

Pre-Mitigation Impact: If the measures described above had not been incorporated into the development design there would be potential for direct, negative, slight, long term, low probability impact on water quality

Proposed Mitigation Measures

The risk of uncontrolled emissions is minimized by the collection, treatment and discharge of storm water via, attenuation systems, filter drains and petrol/oil interceptors as described above.

Residual Impact

The potential source of pollution can be readily controlled and standard procedures will ensure no significant releases will occur. Mitigation measures, in particular the attenuation systems, filter drains and petrol/oil interceptor will break the pathway from the proposed works areas to the watercourses. The residual impacts are indirect, neutral, imperceptible, long term, unlikely impact.

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Therefore, significant effects on surface water or ground water quality will not occur.

8.6.4.12.2 Potential Impacts on Hydrologically Connected Designated Sites

Surface water runoff can potentially contain elevated levels of contaminants such as hydrocarbons and suspended solids. These contaminants have the potential to impact on local downstream groundwater and surface water quality. This is somewhat relevant to this site, due to its proximity to the Rye Water River and the Rye Water Valley/Carton SAC however the QI's for this site relate to ground water dependant species rather than surface water. Ecological surveys also show that there are no mapped petrifying springs or QI's downstream of the site and there is no potential for impacts on the Louisa Bridge Springs.

Possible effects during the operational phase continue to include water quality impacts which could occur if ongoing mitigation is not put in place.

There will be no impacts on the local surface water hydrological regime during the operational phase of the development for the following reasons:

- During the operational phase all surface water arising on site will drain to attenuation systems before discharge to a local watercourse.
- All road gullies are designed to intercept and trap road grit and silt. All road drainage water will pass through hydrocarbon interceptors and attenuation systems, prior to controlled/flow limited outfall. Groundwater quality risks are reduced during the operational phase by use of hydrocarbon interceptors and filter drain prior to discharge to the watercourse.
- As one of the qualifying interests of the SAC is linked to groundwater flows (calcareous tufa springs), the distance between them is seen as a significant factor, and there is no connection between groundwater at the Proposed Development site, and that discharging to any tufa springs within the SAC (including the mapped spring located approximately 5km from the Proposed Development at Louisa Bridge).
- No dewatering will occur during the operational phase of the development.
- All building works will be complete and will have been installed at or very near existing ground levels with minimal ground disturbance having occurred.

No extensive areas of deep foundations, such as basements, underground carparks etc, will have been installed. As such there will be no interruption or blocking of shallow or deep groundwater pathways below the site during the operational phaseWhile there are no known petrifying springs or qualifying interests of the Rye Water Valley/Carton SAC within proximity of the MOOR (following ecological surveys completed in 2022), the potential for the occurrence of unmapped petrifying springs within the SAC has been considered below.

These standard drainage design controls and construction phase mitigation measures will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the proposed development.

The project design ensures that there will be no dewatering of the bedrock aquifer during the construction phase and so there will be no obstruction or alteration of existing groundwater flows.

There will be no significant alteration to groundwater recharge. The majority of rainfall will continue to percolate to shallow subsurface and discharge to the surface water systems locally with low levels of recharge to ground. Rainfall allowed to percolate to ground and/or flow via subsurface flow to the Blackhall Little/Rye Water River will be within the green/ landscaped areas of the MOOR and so there

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is no significant source of pollution related to these areas. Rainfall will be directed to the surface water drainage system there by mimicking the existing hydrological regime and so the impact of this is considered to be imperceptible.

With the implementation of the project as designed and the standard drainage control measures outlined above and throughout Section 8.6.4.4 above, the potential for the MOOR to cause any groundwater drawdown or groundwater quality impacts in the SAC is imperceptible.

Groundwater below the MOOR will flow to the south and discharge as baseflow to the Rye Water River and/or the Blackhall Little stream to the centre of the site. Groundwater flow from the site will, therefore, have no impact on the Louisa Bridge (spring) groundwater flow (Rye Water Valley/Carton SAC) as previous site investigations and hydrological assessments (c.f. Section 2.4, (Hydro-G, 2008)) have shown that the flow to these springs is not derived from the Rye Water River.

Groundwater flowpaths will be maintained during the operational phase as existing building foundations and any previous excavation will be shallow. Groundwater flowpaths during the operational phase will be unaltered by the MOOR. The SI data shows that dewatering of groundwater from the bedrock aquifer will not occur and so there is no potential for significant effects on the calcareous tufa springs and associated species.

Following an extremely precautionary principle, the potential for other downstream designated sites to be impacted by the proposed works was also considered. On the basis of the Proposed Development design and the mitigation measures proposed to protect the immediate water receptors there will be no impacts on designated sites.

Pathway: Site drainage network and groundwater flowpaths.

Receptor: Rye Water Valley/Carton SAC and any associated Tufa Springs and vertigo snail populations (including the known spring 5km downstream at Louisa Bridge).

Pre-Mitigation Impact

Indirect, negative, slight, long term, likely impact to surface water quality.

Imperceptible impacts on groundwater levels or existing hydrological regime or flowpaths due to operation of Site C.

Proposed Mitigation Measures

During the operational phase all surface water arising on site will drain to attenuation system, hydrocarbon interceptor and filter drain before discharge to Blackhall Little/Rye Water River at controlled greenfield rates. Groundwater quality risks are reduced during the operational phase by use of hydrocarbon interceptors and silt traps prior to discharge to the watercourse.

Residual Impact

No impacts on water quality or downstream designated sites are anticipated.

Imperceptible impacts on groundwater levels or existing hydrological regime or groundwater flowpaths relating to the Rye Water Valley/ Carton SAC.

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Significance of Effects

No significant impacts on groundwater or surface water quality and downstream designated sites are anticipated.

No significant impacts on groundwater levels, existing hydrological regime, or groundwater flowpaths relating to the Rye Water Valley/Carton SAC, the River Rye or the Blackhall Little Stream.

8.6.4.13 Kildare Bridge Application

8.6.4.13.1 *Potential Increased Downstream Flood Risk*

In the absence of mitigation, replacement of the greenfield surface with hardstand surfaces would result in an increased risk of pluvial flooding due to low permeability surfaces which will inhibit any downward percolation of rainwater. Furthermore, in the absence of mitigation measures the uncontrolled discharge of water to the Rye Water River could result in an increased risk of downstream fluvial flooding due to increased peak discharges in the river.

The Kildare Bridge works are relatively small in scale with the majority of the works occurring in subsurface grounds.

The Flood Risk Assessment of the green field run-off rates conclude that the development is not at risk of flooding due to pluvial or groundwater flood events.

Pathway: Site Surface water drainage network.

Receptor: Site, adjacent lands and nearby infrastructure.

Pre-Mitigation Impact

If the Proposed Development design did not include mitigation measures to minimise the risk of increased flooding there would be a direct, negative, imperceptible, long term, low probability impact.

Proposed Mitigation Measures

The risk of pluvial and or fluvial flooding is minimised by the incorporation of a properly designed surface drainage proposals and the nature of the proposed works in this area.

Residual Impact

Direct, neutral, imperceptible, long term, low probability impact in relation to flood risk.

Significance of Effects

No significant impacts in terms of flooding are expected due to the Proposed Development.

8.6.4.13.2 *Potential Operational Phase Water Quality Impacts*

Rainfall allowed to percolate to ground and/or flow via subsurface flow to the Rye Water River will be within the green/ landscaped areas of the Proposed Development and so there is no significant source

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of pollution related to these areas. There is no real likelihood of environmental emissions to water during the operational phase for the pedestrian/cycle bridge.

Therefore, significant effects on surface water or ground water quality will not occur.

8.6.4.13.3 *Potential Impacts on Hydrologically Connected Designated Sites*

There is no potential for significant impacts on any designated sites during the operational phase of the Kildare Bridge works due to their nature and scale. There are no sources of emissions nor any potential effects on the local hydrological regime during the operational phase.

8.6.4.14 Moyglare Bridge Application

8.6.4.14.1 *Potential Increased Downstream Flood Risk due to Increased Hardstanding Area*

In the absence of mitigation, replacement of the greenfield surface with hardstand surfaces would result in an increased risk of pluvial flooding due to low permeability surfaces which will inhibit any downward percolation of rainwater. Furthermore, in the absence of mitigation measures the uncontrolled discharge of water to the Rye Water River could result in an increased risk of downstream fluvial flooding due to increased peak discharges in the river.

The drainage of the proposed road will be designed such that surface water drainage and sub-grade drainage will be provided for the mainline carriageway and all new sections of minor roads. This discharge will be directed to the existing watercourses and discharged, following attenuation and treatment through fuel separators.

The road drainage for the scheme has been designed in accordance with the GDSDS. The elements of the drainage to be constructed will be constructed in accordance with the Greater Dublin Region Code of Practice for Drainage Works. Any SuDS elements incorporated into the scheme will be designed in accordance with The SuDS Manual, C753 (published by CIRIA, 2007). All drainage designs have been carried out with regard to both Meath and Kildare County Council's respective Development Plans and Frameworks.

The Flood Risk Assessment of the green field run-off rates conclude that the development is not at risk of flooding due to pluvial or groundwater flood events.

Pathway: Site Surface water drainage network.

Receptor: Site, adjacent lands and nearby infrastructure.

Pre-Mitigation Impact

If the Proposed Development design did not include mitigation measures to minimise the risk of increased flooding there would be a direct, negative, slight, long term, low probability impact.

Proposed Mitigation Measures

The risk of pluvial and or fluvial flooding is minimised by the incorporation of a properly designed surface drainage and gravity sewer network, and by using underground attenuation tanks areas and flow restrictors for drainage management which will control discharges to the Rye Water River at pre-development greenfield rates. Water quality risks are mitigated by the use of hydrocarbon interceptors and silt traps as described in Chapter 4.

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Residual Impact

Direct, neutral, imperceptible, long term, low probability impact in relation to flood risk.

Significance of Effects

No significant impacts in terms of flooding are expected due to the Proposed Development.

8.6.4.15 Potential Operational Phase Water Quality Impacts

Once the construction phase is completed potential emissions to ground and / or surface water include storm water run-off and wastewater. All rainfall runoff on the new Bridge and the MOOR is to be captured by adequately spaced trapped road gullies, which connect to a main carrier drain under the road. The rainfall runoff on the aligning footpath and cycle-track shall be intercepted by the dividing treelined grass verge, with excess runoff only being collected by the road's gully network.

Surface water attenuation will be used to control surface water runoff rates from all hard surfaces in accordance with the GDSDS, with these being restricted to a maximum flow rate of 5.5 l/s/ha, which is less than the calculated greenfield runoff equivalent. The attenuation systems are to largely comprise enclosed vegetated ponds, and shall be preceded by a Class 1 bypass fuel separator

Rainfall allowed to percolate to ground and/or flow via subsurface flow to the Rye Water River within the green/ landscaped areas of the Proposed Development are not a significant source of pollution related to these areas.

Pathway: Site surface water and foul water drainage network.

Receptor: On-Site, adjacent and downstream water courses and foul water infrastructure

Pre-Mitigation Impact: If the measures described above had not been incorporated into the development design there would be potential for direct, negative, slight, long term, low probability impact on water quality

Proposed Mitigation Measures

The risk of uncontrolled emissions is minimized by the collection, treatment and discharge of storm water to the Rye Water River via, attenuation systems, filter drains and petrol/oil interceptors as described above.

Residual Impact

The potential source of pollution can be readily controlled and standard procedures will ensure no significant releases will occur. Mitigation measures, in particular the attenuation systems, filter drains and petrol/oil interceptor will break the pathway from the proposed works areas to the watercourse. The residual impacts are indirect, neutral, imperceptible, long term, unlikely impact.

Therefore, significant effects on surface water or ground water quality will not occur.

8.6.4.16 Potential Impacts on Hydrologically Connected Designated Sites

Surface water runoff areas can potentially contain elevated levels of contaminants such as hydrocarbons and suspended solids. These contaminants have the potential to impact on local downstream groundwater and surface water quality. This is somewhat relevant to this site, due to its proximity to the

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Rye Water River and the Rye Water Valley/Carton SAC however the QI's for this site relate to ground water dependant species rather than surface water. Ecological surveys also show that there are no mapped petrifying springs or QI's downstream of the site and there is no potential for impacts on the Louisa Bridge Springs.

Possible effects during the operational phase continue to include water quality impacts which could occur if ongoing mitigation is not put in place.

There will be no impacts on the local surface water hydrological regime during the operational phase of the development for the following reasons:

- During the operational phase all surface water arising on site will drain to attenuation systems before discharge to a local watercourse.
- All road gullies are designed to intercept and trap road grit and silt. All road drainage water will pass through hydrocarbon interceptors and attenuation systems, prior to controlled/flow limited outfall. Groundwater quality risks are reduced during the operational phase by use of hydrocarbon interceptors and filter drain prior to discharge to the watercourse.
- As one of the qualifying interests of the SAC is linked to groundwater flows (calcareous tufa springs), the distance between them is seen as a significant factor, and there is no connection between groundwater at the Proposed Development site, and that discharging to any tufa springs within the SAC (including the mapped spring located approximately 5km from the Proposed Development at Louisa Bridge).
- No dewatering will occur during the operational phase of the development.
- All building works will be complete and will have been installed at or very near existing ground levels with minimal ground disturbance having occurred.

No extensive areas of deep foundations, such as basements, underground carparks etc, will have been installed. As such there will be no interruption or blocking of shallow or deep groundwater pathways below the site during the operational phaseWhile there are no known petrifying springs or qualifying interests of the Rye Water Valley/Carton SAC within proximity of the Proposed Development (following ecological surveys carried out in 2022), the potential for the occurrence of unmapped petrifying springs within the SAC has been considered below.

These standard drainage design controls and construction phase mitigation measures will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the proposed development.

The project design ensures that there will be no dewatering of the bedrock aquifer during the construction phase and so there will be no obstruction or alteration of existing groundwater flows.

There will be no significant alteration to groundwater recharge. The majority of rainfall will continue to percolate to shallow subsurface and discharge to the surface water systems locally with low levels of recharge to ground and so the impact of this is considered to be imperceptible.

With the implementation of the project as designed and the standard drainage control measures outlined above and throughout Section 8.6.3 above, the potential for the Proposed Development to cause any groundwater drawdown or groundwater quality impacts in the SAC is imperceptible.

Groundwater below the Proposed Development will flow to the south and discharge as baseflow to the Rye Water River and/or the Blackhall Little stream to the east. Groundwater flow from the site will, therefore, have no impact on the Louisa Bridge (spring) groundwater flow (Rye Water Valley/Carton

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SAC) as previous site investigations and hydrological assessments (c.f. Section 2.4, (Hydro-G, 2008)) have shown that the flow to these springs is not derived from the Rye Water River.

Groundwater flowpaths will be maintained during the operational phase as existing building foundations and any previous excavation will be shallow. Groundwater flowpaths during the operational phase will be unaltered by the Proposed Development. The SI data shows that dewatering of groundwater from the bedrock aquifer will not occur and so there is no potential for significant effects on the calcareous tufa springs and associated species.

Following an extremely precautionary principle, the potential for other downstream designated sites to be impacted by the proposed works was also considered. On the basis of the Proposed Development design and the mitigation measures proposed to protect the immediate water receptors there will be no impacts on designated sites.

Pathway: Site drainage network and groundwater flowpaths.

Receptor: Rye Water Valley/Carton SAC and any associated Tufa Springs and vertigo snail populations (including the known spring 5km downstream at Louisa Bridge).

Pre-Mitigation Impact

Indirect, negative, not significant, long term, likely impact to surface water quality.

Imperceptible impacts on groundwater levels or existing hydrological regime or flowpaths due to operation of the Proposed Development.

Proposed Mitigation Measures

During the operational phase all surface water arising on site will drain to attenuation systems, hydrocarbon interceptor and filter drain before discharge to Rye Water River at controlled rates that are less than the greenfield rates. Groundwater quality risks are reduced during the operational phase by use of hydrocarbon interceptors and silt traps prior to discharge to the watercourse.

Residual Impact

No impacts on water quality or downstream designated sites are anticipated.

Imperceptible impacts on groundwater levels or existing hydrological regime or groundwater flowpaths relating to the Rye Water Valley/ Carton SAC.

Significance of Effects

No significant impacts on groundwater or surface water quality and downstream designated sites are anticipated.

No significant impacts on groundwater levels, existing hydrological regime, or groundwater flowpaths relating to the Rye Water Valley/Carton SAC, the Rye Water River or the Blackhall Little Stream.

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8.6.5 Assessment of Potential Impacts on Water Supplies

Potential health effects are associated with negative impacts on public and private water supplies and potential flooding. There are no mapped public supply group water scheme groundwater protection zones in the area of the Proposed Development.

The proposed site design and mitigation measures outlined in the previous subsections ensures that the potential for impacts on the water environment are not significant and by extension cannot impact significantly on human health.

The flood risk assessment for the development has also shown that the Proposed Development will not increase the risk of flooding elsewhere, and also that there is no significant risk of flooding within the Proposed Development area and it is considered appropriate for the proposed use.

8.6.6 Monitoring Proposals

An inspection and maintenance plan for the on-site drainage systems and mitigation measures will be prepared in advance of commencement of any works and for the duration of construction for each phase of the development. The mitigation measures and monitoring proposals will be dependant on and will be designed for the catchments within which works are proposed. Regular inspections of all installed drainage systems and controls will be undertaken daily, to check that the integrity of silt fencing, for example, is intact. Daily visual checks of the stream will also be carried out and continuous turbidity meters will be installed as required (SONDES).

During the construction phase, field testing and laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken for the adjacent Rye Water River (as per the CEMP).

Field chemistry measurements of unstable parameters, (pH, conductivity, dissolved oxygen, temperature) will be taken at the two surface water monitoring locations on the Rye Water River/Blackhall Little, subject to agreement with Meath and Kildare County Councils. In-situ field monitoring will be completed on a monthly basis.

Baseline laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken prior to construction at two locations on the Rye Water River.

The analytical determinants of the monitoring programme will be as set out below and carried out quarterly.

- pH (field measured)
- Electrical Conductivity (field measured)
- Temperature (field measured)
- Dissolved Oxygen (field measured)
- Total Suspended Solids
- Total Phosphorus
- Chloride
- Nitrate
- Nitrite
- Total Nitrogen
- Ortho-Phosphate
- Ammonia N
- Biochemical Oxygen Demand

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8.6.7 Cumulative effects resulting from Interactions between various elements of the proposed development

The interaction of the various elements of the Proposed Development was considered and assessed in this EIAR with regards hydrology. The potential for each individual element of the Proposed Development on its own to result in significant effects on water receptors was considered in the impact assessment. The entire project including the interactions between all its elements was also considered and assessed for its potential to result in significant effects on water receptors in the impact assessment presented. The complex interactions between the requirement for site drainage and the requirement to protect the Blackhall Little/Rye Water River and other sensitive receptors were taken into account for the entire project and any impacts avoided through a series of mitigation measures that were fully described. The management and handling of potentially harmful materials across the entire project was assessed with mitigation proposed and described fully.

All interactions between the various elements of the project were considered and assessed both individually and cumulatively within this chapter. Where necessary, mitigation was employed to ensure that no cumulative effects will arise as a result of the interaction of the various elements of the development with one another.

8.6.8 Cumulative In-combination

The potential cumulative effects of the Proposed Development in combination with the other projects described in Chapter 2 of this report have been considered in terms of impacts on hydrology and hydrogeology.

There are a number of proposed or permitted housing developments within the vicinity of the Proposed Development. A description of the developments is provided in Chapter 2, and where appropriate the application documentation, EIAR and NIS for each development have been reviewed.

There are no proposed direct discharges of any substance to the Blackhall Little/Rye Water River or other watercourses from the site during the construction phase of the Proposed Development. The hydrological regime, which includes shallow subsurface flows to the Blackhall Little/Rye Water River and some percolation of rainfall to ground, will not be altered significantly during the construction phase. Potential emissions from the site are therefore related to potential uncontrolled releases and so a range of procedures, management plans and infrastructural mitigation proposals have been identified and described earlier in this chapter and will be implemented to ensure that such uncontrolled releases do not occur. The potential for residual impacts on water and ground water receptors is considered to be imperceptible and so the potential for cumulative effects associated with these receptors is limited. It is highly unlikely that all projects would be constructed at the same time and so the potential for multiple uncontrolled releases to water are also not likely. Should some or all projects be constructed at the same time, the water quality controls at the Proposed Development site will ensure no likely significant cumulative effects will occur. Furthermore, it should be noted that planning and construction standards require that similar water quality controls will be implemented at the other sites, thus further reducing the potential for likely, significant cumulative effects.

During the operational phase, discharges are proposed to the Blackhall Little/Rye Water River and this has been assessed as leading to a potential imperceptible effect as the discharge rate will be as per pre-development rates and water quality will be controlled. Again, the water quality controls at the Proposed Development site will ensure no likely significant effects cumulatively will occur during the operational phase. Mandated water quality controls at the other project sites will further reduce the potential for likely, significant cumulative effects.

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Wastewater effluent arising from the operational phase of the proposed development will be piped from the proposed onsite pumping station, to the existing Maynooth pumping station, before being piped to and treated at, the municipal wastewater treatment plant at Leixlip. The Leixlip treatment plan operates under licence from the EPA. The EPA cannot issue a licence in the event that emissions from that facility could lead to unacceptable environmental emissions. In circumstances where Irish Water has confirmed that the wastewater arising from the Proposed Development will be treated at the Leixlip wastewater treatment plant, the potential for cumulative effects associated with the wastewater discharges does not arise.

No significant cumulative impacts on the water environment are anticipated during the construction or operational phases in circumstances where the proposed mitigation measures are implemented effectively. The 3 no. developments in the locality of the Proposed Development have been designed with appropriate water and wastewater services as has the Proposed Development.

8.6.9 Conclusion

During each phase of the Proposed Development (construction and operation) a number of activities will take place on the development site which will have the potential to affect the hydrological regime, hydrogeological regime or water quality at the site or its vicinity. These potential impacts generally arise during the construction stage from sediment input from runoff and other pollutants such as hydrocarbons and cement-based compounds, with the former having the most potential for impact.

Surface water drainage measures, pollution control and other preventative measures have been incorporated into the project design to minimise significant negative or adverse impacts on water quality including the adjacent Blackhall Little/Rye Water River and avoid impact on downstream designated sites. Preventative measures during construction include fuel and concrete management and a waste management plan which have been incorporated into the Construction and Environmental Management Plan. A range of surface water control measures will also be used including silt fencing along the Blackhall Little/Rye Water River and the maintenance of a set back from the watercourse during construction.

During the operational phase, the key surface water control measure is that there will be a gravity fed sewer network, water drainage system with a Hydro-Brake flow restrictor, filter drain and attenuation systems along with petrol / oil interceptors prior to outflow to the Blackhall Little/Rye Water River. The proposed system will control discharge volume and discharge quality to acceptable greenfield levels. It is also proposed to retain the existing riparian zone which will act as a buffer between the development and the two watercourses.

Overall, the proposal presents no real likelihood of significant impacts to surface water or groundwater quality provided the proposed mitigation measures are implemented.

There will be no net impact on the local hydrological regime, groundwater levels, or groundwater flowpaths during the construction and operational phase of the Proposed Development. There will be no perceptible direct or indirect hydrological impacts on designated sites, in particular the Rye Water Valley / Carton SAC.

No significant cumulative impacts on surface water, groundwater or designated sites will occur.

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9. AIR & CLIMATE

9.1 Introduction

This chapter identifies, describes and assesses the potential significant direct and indirect effects on air quality and climate arising from the construction and operation of the Proposed Development. This section of the EIAR has been completed in accordance with the EIA guidance and legislation set out in Chapter 1: Introduction. For the purposes of this EIAR, where the Proposed Development is referred to, this relates to all the project components described in detail in Chapter 4 of this EIAR. The full description of the Proposed Development is provided in Chapter 4 of this EIAR.

Due to the non-industrial nature of the Proposed Development and the general character of the surrounding environment, air quality sampling was deemed to be unnecessary for this EIAR. It is expected that air quality in the existing environment is good, since there are no major sources of air pollution (e.g., heavy industry) in close proximity to the site.

9.1.1 Statement of Authority

This section of the EIAR has been prepared by Niamh McHugh, David Naughton, Daire O'Shaughnessy reviewed by Eoin O'Sullivan, of MKO. Niamh is a Graduate Environmental Scientist and holds a BSc (Hons) in Environmental Science from the National University of Ireland, Galway. Since joining the company in 2021, Niamh has been involved in the preparation of chapters for a number of Environmental Impact Assessment Reports for large-scale developments. David is an Environmental Scientist with five years of consultancy experience with MKO and has been involved in a number of EIAR applications, predominantly in renewable energy, namely onshore wind. David has worked as project manager for a number of EIAR applications, providing a pivotal link liaising between the applicant and the EIAR project team to ensure all work is carried out to a high standard. David holds a BSc (Hons) in Environmental Science. Daire O'Shaughnessy is an Environmental Scientist who holds a B.Sc (Hons) in Environmental Science with three years of consultancy experience with MKO and has been involved in a range of EIAR applications. Eoin O'Sullivan is an experienced geo-environmental scientist and has over twelve years' experience in the assessment of a wide range of energy and infrastructure related projects and working in the fields of environmental and human health risk assessment, waste management, waste policy and permitting. Eoin has also got extensive experience in the preparation of air and climate assessments and reports for EIAs. Eoin has wide experience in the project management of large-scale infrastructural projects and brownfield developments and has routinely undertaken detailed quantitative risk assessment for the protection of controlled waters and ground gas risk assessments. Eoin holds an MSc in Environmental Engineering and is a Chartered Member of the Chartered Institute of Water and Environmental Management (CWEM) and Chartered Environmentalist (CEnv) with the Society of Environment.

9.2 Air

9.2.1 Background

The Proposed Development site is located within Co. Meath and Co. Kildare and located on the northern environs of Maynooth town, within zoned lands known as the 'Maynooth Environs lands' as set out in the Maynooth Environs Local Area Plan 2013-2019 (MLAP), which is incorporated into the Meath County Development Plan 2021-2027. The Proposed Development site is currently a greenfield site, with small scale agriculture as the primary land-use.

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9.2.2 Air Quality Standards

In 1996, the Air Quality Framework Directive (96/62/EC) was published. This Directive was transposed into Irish law by the Environmental Protection Agency Act 1992 (Ambient Air Quality Assessment and Management) Regulations 1999. The Directive was followed by four Daughter Directives, which set out limit values for specific pollutants:

- The first Daughter Directive (1999/30/EC) addresses sulphur dioxide, oxides of nitrogen, particulate matter and lead.
- The second Daughter Directive (2000/69/EC) addresses carbon monoxide and benzene. The first two Daughter Directives were transposed into Irish law by the Air Quality Standards Regulations 2002 (SI No. 271 of 2002).
- The third Daughter Directive, Council Directive (2002/3/EC) relating to ozone was published in 2002 and was transposed into Irish law by the Ozone in Ambient Air Regulations 2004 (SI No. 53 of 2004).
- The fourth Daughter Directive, published in 2007, relates to polyaromatic hydrocarbons (PAHs), arsenic, nickel, cadmium and mercury in ambient air and was transposed into Irish law by the Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations, 2009 (S.I. No. 58 of 2009).

The Air Quality Framework Directive and the first three Daughter Directives have been replaced by the Clean Air for Europe (CAFE) Directive (Directive 2008/50/EC on ambient air quality) (as amended by Directive EU 2015/1480), which encompasses the following elements:

- The merging of most of the existing legislation into a single Directive (except for the Fourth Daughter Directive) with no change to existing air quality objectives.
- New air quality objectives for $PM_{2.5}$ (fine particles) including the limit value and exposure concentration reduction target.
- The possibility to discount natural sources of pollution when assessing compliance against limit values.
- The possibility for time extensions of three years (for particulate matter PM_{10}) or up to five years (nitrogen dioxide, benzene) for complying with limit values, based on conditions and the assessment by the European Commission.

Table 9-1 below sets out the limit values of the CAFE Directive, as derived from the Air Quality Framework Daughter Directives. Limit values are presented in micrograms per cubic metre ($\mu g/m^3$) and parts per billion (ppb). The notation PM_{10} is used to describe particulate matter or particles of ten micrometres or less in aerodynamic diameter. $PM_{2.5}$ represents particles measuring less than 2.5 micrometres in aerodynamic diameter.

The CAFE Directive was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011) as amended by the Air Quality Standards (Amendments) and Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations, 2016 (S.I. 659 2016). These Regulations supersede the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and the Ambient Air Quality Assessment and Management Regulations 1999 (S.I. No. 33 of 1999).

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Table 9-1 Limit values of Directive 2008/50/EC, 1999/30/EC and 2000/69/EC (Source: https://www.epa.ie/air/quality/standards/)

Pollutant	Limit Value Objective	Averaging Period	Limit Value (µg/m3)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Sulphur dioxide (SO_2)	Protection of Human Health	1 hour	350	132	Not to be exceeded more than 24 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Protection of human health	24 hours	125	47	Not to be exceeded more than 3 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Upper assessment threshold for the protection of Human Health	24 hours	75	28	Not to be exceeded more than 3 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Lower assessment threshold for the protection of human health	24 hours	50	19	Not to be exceeded more than 3 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Protection of vegetation	Calendar year	20	7.5	Annual mean	19th Jul 2001
Sulphur dioxide (SO_2)	Protection of vegetation	1st Oct to 31st Mar	20	7.5	Winter mean	19th Jul 2001
Nitrogen dioxide (NO_2)	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year	1st Jan 2010
Nitrogen dioxide (NO_2)	Protection of human health	Calendar year	40	21	Annual mean	1st Jan 2010
Nitrogen dioxide (NO_2)	Upper assessment threshold for the protection	1 hour	140	73	Not to be exceeded more than 18 times in a calendar year	1st Jan 2010

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Pollutant	Limit Value Objective	Averaging Period	Limit Value (µg/m3)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
	of human health					
Nitrogen dioxide (NO_2)	Lower assessment threshold for the protection of human health	1 hour	100	52	Not to be exceeded more than 18 times in a calendar year	1st Jan 2010
Nitrogen monoxide (NO) and nitrogen dioxide (NO_2)	Protection of ecosystems	Calendar year	30	16	Annual mean	19th Jul 2001
Particulate matter 10 (PM_{10})	Protection of human health	24 hours	50	-	Not to be exceeded more than 35 times in a calendar year	1st Jan 2005
Particulate matter 10 (PM_{10})	Upper assessment threshold for the protection of human health	24 hours	35	-	Not to be exceeded more than 35 times in a calendar year	Based on the indicative limit values for 1 January 2010
Particulate matter 10 (PM_{10})	Lower assessment threshold for the protection of human health	24 hours	25	-	Not to be exceeded more than 35 times in a calendar year	Based on the indicative limit values for 1 January 2010
Particulate matter 2.5 ($PM_{2.5}$)	Protection of human health	Calendar year	40	-	Annual mean	1st Jan 2005
Particulate matter 2.5 ($PM_{2.5}$) Stage 1	Protection of human health	Calendar year	25	-	Annual mean	1st Jan 2015
Particulate matter 2.5 ($PM_{2.5}$) Stage 2	Protection of human health	Calendar year	20	-	Annual mean	1st Jan 2020

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Pollutant	Limit Value Objective	Averaging Period	Limit Value (µg/m3)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Lead (Pb)	Protection of human health	Calendar year	0.5	-	Annual mean	1st Jan 2005
Carbon Monoxide (CO)	Protection of human health	8 hours	10,000	8,620	-	1st Jan 2005
Benzene (C_6H_6)	Protection of human health	Calendar Year	5	1.5	-	1st Jan 2010

The Ozone Daughter Directive 2002/3/EC is different from the other Daughter Directives in that it sets target values and long-term objectives for ozone rather than limit values. Table 9-2 presents the limit and target values for ozone.

Table 9-2 Target values for Ozone Defined in Directive 2008/50/EC .

Objective	Parameter	Target Value for 2010	Target Value for 2020
Protection of human health	Maximum daily 8-hour mean	120 mg/m^3 not to be exceeded more than 25 days per calendar year averaged over 3 years	120 mg/m^3
Protection of vegetation	AOT40* calculated from 1-hour values from May to July	18,000 $mg/m^3.h$ averaged over 5 years	6,000 $mg/m^3.h$
Information Threshold	1-hour average	180 mg/m^3	-
Alert Threshold	1-hour average	240 mg/m^3	-

* AOT40 is a measure of the overall exposure of plants to ozone. It is the sum of the differences between hourly ozone concentration and 40 ppb for each hour when the concentration exceeds 40 ppb during a relevant growing season, e.g. for forest and crops.

9.2.2.1 Air Quality and Health

The Environmental Protection Agency (EPA) report '*Air Quality in Ireland 2020'* noted that in Ireland, the premature deaths attributable to poor air quality are estimated at 1,300 people per annum. A more recent European Environmental Agency (EEA) Report, '*Air Quality in Europe – 2020 Report'* highlights the negative effects of air pollution on human health. The report assessed that poor air quality accounted for premature deaths of approximately 417,000 people in Europe in 2018, with regards to deaths relating to $PM_{2.5}$. The estimated impacts on the population in Europe of exposure to NO_2 and O_3 concentrations in 2018 were around 55,000 and 20,600 premature deaths per year, respectively. From this, 1,300 Irish deaths were attributable to fine particulate matter ($PM_{2.5}$), 50 Irish deaths were attributable to nitrogen oxides (NO_2) and 60 Irish deaths were attributable to Ozone (O_3) (Source: *Air Quality in Europe – 2020 Report',* EEA, 2020).

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Whilst there is the potential of such emissions and also dust emissions to be generated from the site operations, a number of mitigation measures will be implemented at this site to reduce the impact from dust and vehicle emissions, which are discussed in Section 9.2.4 below.

9.2.3 Air Quality Zones

The Environmental Protection Agency (EPA) has designated four Air Quality Zones for Ireland:

- Zone A: Dublin City and environs
- Zone B: Cork City and environs
- Zone C: 16 urban areas with population greater than 15,000
- Zone D: Remainder of the country.

These zones were defined to meet the criteria for air quality monitoring, assessment and management described in the Framework Directive and Daughter Directives. The Proposed Development site lies within Zone D, which represents rural areas located away from large population centres.

9.2.4 Existing Air Quality

The air quality in the vicinity of the Proposed Development site is typical of that of rural areas in the East of Ireland, i.e., Zone D. The EPA publishes Air Monitoring Station Reports for monitoring locations in all four Air Quality Zones. The most recent report on air quality in Ireland, 'Air Quality in Ireland 2020'[1] was published by the EPA in 2021. The EPA reports provide SO_2, PM_{10}, NO_2 and O_3 concentrations for areas in Zone D.

9.2.4.1 Sulphur Dioxide (SO_2)

The EPA Air Quality in Ireland 2020 summary tables provide statistics for hourly sulphur dioxide concentrations for four Zone D monitoring stations under Table A5 of the EPA report, namely, Cork Harbour, Kilkitt, Askeaton and Letterkenny. The average sulphur dioxide statistics across each of the four monitoring stations listed in Zone D from the 2020 summary tables is presented in Table 9-3 below[2].

Table 9-3 Average Sulphur Dioxide Data for Zone D Sites in 2020

Parameter	Measurement (ug/m^3)
Annual Mean	4.15
Hourly values > 350	0.5
Hourly max	135.18
Daily values > 125	0
Daily max	25.55

During the monitoring period there were no exceedances of the daily limit values for the protection of human health. As can observed from Table 9-3 the average maximum hourly value recorded during

[1] *EPA (2021). Air Quality in Ireland 2020 – Summary Data Tables* https://www.epa.ie/publications/monitoring–assessment/air/Summary-Data-Tables–2020.pdf

[2] *Letterkenny had the highest levels of Sulphur Dioxide emissions (Annual Mean, Median, Hourly Max and Daily Max) of any of the monitoring stations listed within the country for Table A5 of the 'Air Quality in Ireland 2020 – Summary Data Tables'. Lower values would be expected for the Proposed Development as it is located within a much more rural location.*

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the assessment period was 135.18 µg/m^3. In addition, there were no exceedances of the annual mean limit for the protection of ecosystems. It would be expected that SO_2 values at the Proposed Development site would be similar or lower than those recorded for the Zone D sites above.

9.2.4.2 Particulate Matter (PM_{10})

Sources of particulate matter include vehicle exhaust emissions, soil and road surfaces, construction works and industrial emissions. The EPA Air Quality in Ireland 2020 summary tables provide annual mean PM_{10} concentration for twelve Zone D monitoring stations under Table A11 of the EPA report, namely, Tipperary Town, Carrick-on-Shannon, Enniscorthy, Birr, Askeaton, Macroom, Castlebar, Cobh, Claremorris, Kilkitt, Cavan and Roscommon Town. The average Particulate matter (PM_{10}) statistics across each of the twelve monitoring stations listed in Zone D from the 2020 summary tables is presented in Table 9-4.

Table 9-4 Average Particulate Matter (PM_{10}) Data for Zone D Sites in 2020

Parameter	Measurement (ug/m^3)
Annual Mean	11.17
% Data Capture	75
Values > 50 ug/m^3	Maximum Value of 5 exceedances at Macroom
Daily Max	46.5

Notes: [1-] PM_{10} daily limit for the protection of human health: No more than 35 days >50 µg/m^3

The daily limit of 50 µg/m^3 for the protection of human health was not exceeded more than 35 times during the monitoring period. It would be expected that PM_{10} values at the Proposed Development site would be similar or lower than those recorded for the Zone D sites above.

9.2.4.3 Nitrogen Dioxide (NO_2)

The EPA Air Quality in Ireland 2020 summary tables provide statistics for hourly nitrogen dioxide concentrations for five Zone D monitoring stations under Table A2 of the EPA report, namely, Emo Court, Birr, Castlebar, Carrick-on-Shannon and Kilkitt. The average Nitrogen Dioxide (NO_2) statistics across each of the five monitoring stations listed in Zone D from the 2020 summary tables is presented in in 2020 is presented in Table 9-5 below.

Table 9-5 Average Nitrogen Dioxide Data for Zone D Sites in 2020

Parameter	Measurement (µg/m^3)
Annual Mean	7.6
NO_2 Values >200	0
Values > 140 (UAT)	0
Values >100 (LAT)	0
Hourly Max.	54

The annual NO_2 value was below the annual mean limit value for the protection of human health of 40 µg/m^3. Furthermore, the lower and upper assessment thresholds of 100 and 140 µg/m^3 was not exceeded during the monitoring period. The average hourly max. NO_2 value of 54 µg/m^3 measured during the monitoring period was below the hourly max threshold of 200 µg/m^3. It would be expected

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that NO_2 values at the Proposed Development site would be similar or lower than those recorded for the Zone D sites above.

9.2.4.4 Carbon Monoxide (CO)

The EPA Air Quality in Ireland 2020 summary tables provide statistics for rolling 8-hour carbon monoxide concentrations for only one Zone D site, namely Birr air monitoring station, under Table A6 of the EPA report. Carbon Monoxide data from Birr Monitoring Station (Zone D) in 2020 is presented in Table 9-6 below.

Table 9-6 Carbon Monoxide Data for Birr - Zone D Site in 2020

Parameter	Measurement
Annual Mean	0.4 mg/m^3
Median	0.4 mg/m^3
% Data Capture	4.2%
Values > 10	0
Max	1.2 mg/m^3

The average concentration of carbon monoxide was 0.4 mg/m^3. The carbon monoxide limit value for the protection of human health is 10,000 $\mu g/m^3$ (or 10mg/m^3). On no occasions were values in excess of the 10 mg limit value set out in Directives 2000/69/EC or 2008/69/EC. It would be expected that Carbon Monoxide values at the Proposed Development site would be similar or lower than those at Birr.

9.2.4.5 Ozone (O_3)

The EPA Air Quality in Ireland 2020 summary tables provide statistics for rolling 8-hour ozone concentrations for seven Zone D monitoring stations under Table A7 of the EPA report, namely, Emo Court, Kilkitt, Carnsore Point, Mace Head, Castlebar, Valentia and Malin Head. The average Ozone (O_3) statistics across each of the seven monitoring stations listed in Zone D from the 2020 summary tables is presented in Table 9-7 below.

Table 9-7 Average Ozone Data for Zone D Sites in 2020

Parameter	Measurement
Annual Mean	62 $\mu g/m^3$
Median	63 $\mu g/m^3$
% Data Capture	98%
No. of days > 1800	0 days

There were no exceedances of the maximum daily eight-hour mean limit of 120 $\mu g/m^3$. The legislation stipulates that this limit should not be exceeded on more than 25 days. It would be expected that ozone values at the Proposed Development site would be similar to those recorded for the Zone D sites above.

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9.2.4.6 Dust

There are no statutory limits for dust deposition in Ireland. The German TA-Luft standard for dust deposition sets a maximum permissible emission level for dust deposition of 350 mg/m^2/day. Recommendations from the Department of the Environment, Health & Local Government[3] apply the Bergerhoff limit of 350 mg/m^2/day to the site boundary of quarries. This limit value can also be implemented with regard to dust impacts from construction activities associated with the Proposed Development.

The extent of dust generation at any site depends on the type of activity undertaken, the location, the nature of the dust, i.e., soil, sand, etc., and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or, periods of dry weather. Dust has the potential to be generated during the construction phase of the Proposed Development from on-site activities such as excavation and backfilling. Construction traffic movements also have the potential to generate dust as they travel along the haul route.

The potential dust-related effects on local air quality and the relevant associated mitigation measures are presented in Sections 9.2.5.2.1 and 9.2.5.3.1 below.

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[3] *DOEHLG (2004) Quarries and Ancillary Activities, Guidelines for Planning Authorities*

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9.2.5 Likely Significant Effects and Associated Mitigation Measures

9.2.5.1 'Do-Nothing' Scenario

If the Proposed Development were not to proceed, there would be no change to the current land-use practice of agriculture. There would be no potential for minor emissions to occur as a result of the construction and operational phases of the Proposed Development.

9.2.5.2 Construction Phase

9.2.5.2.1 *Strategic Employment Zone (Site A)*

Dust Emissions

Dust can be generated from many on-site activities such as excavation works, construction of buildings and site roads and delivery of aggregate materials to the site. The extent of dust generation will depend on the type of activity undertaken, the location, the nature of the dust, i.e. rock, soil etc and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or, periods of dry weather. Traffic movements also have the potential to generate dust.

Pre-mitigation, these impacts have the potential to have a Short-term Moderate Negative Impact.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Dampening down the dust at the source by the use of barriers such as debris netting on scaffolding around the buildings to block dust escaping where the building is within 10m of the site boundary where residential properties or public roads exist.
- Site roadways will be maintained in a stoned hard-core condition not allowing soil to accumulate which when dry can create dust.
- Wheel wash equipment will be set up at the site exit gates for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways.
- The roads adjacent the site will continue to be regularly inspected by the Site Manager for cleanliness and cleaned as necessary.
- If necessary, sporadic wetting of loose stone and soil surface will be carried out during the construction phase to minimise movement of dust particles to the air.
- Any hardstanding areas/site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- The transport of material, which has significant potential to cause dust, will be undertaken in tarpaulin-covered vehicles.
- Dust levels will be monitored visually, on a daily basis by the project Environmental Officer. If dust levels become an issue, then all dust generating activities on site will cease until such time as weather conditions improve (e.g., wind levels drop or rain falls) or mitigation measures such as damping down of the ground are completed.
- A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Volume 3a Appendix 4-3). A CEMP is included with this application and includes further details of the above dust suppression measures and dust monitoring measures.

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Residual Impact

Following implementation of the mitigation measures outlined above, residual impacts of dust generation from the construction phase will have a Short-term Imperceptible Negative Impact.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects on air quality due to dust emissions during the construction of Site A.

Exhaust Emissions

The construction of Site A will require the use of machinery and plant, thereby giving risk to exhaust emissions. This is likely to have a Short-term slight negative effect, which will be reduced through the use of the best practices mitigation measures as presented below.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- All machinery will be switched off when not in use.
- Users of the site will be required to ensure that all plant and vehicles are suitably maintained to ensure that emissions of engine generated pollutants are kept to a minimum.
- The methods of working will comply with all relevant legislation and best practice guidelines in reducing the environmental impacts of the works. A detailed CEMP will be prepared and submitted to Meath County Council for approval in advance of the works.

Residual Impact

Following implementation of the mitigation measures outlined above, residual impacts of dust generation from the construction phase will have a Short-term Imperceptible Negative Impact

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects on air quality due to exhaust emissions during the construction of Site A.

9.2.5.2.2 *Healthcare Application (Site B)*

Dust Emissions

Dust can be generated from many on-site activities such as excavation works, construction of buildings and site roads and delivery of aggregate materials to the site. The extent of dust generation will depend on the type of activity undertaken, the location, the nature of the dust, i.e. rock, soil etc and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or, periods of dry weather. Traffic movements also have the potential to generate dust. Pre-mitigation, these impacts will have a Short-term Moderate Negative Impact.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.

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- Dampening down the dust at the source by the use of barriers such as debris netting on scaffolding around the buildings to block dust escaping where the building is within 10m of the site boundary where residential properties or public roads exist.
- Site roadways will be maintained in a stoned hard-core condition not allowing soil to accumulate which when dry can create dust.
- Wheel wash equipment will be set up at the site exit gates for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways.
- The roads adjacent the site will continue to be regularly inspected by the Site Manager for cleanliness and cleaned as necessary.
- If necessary, sporadic wetting of loose stone and soil surface will be carried out during the construction phase to minimise movement of dust particles to the air.
- Any hardstanding areas/site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- The transport of material, which has significant potential to cause dust, will be undertaken in tarpaulin-covered vehicles.
- Dust levels will be monitored visually, on a daily basis by the project Environmental Officer. If dust levels become an issue, then all dust generating activities on site will cease until such time as weather conditions improve (e.g., wind levels drop or rain falls) or mitigation measures such as damping down of the ground are completed.
- A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Volume 3b Appendix 4-3). A CEMP is included with this application and includes further details of the above dust suppression measures and dust monitoring measures.

Residual Impact

Following implementation of the mitigation measures outlined above, residual impacts of dust generation from the construction phase will have a Short-term Imperceptible Negative Impact.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects on air quality due to dust emissions during the construction of Site B.

Exhaust Emissions

The construction of Site B will require the use of machinery and plant, thereby giving risk to exhaust emissions. This is likely to have a Short-term slight negative effect, which will be reduced through the use of the best practices mitigation measures as presented below.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- All machinery will be switched off when not in use.
- Users of the site will be required to ensure that all plant and vehicles are suitably maintained to ensure that emissions of engine generated pollutants are kept to a minimum.
- The methods of working will comply with all relevant legislation and best practice guidelines in reducing the environmental impacts of the works. A detailed CEMP will be prepared and submitted to Meath County Council for approval in advance of the works.

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Residual Impact

Following implementation of the mitigation measures outlined above, residual impacts of dust generation from the construction phase will have a Short-term Imperceptible Negative Impact

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects on air quality due to exhaust emissions during the construction of Site B.

9.2.5.2.3 *Strategic Housing Development (Site C)*

Dust Emissions

Dust can be generated from many on-site activities such as excavation works, construction of buildings and site roads and delivery of aggregate materials to the site. The extent of dust generation will depend on the type of activity undertaken, the location, the nature of the dust, i.e. rock, soil etc and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or, periods of dry weather. Traffic movements also have the potential to generate dust. Pre-mitigation, these impacts will have a Short-term Moderate Negative Impact.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Dampening down the dust at the source by the use of barriers such as debris netting on scaffolding around the buildings to block dust escaping where the building is within 10m of the site boundary where residential properties or public roads exist.
- Site roadways will be maintained in a stoned hard-core condition not allowing soil to accumulate which when dry can create dust.
- Wheel wash equipment will be set up at the site exit gates for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways.
- The roads adjacent the site will continue to be regularly inspected by the Site Manager for cleanliness and cleaned as necessary.
- If necessary, sporadic wetting of loose stone and soil surface will be carried out during the construction phase to minimise movement of dust particles to the air.
- Any hardstanding areas/site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- The transport of material, which has significant potential to cause dust, will be undertaken in tarpaulin-covered vehicles.
- Dust levels will be monitored visually, on a daily basis by the project Environmental Officer. If dust levels become an issue, then all dust generating activities on site will cease until such time as weather conditions improve (e.g., wind levels drop or rain falls) or mitigation measures such as damping down of the ground are completed.
- A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Volume 3c Appendix 4-3). A CEMP is included with this application and includes further details of the above dust suppression measures and dust monitoring measures.

Residual Impact

Following implementation of the mitigation measures outlined above, residual impacts of dust generation from the construction phase will have a Short-term Imperceptible Negative Impact.

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Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects on air quality due to dust emissions during the construction of Site C.

Exhaust Emissions

The construction of Site C will require the use of machinery and plant, thereby giving risk to exhaust emissions. This is likely to have a Short-term slight negative effect, which will be reduced through the use of the best practices mitigation measures as presented below.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- All machinery will be switched off when not in use.
- Users of the site will be required to ensure that all plant and vehicles are suitably maintained to ensure that emissions of engine generated pollutants are kept to a minimum.
- The methods of working will comply with all relevant legislation and best practice guidelines in reducing the environmental impacts of the works. A detailed CEMP will be prepared and submitted Meath County Council for approval in advance of the works.

Residual Impact

Following implementation of the mitigation measures outlined above, residual impacts of dust generation from the construction phase will have a Short-term Imperceptible Negative Impact

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects on air quality due to exhaust emissions during the construction of Site C.

9.2.5.2.4 *Maynooth Outer Orbital Road (MOOR)*

Dust Emissions

Dust can be generated from many on-site activities such as excavation works, construction of site roads and delivery of aggregate materials to the site. The extent of dust generation will depend on the type of activity undertaken, the location, the nature of the dust, i.e. rock, soil etc and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or, periods of dry weather. Traffic movements also have the potential to generate dust. Pre-mitigation, these impacts will have a Short-term Moderate Negative Impact.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Dampening down the dust at the source by the use of barriers such as debris netting on scaffolding around the buildings to block dust escaping where the building is within 10m of the site boundary where residential properties or public roads exist.

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- Site roadways will be maintained in a stoned hard-core condition not allowing soil to accumulate which when dry can create dust.
- Wheel wash equipment will be set up at the site exit gates for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways.
- The roads adjacent the site will continue to be regularly inspected by the Site Manager for cleanliness and cleaned as necessary.
- If necessary, sporadic wetting of loose stone and soil surface will be carried out during the construction phase to minimise movement of dust particles to the air.
- Any hardstanding areas/site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- The transport of material, which has significant potential to cause dust, will be undertaken in tarpaulin-covered vehicles.
- Dust levels will be monitored visually, on a daily basis by the project Environmental Officer. If dust levels become an issue, then all dust generating activities on site will cease until such time as weather conditions improve (e.g., wind levels drop or rain falls) or mitigation measures such as damping down of the ground are completed.
- A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Volume 3d: Appendix 4-2). A CEMP is included with this application and includes further details of the above dust suppression measures and dust monitoring measures.

Residual Impact

Following implementation of the mitigation measures outlined above, residual impacts of dust generation from the construction phase will have a Short-term Imperceptible Negative Impact.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects on air quality due to dust emissions during the construction of the MOOR.

Exhaust Emissions

The construction of the MOOR will require the use of machinery and plant, thereby giving risk to exhaust emissions. This is likely to have a Short-term slight negative effect, which will be reduced through the use of the best practices mitigation measures as presented below.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- All machinery will be switched off when not in use.
- Users of the site will be required to ensure that all plant and vehicles are suitably maintained to ensure that emissions of engine generated pollutants are kept to a minimum.
- The methods of working will comply with all relevant legislation and best practice guidelines in reducing the environmental impacts of the works. A detailed CEMP will be prepared and submitted to Meath County Council for approval in advance of the works.

Residual Impact

Following implementation of the mitigation measures outlined above, residual impacts of dust generation from the construction phase will have a Short-term Imperceptible Negative Impact

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Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects on air quality due to exhaust emissions during the construction of the MOOR.

9.2.5.2.5 *Kildare Bridge*

Dust Emissions

Dust can be generated from many on-site activities such as excavation works, construction of site roads and delivery of aggregate materials to the site. The extent of dust generation will depend on the type of activity undertaken, the location, the nature of the dust, i.e. rock, soil etc and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or, periods of dry weather. Traffic movements also have the potential to generate dust. Pre-mitigation, these impacts will have a Short-term Moderate Negative Impact.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Dampening down the dust at the source by the use of barriers such as debris netting on scaffolding around the buildings to block dust escaping where the building is within 10m of the site boundary where residential properties or public roads exist.
- Site roadways will be maintained in a stoned hard-core condition not allowing soil to accumulate which when dry can create dust.
- Wheel wash equipment will be set up at the site exit gates for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways.
- The roads adjacent the site will continue to be regularly inspected by the Site Manager for cleanliness and cleaned as necessary.
- If necessary, sporadic wetting of loose stone and soil surface will be carried out during the construction phase to minimise movement of dust particles to the air.
- Any hardstanding areas/site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- The transport of material, which has significant potential to cause dust, will be undertaken in tarpaulin-covered vehicles.
- Dust levels will be monitored visually, on a daily basis by the project Environmental Officer. If dust levels become an issue, then all dust generating activities on site will cease until such time as weather conditions improve (e.g., wind levels drop or rain falls) or mitigation measures such as damping down of the ground are completed.
- A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Volume 3e: Appendix 4-2). A CEMP is included with this application and includes further details of the above dust suppression measures and dust monitoring measures.

Residual Impact

Following implementation of the mitigation measures outlined above, residual impacts of dust generation from the construction phase will have a Short-term Imperceptible Negative Impact.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects on air quality due to dust emissions during the construction of the Kildare Bridge works.

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Exhaust Emissions

The construction of the Kildare Bridge works will require the use of machinery and plant, thereby giving risk to exhaust emissions. This is likely to have a Short-term slight negative effect, which will be reduced through the use of the best practices mitigation measures as presented below.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- All machinery will be switched off when not in use.
- Users of the site will be required to ensure that all plant and vehicles are suitably maintained to ensure that emissions of engine generated pollutants are kept to a minimum.
- The methods of working will comply with all relevant legislation and best practice guidelines in reducing the environmental impacts of the works. A detailed CEMP will be prepared and submitted to Kildare County Council for approval in advance of the works.

Residual Impact

Following implementation of the mitigation measures outlined above, residual impacts of dust generation from the construction phase will have a Short-term Imperceptible Negative Impact

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects on air quality due to exhaust emissions during the construction of the Kildare Bridge works.

9.2.5.2.6 *Moyglare Bridge*

Dust Emissions

Dust can be generated from many on-site activities such as excavation works, construction of site roads and delivery of aggregate materials to the site. The extent of dust generation will depend on the type of activity undertaken, the location, the nature of the dust, i.e. rock, soil etc and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or, periods of dry weather. Traffic movements also have the potential to generate dust. Pre-mitigation, these impacts will have a Short-term Moderate Negative Impact.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Dampening down the dust at the source by the use of barriers such as debris netting on scaffolding around the buildings to block dust escaping where the building is within 10m of the site boundary where residential properties or public roads exist.
- Site roadways will be maintained in a stoned hard-core condition not allowing soil to accumulate which when dry can create dust.
- Wheel wash equipment will be set up at the site exit gates for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways.

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- The roads adjacent the site will continue to be regularly inspected by the Site Manager for cleanliness and cleaned as necessary.
- If necessary, sporadic wetting of loose stone and soil surface will be carried out during the construction phase to minimise movement of dust particles to the air.
- Any hardstanding areas/site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- The transport of material, which has significant potential to cause dust, will be undertaken in tarpaulin-covered vehicles.
- Dust levels will be monitored visually, on a daily basis by the project Environmental Officer. If dust levels become an issue, then all dust generating activities on site will cease until such time as weather conditions improve (e.g., wind levels drop or rain falls) or mitigation measures such as damping down of the ground are completed.
- A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Volume 3f: Appendix 4-2). A CEMP is included with this application and includes further details of the above dust suppression measures and dust monitoring measures.

Residual Impact

Following implementation of the mitigation measures outlined above, residual impacts of dust generation from the construction phase will have a Short-term Imperceptible Negative Impact.

Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects on air quality due to dust emissions during the construction of the Moyglare Bridge.

Exhaust Emissions

The construction of the Moyglare Bridge will require the use of machinery and plant, thereby giving risk to exhaust emissions. This is likely to have a Short-term slight negative effect, which will be reduced through the use of the best practices mitigation measures as presented below.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- All machinery will be switched off when not in use.
- Users of the site will be required to ensure that all plant and vehicles are suitably maintained to ensure that emissions of engine generated pollutants are kept to a minimum.
- The methods of working will comply with all relevant legislation and best practice guidelines in reducing the environmental impacts of the works. A detailed CEMP will be prepared and submitted to Kildare County Council for approval in advance of the works.

Residual Impact

Following implementation of the mitigation measures outlined above, residual impacts of dust generation from the construction phase will have a Short-term Imperceptible Negative Impact

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Significance of Effects

Based on the assessment above there will be no significant direct or indirect effects on air quality due to exhaust emissions during the construction of the Moyglare Bridge.

9.2.5.3 Operational Phase

9.2.5.3.1 *Strategic Employment Zone (Site A)*

Exhaust Emissions

Exhaust emissions associated with the operational phase of Site A will arise from machinery and vehicles such as cars and vans of employees and customers who work and require the services provided within the Strategic Employment Zone. This will give rise to a long-term imperceptible negative effect.

Mitigation

Any machinery and/or maintenance vehicles brought onsite during the operational phase of Site A will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thus minimising harmful emissions which may arise.

Residual Impacts

Long-term Imperceptible Negative Impact.

Significance of Effects

Based on the assessment above, there will be no significant direct or indirect effects on air quality due to the operation of Site A.

9.2.5.3.2 *Healthcare Application (Site B)*

Exhaust Emissions

Exhaust emissions associated with the operational phase of Site B will arise from machinery and vehicles such as cars and vans of employees and customers who work and require the services provided within the Community Healthcare Facilities. This will give rise to a long-term imperceptible negative effect.

Mitigation

Any machinery and/or maintenance vehicles brought onsite during the operational phase of Site B will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thus minimising harmful emissions which may arise.

Residual Impacts

Long-term Imperceptible Negative Impact.

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Significance of Effects

Based on the assessment above, there will be no significant direct or indirect effects on air quality due to the operation of Site B.

9.2.5.3.3 *Strategic Housing Development (Site C)*

Exhaust Emissions

Exhaust emissions associated with the operational phase of Site C will arise from machinery and vehicles such as cars and vans of residents who live within the Strategic Housing Development. This will give rise to a long-term imperceptible negative effect.

Mitigation

Any machinery and/or maintenance vehicles brought onsite during the operational phase of Site C will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thus minimising harmful emissions which may arise.

Residual Impacts

Long-term Imperceptible Negative Impact.

Significance of Effects

Based on the assessment above, there will be no significant direct or indirect effects on air quality due to the operation of the Site C.

9.2.5.3.4 *Maynooth Outer Orbital Road (MOOR)*

Exhaust Emissions

Exhaust emissions associated with the operational phase of the MOOR will arise from machinery and vehicles such as cars and vans who require the services provided within the Maynooth Outer Orbital Road. This will give rise to a long-term imperceptible negative effect.

Mitigation

Any machinery and/or maintenance vehicles brought onsite during the operational phase of the Proposed Development will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thus minimising harmful emissions which may arise.

Residual Impacts

Long-term Imperceptible Negative Impact.

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Significance of Effects

Based on the assessment above, there will be no significant direct or indirect effects on air quality due to the operation of the MOOR.

9.2.5.3.5 *Kildare Bridge*

Exhaust Emissions

Exhaust emissions associated with the operational phase of the Kildare Bridge application will arise from machinery and vehicles such as cars and vans who require the services provided within the Kildare Bridge application. This will give rise to a long-term imperceptible negative effect.

Mitigation

Any machinery and/or maintenance vehicles brought onsite during the operational phase of the Proposed Development will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thus minimising harmful emissions which may arise.

Residual Impacts

Long-term Imperceptible Negative Impact.

Significance of Effects

Based on the assessment above, there will be no significant direct or indirect effects on air quality due to the operation of the Kildare Bridge.

9.2.5.3.6 *Moyglare Bridge*

Exhaust Emissions

Exhaust emissions associated with the operational phase of The Moyglare Bridge will arise from machinery and vehicles such as cars and vans of employees and customers who work and require the services provided within the Moyglare Bridge application. This will give rise to a long-term imperceptible negative effect.

Mitigation

Any machinery and/or maintenance vehicles brought onsite during the operational phase of the Proposed Development will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thus minimising harmful emissions which may arise.

Residual Impacts

Long-term Imperceptible Negative Impact.

Significance of Effects

Based on the assessment above, there will be no significant direct or indirect effects on air quality due to the operation of the Moyglare Bridge.

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9.2.5.4 Assessment of Potential for Impacts on Human Health

Whilst the Construction and Operational Phases of the Proposed Development are likely to lead to imperceptible increases in vehicle and dust emissions, the implementation of the mitigation measures as outlined above, and good management practices can prevent or minimise the potential effects off-site. Good management practice consists of good site design and layout, adopting appropriate working methods for any maintenance works to be carried out during operation, and choosing the right equipment for such maintenance works. The potential for health effects are considered to be imperceptible for both dust and exhaust emissions during the construction and operational phase of the Proposed Development and will be limited and controlled through site layout design and mitigation measures.

9.2.5.5 Cumulative Effects Resulting from Interactions Between Various Elements of the Proposed Development

The interaction of the various elements of the Proposed Development were considered and assessed in this EIAR with regards to air quality. The potential for each individual element of the Proposed Development on its own to result in significant effects on air quality was considered in the impact assessment. The entire project including the interactions between all its elements was also considered and assessed for its potential to result in significant effects on air quality in the impact assessment presented.

All interactions between the various elements of the project were considered and assessed both individually and cumulatively within this chapter. Where necessary, mitigation was employed to ensure that no cumulative effects will arise as a result of the interaction of the various elements of the development with one another.

9.2.5.6 Potential Cumulative In-Combination Effects

The potential cumulative effects of the Proposed Development in combination with the other projects described in Chapter 2 of this report have been considered in terms of impacts on population & human health.

There are a number of proposed or permitted housing developments within the vicinity of the Proposed Development. A description of the developments is provided in Chapter 2, and where appropriate the application documentation, EIAR and NIS for each development have been reviewed

Further information on the above is provided in Table 2-5 in Section 4.2.1 of Chapter 2..

9.2.5.6.1 *Cumulative In-Combination Effects on Air Quality*

Potential cumulative air quality impacts may arise during the construction phase due to possible overlap of the construction phases of the Proposed Development and offsite residential developments to the west and south. Agriculture, residential heating, transport vehicles and other local construction activities and the construction of the Proposed Development will require the consumption of fossil fuels and therefore will lead to a minor level of air emissions cumulatively. However, given the relatively small-scale machinery used, short-term duration of the construction phases, together with the implementation of the mitigation measures discussed above, there will be no significant cumulative impacts arising from the construction phase of the Proposed Development in combination with other local developments, projects and plans. The cumulative, in combination impact on air quality with other projects, will be negative, short term, and imperceptible.

While there will be an increase in local traffic and associated exhaust emissions with the Proposed Development, this impact will be imperceptible. Other future developments, including potential future

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applications within the Moygaddy Masterplan area and nearby permitted residential developments, in the area once constructed will also contribute to increased traffic levels and associated exhaust emissions Any machinery and/or maintenance vehicles brought onsite during the operational phase of the Proposed Development will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thus minimising harmful emissions which may arise. Mitigation measures associated with other developments listed in Section 9.2.5.6 above will also be implemented. Therefore, these increases will also be imperceptible and the cumulative air quality impact of the operation of the Proposed Development when considered with other developments will be an imperceptible negative impact.

9.2.5.6.2 *Cumulative In-Combination Dust Emissions*

Dust emissions from the other land use activities in the area are likely to be imperceptible and localised to the immediate area of those projects. The potential for dust emissions from the construction phase of the Proposed Development exists but the residual effects will be imperceptible given the proposed mitigation measures in Section 9.2.5.2.1 above. Therefore, cumulative dust emission impacts resulting from the construction of the Proposed Development, in combination with other projects, will be negative, short term, and imperceptible.

9.3 Climate

9.3.1 Climate and Weather in the Existing Environment

Ireland has a temperate, oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Casement, Co. Dublin, is the nearest weather and climate monitoring station to the Proposed Development site that has meteorological data recorded for the 30-year period from 1981 – 2010. The monitoring station is located approximately 19.3 km southeast of the Proposed Development site. Meteorological data recorded at casement over the 30-year period from 1981 – 2010 is shown in Table 8-7. The wettest months are October, November and January, with July being the driest month. July was also shown to be the hottest month with a mean temperature of 15.7 degrees Celsius.

9.3.1.1 Wind

The wind field characteristics of the area are important climatological elements in examining the potential for the generation of fugitive dust emissions from the site. Fugitive dust emissions from a surface occur if the winds are sufficiently strong and turbulent and the surface is dry and loose, together causing re-suspension of particulate matter from the ground. A wind speed at ground level in excess of about five metres per second is considered to be the threshold above which re-suspension of fine sized material from an exposed surface may occur. The surface needs to have a relatively low moisture content for this type of dust emission to take place and any wetting either by rainfall or sprayers, will greatly reduce the potential of fugitive dust emissions. The mean annual wind speed at the station, in Casement, is 10.7 metres per second.

9.3.1.2 Rainfall

Long term rainfall data was also obtained from the Met Éireann monitoring station at Casement. The 30-year annual average rainfall is 754.2 mm/yr. this is considered to be slightly above average when compared to the annual average rainfall for Dublin (Merrion Square) which recorded annual average rainfall of 730 mm/yr over the same period.

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Table 8-7 Data from Met Éireann Weather Station at Casement, 1981 to 2010: Monthly and Annual Mean and Extreme Values

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
TEMPERATURE (degrees Celsius)													
Mean daily max	8.0	8.2	10.2	12.4	15.2	17.9	19.8	19.5	17.1	13.6	10.2	8.3	13.4
Mean daily min	2.1	2.0	3.3	4.1	6.6	9.4	11.5	11.3	9.5	7.0	4.2	4.2	6.1
Mean temperature	5.1	5.1	6.8	8.2	10.9	13.6	15.7	15.4	13.3	10.3	7.2	5.4	9.7
Absolute max.	15.2	15.9	17.3	22.7	24.9	27.6	31.0	29.5	25.4	21.3	17.7	14.8	31.0
Absolute Min.	-12.4	-8.0	-9.0	-5.5	-2.4	0.4	4.6	2.2	0.2	-4.1	-9.1	-15.7	-15.7
Mean No. of Days With Air Frost	7.5	7.7	4.6	3.4	0.8	0.0	0.0	0.0	0.0	1.3	4.3	7.6	37.2
Mean No. of Days With Ground Frost	14.0	14.0	11.0	11.0	4.0	0.0	0.0	0.0	1.0	4.0	9.0	14.0	82.0
RELATIVE HUMIDITY (%)													
Mean at 0900UTC	87.2	86.7	84.5	80.1	77.4	77.7	79.1	82.2	84.5	86.3	88.9	88.4	83.6
Mean at 1500UTC	82.2	76.7	71.8	67.7	67.3	67.9	68.9	69.0	71.8	76.6	81.6	84.1	73.8
SUNSHINE (hours)													
Mean daily duration	1.7	2.5	3.3	5.1	6.0	5.3	4.9	4.8	4.1	3.3	2.2	1.5	3.7
Greatest daily duration	8.1	9.2	10.9	13.2	15.4	16.0	15.5	14.4	12.3	10.1	8.5	6.9	16.0
Mean num. of days with no sun	8.9	5.8	4.4	2.5	1.8	2.1	1.6	1.1	2.4	4.5	7.0	9.9	52.0
RAINFALL (mm)													

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	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean monthly total	63.8	48.5	50.7	51.9	59.1	62.5	54.2	72.3	60.3	81.3	73.7	75.7	754.2
Greatest daily total	30.0	32.2	31.1	38.7	29.8	97.5	33.7	89.3	51.1	50.1	82.0	46.8	97.5
Mean num. of days with >= 0.2mm	17	14	16	14	15	14	15	16	14	16	16	16	183
Mean num. of days with >= 1.0mm	12	10	11	10	11	10	10	11	10	12	11	12	130
Mean num. of days with >= 5.0mm	4	3	3	3	3	3	3	4	4	4	4	5	43
WIND (knots)													
Mean monthly speed	13.6	12.9	12.4	9.8	9.1	8.6	8.8	9.0	9.6	11.1	11.6	12.3	10.7
Max. gust	80	78	71	59	63	51	58	55	59	65	66	82	82
Max. mean 10-minute speed	57	54	47	43	43	36	39	36	38	44	46	57	57
Mean num. of days with gales	4.5	3.2	2.1	0.6	0.4	0.1	0.1	0.2	0.3	1.2	1.9	3.5	18.1
WEATHER (mean no. of days with)													
Snow or sleet	4.1	3.9	2.5	1.1	0.1	0.0	0.0	0.0	0.0	0.0	0.5	2.3	14.6
Hail	1.0	1.5	2.7	2.4	1.5	0.2	0.2	0.1	0.2	0.2	0.7	0.6	11.3
Thunder	0.1	0.1	0.3	0.4	1.1	1.0	1.0	1.2	0.6	0.4	0.1	0.1	6.3
Fog	1.8	1.9	1.6	1.6	1.5	1.2	1.1	2.0	2.8	2.0	2.1	2.4	22.1

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9.3.2 Likely Significant Effects and Associated Mitigation Measures

9.3.2.1 'Do-Nothing' Scenario

If the Proposed Development were not to proceed, there would be no change to the current land-use practice of agriculture and the site would continue to be managed under the existing farming practices. If the Proposed Development were not to proceed, greenhouse gas emissions, e.g., carbon dioxide (CO_2), carbon monoxide and nitrogen oxides associated with construction vehicles and plant, and increased traffic volumes during the operational phase, would not arise. There would be no potential for minor emissions to occur as a result of the construction and operational phases of the Proposed Development.

9.3.2.2 Construction Phase

9.3.2.2.1 *Strategic Employment Zone (Site A)*

Greenhouse Gas Emissions During Construction Activities

The construction of foundations and buildings, site roads and associated infrastructure will require the operation of construction vehicles and plant on-site. Greenhouse gas emission, e.g., carbon dioxide (CO_2), carbon monoxide and nitrogen oxides associated with vehicles and plant will arise as a result of the construction activities. This potential impact will be slight, given the insignificant quantity of greenhouse gases that will be emitted, and will be restricted to the duration of the construction phase. Therefore, this is a Short-term Slight Negative impact. Mitigation measures to reduce this impact are presented below.

Transport of Materials to Site

The transport of construction materials to the site will also give rise to greenhouse gas emissions associated with transport vehicles. This constitutes a Short-term Slight Negative Impact in terms of air quality. Mitigation measures in relation to greenhouse gas emission are presented below.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Aggregate materials for the construction of Site A will be obtained from local quarries and batching facilities where needed. This will significantly reduce the distance that delivery vehicles will need to travel to access the site.

9.3.2.2.2 *Healthcare Application (Site B)*

Greenhouse Gas Emissions During Construction Activities

The construction of foundations and buildings, site roads and associated infrastructure will require the operation of construction vehicles and plant on-site. Greenhouse gas emission, e.g., carbon dioxide (CO_2), carbon monoxide and nitrogen oxides associated with vehicles and plant will arise as a result of the construction activities. This potential impact will be slight, given the insignificant quantity of greenhouse gases that will be emitted, and will be restricted to the duration of the construction phase.

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Therefore, this is a Short-term Slight Negative impact. Mitigation measures to reduce this impact are presented below.

Transport of Materials to Site

The transport of construction materials to the site, will also give rise to greenhouse gas emissions associated with transport vehicles. This constitutes a Short-term Slight Negative Impact in terms of air quality. Mitigation measures in relation to greenhouse gas emission are presented below.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Aggregate materials for the construction of Site B will be obtained from local quarries and batching facilities where needed. This will significantly reduce the distance that delivery vehicles will need to travel to access the site.

9.3.2.2.3 *Strategic Housing Development (Site C)*

Greenhouse Gas Emissions During Construction Activities

The construction of foundations and buildings, site roads and associated infrastructure will require the operation of construction vehicles and plant on-site. Greenhouse gas emission, e.g., carbon dioxide (CO_2), carbon monoxide and nitrogen oxides associated with vehicles and plant will arise as a result of the construction activities. This potential impact will be slight, given the insignificant quantity of greenhouse gases that will be emitted, and will be restricted to the duration of the construction phase. Therefore, this is a Short-term Slight Negative impact. Mitigation measures to reduce this impact are presented below.

Transport of Materials to Site

The transport of construction materials to the site, will also give rise to greenhouse gas emissions associated with transport vehicles. This constitutes a Short-term Slight Negative Impact in terms of air quality. Mitigation measures in relation to greenhouse gas emission are presented below.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Aggregate materials for the construction of Site C will be obtained from local quarries and batching facilities where needed. This will significantly reduce the distance that delivery vehicles will need to travel to access the site.

9.3.2.2.4 *Maynooth Outer Orbital Road (MOOR)*

Greenhouse Gas Emissions During Construction Activities

The construction of foundations and buildings, site roads and associated infrastructure will require the operation of construction vehicles and plant on-site. Greenhouse gas emission, e.g., carbon dioxide (CO_2), carbon monoxide and nitrogen oxides associated with vehicles and plant will arise as a result of the construction activities. This potential impact will be slight, given the insignificant quantity of greenhouse gases that will be emitted, and will be restricted to the duration of the construction phase.

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Therefore, this is a Short-term Slight Negative impact. Mitigation measures to reduce this impact are presented below.

Transport of Materials to Site

The transport of construction materials to the site, will also give rise to greenhouse gas emissions associated with transport vehicles. This constitutes a Short-term Slight Negative Impact in terms of air quality. Mitigation measures in relation to greenhouse gas emission are presented below.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Aggregate materials for the construction of the MOOR will be obtained from local quarries and batching facilities where needed. This will significantly reduce the distance that delivery vehicles will need to travel to access the site.

9.3.2.2.5 *Kildare Bridge*

Greenhouse Gas Emissions During Construction Activities

The construction of foundations and buildings, site roads and associated infrastructure will require the operation of construction vehicles and plant on-site. Greenhouse gas emission, e.g., carbon dioxide (CO_2), carbon monoxide and nitrogen oxides associated with vehicles and plant will arise as a result of the construction activities. This potential impact will be slight, given the insignificant quantity of greenhouse gases that will be emitted, and will be restricted to the duration of the construction phase. Therefore, this is a Short-term Slight Negative impact. Mitigation measures to reduce this impact are presented below.

Transport of Materials to Site

The transport of construction materials to the site, will also give rise to greenhouse gas emissions associated with transport vehicles. This constitutes a Short-term Slight Negative Impact in terms of air quality. Mitigation measures in relation to greenhouse gas emission are presented below.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Aggregate materials for the construction of Kildare Bridge will be obtained from local quarries and batching facilities where needed. This will significantly reduce the distance that delivery vehicles will need to travel to access the site.

9.3.2.2.6 *Moyglare Bridge*

Greenhouse Gas Emissions During Construction Activities

The construction of foundations and buildings, site roads and associated infrastructure will require the operation of construction vehicles and plant on-site. Greenhouse gas emission, e.g., carbon dioxide (CO_2), carbon monoxide and nitrogen oxides associated with vehicles and plant will arise as a result of the construction activities. This potential impact will be slight, given the insignificant quantity of greenhouse gases that will be emitted, and will be restricted to the duration of the construction phase.

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Therefore, this is a Short-term Slight Negative impact. Mitigation measures to reduce this impact are presented below.

Transport of Materials to Site

The transport of construction materials to the site, will also give rise to greenhouse gas emissions associated with transport vehicles. This constitutes a Short-term Slight Negative Impact in terms of air quality. Mitigation measures in relation to greenhouse gas emission are presented below.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Aggregate materials for the construction of Moyglare Bridge will be obtained from local quarries and batching facilities where needed. This will significantly reduce the distance that delivery vehicles will need to travel to access the site.

Residual Impact

Short-term Imperceptible Negative Impact on climate as a result of greenhouse gas emissions.

Significance of Effects

Based on the assessment above, there will be no significant direct or indirect effects.

9.3.2.3 Operational Phase

9.3.2.3.1 *Strategic Employment Zone (Site A)*

Greenhouse Gas Emissions

The operational phase of Site A has the potential to release greenhouse gas emissions, primarily through the burning of fossil fuels, such as oil, for heating purposes and the increased local traffic volumes once the Site A is operational. This has the potential to lead to a Long-term Moderate Negative Impact on Climate as a result of greenhouse gas emissions.

Mitigation

Site A is designed to comply with Building Regulations Part L 2017 nZEB (near zero energy building). Full details of the thermal performance and energy saving measures proposed for the development are given in the Building Services Planning Report, which forms Volume 3a: Appendix 9-1 of this EIAR. Solar PV panels will be located on the roof of each office building to offset any dependency and overuse of fossil fuel. Site A also includes for the upgrade and provision of additional cycling and pedestrian infrastructure and bicycle parking facilities will be provided at Site A. The improved pedestrian and cycling infrastructure will provide alternative modes of transport for those living and working locally to Site A, Maynooth town and surrounding areas, which will reduce the dependency on vehicular transport and associated greenhouse gas emissions.

Residual Impact

Long-term Slight Negative Impact on Climate as a result of greenhouse gas emissions.

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Significance of Effects

Based on the assessment above there will be no significant effects

9.3.2.3.2 *Healthcare Application (Site B)*

Greenhouse Gas Emissions

The operational phase of Site B has the potential to release greenhouse gas emissions, primarily through the burning of fossil fuels, such as oil, for heating purposes and the increased local traffic volumes once the Site B is operational. This has the potential to lead to a Long-term Moderate Negative Impact on Climate as a result of greenhouse gas emissions.

Mitigation

Site B is designed to comply with Building Regulations Part L 2017 nZEB (near zero energy building). Full details of the thermal performance and energy saving measures proposed for the development are given in the Building Services Planning Report, which forms Volume 3b: Appendix 9-1 of this EIAR. Solar PV panels will be located on the roof of each office building to offset any dependency and overuse of fossil fuel. Site B also includes for the upgrade and provision of additional cycling and pedestrian infrastructure and bicycle parking facilities will be provided at Site B. The improved pedestrian and cycling infrastructure will provide alternative modes of transport for those living and working locally to Site B, Maynooth town and surrounding areas, which will reduce the dependency on vehicular transport and associated greenhouse gas emissions.

Residual Impact

Long-term Slight Negative Impact on Climate as a result of greenhouse gas emissions.

Significance of Effects

Based on the assessment above there will be no significant effects

9.3.2.3.3 *Strategic Housing Development (Site C)*

Greenhouse Gas Emissions

The operational phase of Site C has the potential to release greenhouse gas emissions, primarily through the burning of fossil fuels, such as oil, for heating purposes and the increased local traffic volumes once the Site C is operational. This has the potential to lead to a Long-term Moderate Negative Impact on Climate as a result of greenhouse gas emissions.

Mitigation

Site C is designed to comply with Building Regulations Part L 2017 nZEB (near zero energy building). Full details of the thermal performance and energy saving measures proposed for the development are given in the Building Services Planning Report, which forms Volume 3c: Appendix 9-1 of this EIAR. Solar PV panels will be located on the roof of each office building to offset any dependency and overuse of fossil fuel. Site C also includes for the upgrade and provision of additional cycling and pedestrian infrastructure and bicycle parking facilities will be provided at Site C. The improved pedestrian and cycling infrastructure will provide alternative modes of transport for those living and working locally to Site C, Maynooth town and surrounding areas, which will reduce the dependency on vehicular transport and associated greenhouse gas emissions.

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Residual Impact

Long-term Slight Negative Impact on Climate as a result of greenhouse gas emissions.

Significance of Effects

Based on the assessment above there will be no significant effects

9.3.2.3.4 *Maynooth Outer Orbital Road (MOOR)*

Greenhouse Gas Emissions

The operational phase of the MOOR has the potential to release greenhouse gas emissions, primarily through the burning of fossil fuels, such as petrol and diesel for transport purposes and increased traffic volumes. This has the potential to lead to a Long-term Moderate Negative Impact on Climate as a result of greenhouse gas emissions.

Mitigation

The improved pedestrian and cycling infrastructure will provide alternative modes of transport for those living and working locally to Maynooth town and surrounding areas, which will reduce the dependency on vehicular transport and associated greenhouse gas emissions.

Residual Impact

Long-term Slight Negative Impact on Climate as a result of greenhouse gas emissions.

Significance of Effects

Based on the assessment above there will be no significant effects

9.3.2.3.5 *Kildare Bridge*

Greenhouse Gas Emissions

The operational phase of the Kildare Bridge will provide a cycle and pedestrian bridge and therefore no emissions are expected to occur from the operational phase of the Kildare Bridge.

Mitigation

The improved pedestrian and cycling infrastructure will provide alternative modes of transport for those living and working locally to Maynooth town and surrounding areas, which will reduce the dependency on vehicular transport and associated greenhouse gas emissions.

Residual Impact

Long-term Slight positive Impact on Climate due to providing additional pedestrian and cycle access to Maynooth Town.

Significance of Effects

Based on the assessment above there will be no significant effects

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9.3.2.3.6 *Moyglare Bridge*

Greenhouse Gas Emissions

The operational phase of the Moyglare Bridge has the potential to release greenhouse gas emissions, primarily through the burning of fossil fuels, such as petrol and diesel for transport purposes and increased traffic volumes. This has the potential to lead to a Long-term Moderate Negative Impact on Climate as a result of greenhouse gas emissions.

Mitigation

The improved pedestrian and cycling infrastructure will provide alternative modes of transport for those living and working locally to Maynooth town and surrounding areas, which will reduce the dependency on vehicular transport and associated greenhouse gas emissions.

Residual Impact

Long-term Slight Negative Impact on Climate as a result of greenhouse gas emissions.

Significance of Effects

Based on the assessment above there will be no significant effects

9.3.2.4 Cumulative Effects Resulting from Interactions Between Various Elements of the Proposed Development

The interaction of the various elements of the Proposed Development were considered and assessed in this EIAR with regards to climate. The potential for each individual element of the Proposed Development on its own to result in significant effects on climate was considered in the impact assessment. The entire project including the interactions between all its elements was also considered and assessed for its potential to result in significant effects on climate in the impact assessment presented.

All interactions between the various elements of the project were considered and assessed both individually and cumulatively within this chapter. Where necessary, mitigation was employed to ensure that no cumulative effects will arise as a result of the interaction of the various elements of the Proposed Development with one another.

9.3.2.5 Potential Cumulative In-Combination Effects

The potential cumulative effects of the Proposed Development in combination with the other projects described in Chapter 2 of this report have been considered in terms of impacts on population & human health.

There are a number of proposed or permitted housing developments within the vicinity of the Proposed Development. A description of the developments is provided in Chapter 2, and where appropriate the application documentation, EIAR and NIS for each development have been reviewed

Further information on the above is provided in Table 2-5 in Section 4.2.1 of Chapter 2.

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9.3.2.5.1 *Cumulative In-Combination Climate Impacts*

Potential cumulative air quality impacts may arise during the construction phase due to possible overlap of the construction phases of the Proposed Development and other offsite developments and land uses. Agricultural activities in the area, light commercial activity, other local construction activities and the construction of the Proposed Development will require the consumption of fossil fuels and therefore will lead to a minor emissions of greenhouse gasses cumulatively. However, given the relatively small-scale machinery used, short-term duration of the construction phases, together with the implementation of the mitigation measures discussed above, there is unlikely to be significant cumulative impacts arising from the construction phases of the Proposed Development and other local developments, projects and plans.

The Proposed Development once operational will not lead to significant levels of greenhouse gas emissions, with emissions from the use of the buildings and increased traffic volumes mitigated to a Long-term Slight Negative Impact. Other future developments, including potential future applications within the Moygaddy Masterplan area and nearby permitted residential developments, in the area once constructed will also contribute to increased traffic levels and associated exhaust emissions. However, these developments will also employ their own mitigation measures and therefore the cumulative impact on climate from the release of greenhouse gasses during the operation of the Proposed Development when considered with other developments will be Long-term Slight Negative Impact.

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10. NOISE AND VIBRATION

10.1 Introduction

10.1.1 Overview

This chapter describes potential noise and vibration impacts associated with the Proposed Development, as described in Chapter 4. Potential noise and vibration impacts may be divided into the following categories:

- Construction phase noise impacts on surrounding receptors.
- Construction phase vibration impacts on surrounding receptors.
- Operational phase noise impacts on surrounding receptors.
- Operational phase vibration impacts on surrounding receptors.
- Noise impacts within the completed/operational development from external sources ('inward impacts').

Following a preliminary scoping exercise, it was concluded that the Proposed Development will not give rise to any vibration impacts following construction, therefore Operational Phase Vibration Impacts have been scoped out. The remaining four categories are assessed in this chapter.

The 'Proposed Development' considered for the purposes of this EIAR consists of the following, divided across several planning applications:

- A Strategic Employment Zone (hereafter referred to as Site A) which consists of three office block buildings, public road widening, and road realignment works along the existing R157 Regional Road and L2214-3 Local Road, the delivery of approximately 365m of new public access road under the Maynooth Outer Orbital Road (MOOR) scheme, internal access road and associated car parking;
- Healthcare Facilities (hereafter referred to as Site B) which includes a nursing home and primary care centre as well public road widening and road realignment works along the existing R157 Regional Road, internal access road and associated car parking, and all associated infrastructure;
- The Strategic Housing Development (hereafter referred to as Site C) will consist of 360 no. residential homes, a creche facility, scout den, public park, internal access roads, approximately 500m of distributor road, approximately 670m of pedestrian and cycle improvements, two pedestrian and cycle bridges over the Blackhall Little and, shared communal and private open space and all associated site development works.
- The Maynooth Outer Orbital Road (hereafter referred to as the MOOR) which consists of approximately 1.7km of distributor road, a single span bridge over the River Rive Water and a single span bridge over the Blackhall Little Stream, pedestrian and cycle improvement measures, a pedestrian and cycle bridge adjacent to the Kildare bridge, upgrade works to an existing road and all associated utilities.
- The Kildare Bridge works (hereafter referred to as Kildare Bridge) planning application includes road upgrade works to the existing R157 Regional Road, a proposed pedestrian / cycle bridge adjacent to the existing Kildare Bridge, as well as a proposed wastewater connection to the Maynooth Municipal Wastewater Pumping Station to the southeast of the Proposed Development in County Kildare.
- The Moyglare Bridge (hereafter referred to as Moyglare Bridge) planning application includes for the provision of an integral single span bridge over the River Rye Water with associated flood plain works and embankments, as well as services and utilities connections.

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For the purposes of this EIAR, where the 'Proposed Development' is referred to, this relates to all the project components described in detail in Chapter 4 of this EIAR (and listed above).

A comprehensive masterplan for the entire Moygaddy area has being developed, setting out proposals for buildings, spaces and a movement and land-use strategy. The '**Moygaddy Masterplan'** comprises four main parcels of land, currently intended to be developed as follows:

- **Site A: Strategic Employment Zone**, as per Meath County Development Plan (CDP, 2021-2027) and Maynooth Environs Local Area Plan (LAP, see Section 3 of Scoping Document for further details). Proposed to be developed as an Office / Technology Business Park. The initial planning application in this area will be for 3 No. standalone office buildings, to be submitted to Meath County Council.
- **Site B: Healthcare Facilities**, as per Meath CDP (2021-2027) and Maynooth Environs LAP. It is envisaged that the initial planning application within this area will comprise a Nursing Home and Primary Care Centre, to be submitted to Meath County Council. A separate, future planning application is also envisaged for a new public hospital on an adjoining site to the north in collaboration with the HSE and Slaintecare.
- **Site C: Strategic Housing Development**, as per Meath CDP (2021-2027) and Maynooth Environs LAP. It is intended that a Strategic Housing Development planning application will be submitted to An Bord Pleanála for the first phase of residential development within this area. A creche/childcare facility, scout den, public park and playground will also be included as part of the SHD application.
- **Site D: Tourism / Community /Amenity Use,** as per as per Meath CDP (2021-2027) and Maynooth Environs LAP. It is intended that a hotel, sport and leisure facilities, retail and a cultural heritage centre will be delivered on this site, to be submitted to Meath County Council in the future.
- **(MOOR) Maynooth Outer Orbital Road,** as per Meath CDP (2021-2027) and Maynooth Environs LAP. The MOOR consists of approximately 1.7km of a new distributor road linking the existing R157 Regional Road in the east to the Moyglare Hall road in Mariavilla to the southwest of the Masterplan area. This planning application will be submitted to Meath County Council.

Sites A, B and C and the MOOR are addressed in this EIAR. Site D will be developed at a later date in the future. The EIAR study area for the Proposed Development, in context of the overall Moygaddy Masterplan area is shown in Figure 10-1.

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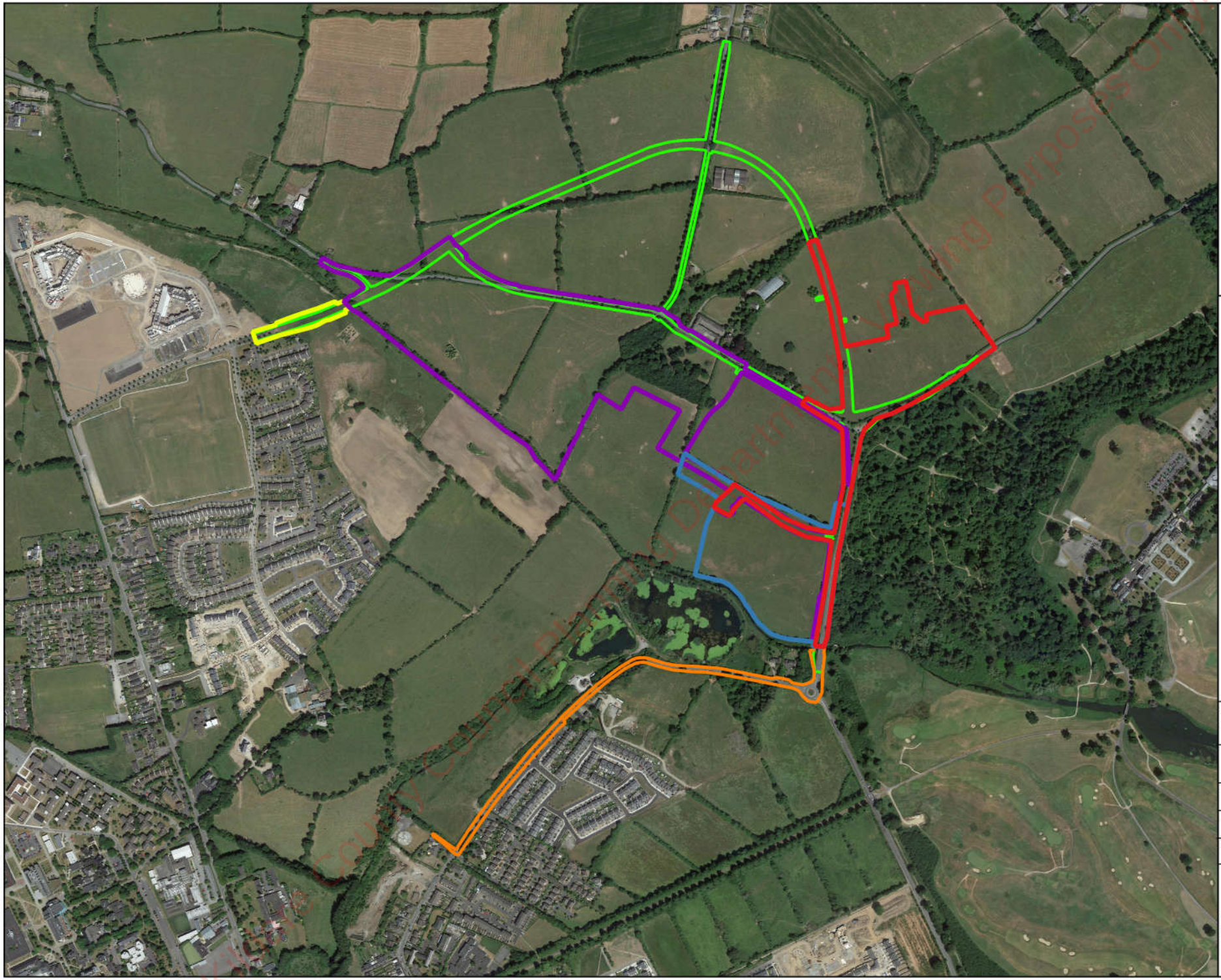

Map Legend

- Site A - Strategic Employment Zone Site Boundary
- Site B Healthcare Facilities Site Boundary
- SHD Site Boundary
- MOOR Site Boundary
- Kildare Bridge Application Site Boundary
- Moyglare Bridge Application Site Boundary

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Drawing Title
Proposed Development Site Boundaries

Project Title	
Moygaddy Mixed-Use Development, Co. Meath	
Drawn By: DOS	Checked By: MW
Project No.: 210414	Drawing No.: Figure 10-1
Scale: 1:10,000	Date: 17.08.2022

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

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10.1.2 Methodology

Typical ambient noise levels across the local area were measured, and these were used to identify appropriate construction phase noise criteria. Likely construction plant were identified, and their noise emissions data used to predict likely noise levels at surrounding receptors. Predicted levels were assessed in the context of identified criteria, and mitigation measures identified where required. Potential sources of vibration during the construction phase were identified, and impacts assessed by reference to commonly applied criteria.

Noise sources associated with the operational phase of the Proposed Development were reviewed, and potential impacts assessed. Such impacts relate chiefly to traffic. An assessment of inward noise impacts was undertaken, and the requirement for enhanced façade treatments was assessed. Although this is typically only relevant to residential developments, it is also of benefit to the healthcare and office settings, particularly given that the proposed nursing home will accommodate elderly persons

The assessment was undertaken having regard to guidance set out in *Guidelines On The Information To Be Contained In Environmental Impact Assessment Reports (Environmental Protection Agency, 2022)*.

10.1.3 Documents consulted

The following documents were consulted during the preparation of this chapter:

- Report RI 8507: Structural Response And Damage Produced By Ground Vibration From Surface Mines Blasting (US Bureau Of Mines, 1980).
- British Standard BS 7385-2:1993 Evaluation And Measurement For Vibration In Buildings – Part 2: Guide To Damage Levels From Groundborne Vibration (1993).
- Guidelines On Community Noise (World Health Organisation, 1999).
- Directive 2002/49/EC Of The European Parliament And Of The Council Relating To The Assessment And Management Of Environmental Noise (2002), Transposed Into Irish Law By The European Communities (Environmental Noise) Regulations 2018 (SI No. 549/2018).
- NANR116: Open/Closed Window Research – Sound Insulation Through Ventilated Domestic Windows (prepared by the Napier University Building Performance Centre for DEFRA, 2007).
- Guidance Note For Noise Action Planning (Environmental Protection Agency, 2009).
- Night Noise Guidelines For Europe (World Health Organisation, 2009).
- Design Manual For Roads And Bridges (UK Highways Agency, 2011).
- Measurement And Assessment Of Groundborne Noise And Vibration (Association Of Noise Consultants (2012).
- Specialist Services Health Technical Memorandum 08-01: Acoustics (UK Department of Health, 2013).
- British Standard BS 4142:2014 Methods For Rating And Assessing Industrial And Commercial Sound (2014).
- British Standard BS 5228-1:2009+A1:2014 Code Of Practice For Noise And Vibration Control On Construction And Open Sites – Part 1: Noise (2014).
- British Standard BS 5228-2:2009+A1:2014 Code Of Practice For Noise And Vibration Control On Construction And Open Sites – Part 2: Vibration (2014).
- British Standard BS 8233:2014 Guidance On Sound Insulation And Noise Reduction For Buildings (2014).
- Good Practice Guidance For The Treatment Of Noise During The Planning Of National Road Schemes (National Roads Authority (Now Transport Infrastructure Ireland), 2014).
- Technical Guidance Document TGD-021-5: Acoustic Performance In New Primary & Post Primary School Buildings (Department of Education & Skills, 2015).

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- NG4 Guidance Note For Noise: Licence Applications, Surveys And Assessments In Relation To Scheduled Activities (Environmental Protection Agency, 2016).
- ProPg Planning & Noise: Professional Practice Guidance On Planning & Noise – New Residential Development (Association Of Noise Consultants, Institute Of Acoustics & Chartered Institute Of Environmental Health, 2017).
- Environmental Noise Guidelines For The European Region (World Health Organisation, 2018).
- County Meath Noise Action Plan (Meath County Council, 2019).
- Third Noise Action Plan 2019-2023 (Kildare County Council, 2019).
- Guidelines On The Information To Be Contained In Environmental Impact Assessment Reports (Environmental Protection Agency, 2022).
- Meath County Development Plan
- Kildare County Development Plan

A baseline noise survey was undertaken in accordance with International Standard ISO 1996-2:2017 *Acoustics – Description, Measurement and Assessment of Environmental Noise, Part 2: Determination of Environmental Noise Levels (2017)*. Predictive modelling was carried out using International Standard ISO 9613-2:1996 *Acoustics: Attenuation of Sound During Propagation Outdoors – Part 2 General Method of Calculation (1996)*.

10.1.4 Competence of assessor

The noise and vibration assessment was undertaken by Damian Brosnan of Damian Brosnan Acoustics who has over 20 years' experience in scoping and carrying out such impact assessments. His qualifications are as follows:

- BSc (Honours) 1993 (University College Cork).
- Diploma in Acoustics & Noise Control 2009 (Institute of Acoustics).
- MSc (Distinction) in Applied Acoustics 2015 (University of Derby).
- Member of Institute of Acoustics (MIOA) & secretary of Irish branch.
- Founding member of Association of Acoustic Consultants of Ireland (AACI).
- Member of Engineers Ireland (MIEI).
- Lead author of Environmental Noise Guidance For Local Authority Planning & Enforcement Departments (AACI, 2019).
- 1996-2001: Noise Officer with Cork County Council.
- 2001-2014: Partner with Dixon Brosnan Environmental Consultants, specialising in EIA.
- 2015–: Principal at Damian Brosnan Acoustics.

10.1.5 Difficulties in compiling information

No difficulties were encountered in preparing this chapter.

10.2 Guidance and criteria

10.2.1 Construction phase noise

There are no national mandatory noise limits relating to the construction phases of projects. In granting planning permission, a local authority may stipulate construction phase noise limits applicable to daytime, evening, night-time and weekend hours as appropriate. There are no national guidelines available regarding the selection of such limits. Many local authorities chose to apply a 65 dB $L_{Aeq\ T}$ limit.

The chief noise guidance document applied in Ireland and the UK in construction phase noise assessments is British Standard BS 5228:2009+A1:2014 *Code Of Practice For Noise And Vibration*

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Control On Construction And Open Sites Part 1: Noise (2014)[1]. Annex E of the document sets out several methods to draw up suitable noise criteria applicable to the construction phase of a project. The most appropriate method here is the 'ABC method', which provides for the selection of criteria based on existing ambient noise data. On the basis of noise data recorded locally, as discussed below, a daytime $L_{Aeq\ 1\ h}$ criterion of 65 dB is identified. This criterion is identical to that typically applied by local authorities and is thus applied in this assessment. The $L_{Aeq\ 1\ h}$ parameter describes the total noise emissions from all construction sources occurring during any 1 h period, averaged over that hour.

BS 5228:2009+A1:2014 states that the 65 dB criterion is applicable to the periods Monday-Friday 0700-1900 h and Saturday 0700-1300 h. Construction operations will not be undertaken during evening or night-time hours, or on Sundays or Bank holidays. This assessment therefore applies the 65 dB criterion in respect of all construction works.

The 65 dB criterion is considered applicable to surrounding receptors, in their immediate curtilage. In this regard, the Environmental Protection Agency (EPA) document *NG4 Guidance Note For Noise: Licence Applications, Surveys And Assessments In Relation To Scheduled Activities (2016)*[2] defines a noise sensitive locations as:

> *'Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires absence of noise at nuisance levels.'*

As construction projects tend to be relatively short, and as construction works areas are usually localised and mobile, the 65 dB limit is usually not subject to any additional criteria such as tone and impulse restrictions.

With respect to construction of the proposed Maynooth Outer Orbital Road (MOOR), reference may be made to *The Good Practice Guidance for The Treatment Of Noise During The Planning Of National Road Schemes (National Roads Authority, now Transport Infrastructure Ireland, 2014)*[3]. This document recommends an $L_{Aeq\ 1\ h}$ limit of 70 dB at receptors, and a L_{ASmax} limit of 80 dB with respect to short term events.

10.2.2 Construction Phase Vibration

As with noise, there are no national limits relating to ground borne vibration, and reference is usually made to guidance set out in British Standard BS 5228-2:2009+A1:2014 *Code Of Practice For Noise And Vibration Control On Construction And Open Sites – Part 2: Vibration (2014)*.[4] Table 10-1 presents guidance included in the document with respect to human perception of peak particle velocity (PPV), the most commonly applied descriptor of ground borne vibration.

[1] *Code Of Practice For Noise And Vibration Control On Construction And Open Sites Part 1: Noise (2014)*[1].
[2] *NG4 Guidance Note For Noise: Licence Applications, Surveys And Assessments In Relation To Scheduled Activities (2016)*
[3] *The Good Practice Guidance for The Treatment Of Noise During The Planning Of National Road Schemes (National Roads Authority, now Transport Infrastructure Ireland, 2014)*
[4] *Code Of Practice For Noise And Vibration Control On Construction And Open Sites – Part 2: Vibration (2014)*

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Table 10-1 Human perception of vibration, from BS 5228-2:2009+A1:2014

PPV	Effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3 mm/s	Vibration might be just perceptible in residential environments.
1.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10.0 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

During construction projects, reference is usually made to criteria relevant to buildings, in order to avoid potential cosmetic or structural damage. The National Roads Authority document identified above has seen increasing application to non-road projects due to the absence of any other Irish guidance. National Transport Authority criteria, listed in Table 10-2, are informed by documents such as British Standard BS 7385-2:1993 *Evaluation and Measurement for Vibration in Buildings – Part 2: Guide to Damage Levels from Ground borne Vibration (1993)*.[5] The criteria apply to the closest part of any relevant building or structure.

Table 10-2 Building vibration criteria, from the National Roads Authority (2014)

Frequency	<10 Hz	10-50 Hz	>50 Hz
PPV	8 mm/s	12.5 mm/s	20 mm/s

Limits set out above are considerably lower than criteria presented in Table 10-3. The criteria presented are those below which cosmetic damage (hairline cracking, etc.) to buildings is unlikely to occur. Limits relating to structural damage are significantly higher.

Table 10-3 Recommended vibration limits

Structure	Lower frequencies	Higher frequencies	Source
Modern dwellings	<40 Hz: 19 mm/s	>40 Hz: 51 mm/s	1
Older dwellings	<40 Hz: 12.7 mm/s	>40 Hz: 51 mm/s	1
Industrial & heavy commercial	4-15 Hz: 50 mm/s	>15 Hz: 50 mm/s	2&3
Residential & light commercial	4-15 Hz: 15-20 mm/s	>15 Hz: 20-50 mm/s	2&3

[5] *Evaluation and Measurement for Vibration in Buildings – Part 2: Guide to Damage Levels from Ground borne Vibration (1993)*

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10.2.3 Operational Phase Noise

10.2.3.1 General

There are no national mandatory noise limits applicable to operational developments. Two elements of the commissioned development may give rise to noise emissions (outside of those associated with external residential activities such as children playing and grass cutting): specifically the proposed non-residential elements (termed 'commercial' for the purposes of this assessment), and traffic. These are typically assessed differently.

10.2.3.2 Traffic Emissions

Local offsite receptors are currently subject to existing traffic noise levels on the surrounding road network. The Proposed Development will increase traffic volumes locally, with a consequent increase in traffic noise levels. *The Design Manual for Roads and Bridges (UK Highway Agency, 2011)* notes that the resulting noise impact is linked to the magnitude of the noise increase. Table 10-4 sets out the DMRB guidance. Included in the table are impact categories listed by the EPA in their 2022 document *Guidelines on The Information to be Contained in Environmental Impact Assessment Reports.*

Table 10-4 DMRB assessment guidance

Noise level increase	Subjective reaction	DMRB impact	EPA impact
0 dB	None	No change	Neutral
0-3 dB	Imperceptible	Negligible	Imperceptible to not significant
3-5 dB	Perceptible	Minor	Not significant to slight
5-10 dB	Up to a doubling of loudness	Moderate	Slight to moderate
>10 dB	Doubling of loudness or greater	Major	Significant to profound

10.2.3.3 Commercial Emissions

Most environmental noise guidance documents issued across Europe ultimately derive limits from guidance issued by the World Health Organisation (WHO). The WHO document *Guidelines on Community Noise (1999)* sets out guideline values considered necessary to protect communities from environmental noise. With respect to residential settings, the document notes that an outdoor $L_{Aeq\ 16\ h}$ level of 55 dB is an indicator of serious annoyance during daytime and evening hours, with 50 dB being an indicator of moderate annoyance. The 55 dB criterion was first suggested by the WHO in their 1980 document Environmental Health Criteria 12.

Since 1980, the 55 dB criterion has become the *de facto* daytime limit applied by most Irish regulatory authorities to commercial and industrial operators. Although the WHO criterion applies to daytime periods of 16 hours, authorities typically specify shorter periods, and thus limits as $L_{Aeq\ 15\ min}$, $L_{Aeq\ 30\ min}$ and $L_{Aeq\ 1\ h}$ are variously applied. In issuing licences to industrial facilities, the EPA typically specifies a daytime $L_{Aeq\ T}$ limit of 55 dB at receptors. The EPA currently considers daytime to refer to 0700-1900 h. A similar daytime limit is usually included in noise conditions attached to planning permission issued by local authorities.

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The WHO's 1999 guidance document recommends an external night-time criterion of 45 dB to prevent sleep disturbance. Although the WHO document Night Noise Guidelines For Europe (2009) makes reference to a 40 dB night-time criterion, this relates to the $L_{night,outside}$ parameter, which is the long term average measured throughout a whole year. The 45 dB criterion is considered more appropriate to short term measurement intervals. As before, $L_{Aeq\ 15\ min}$, $L_{Aeq\ 30\ min}$ and $L_{Aeq\ 1\ h}$ intervals are variously applied by regulatory authorities, rather than the 8-hour period to which the WHO's 45 dB criterion applies. The EPA considers that night-time refers to 2300-0700 h.

Neither of the WHO documents identified above makes reference to evening periods, and indeed their 1999 document assumes that daytime extends to 2300 h. However, a trend towards the separate assessment of evening impacts is currently evident, partly driven by EPA document *NG4 Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (2016)*. The original 2012 version of the document introduced the evening period 1900-2300 h. The NG4 document recommends an evening criterion of 50 dB, applicable externally at receptors.

Many authorities require that a penalty be added to measured noise levels where emissions are tonal and/or impulsive. NG4 specifies the addition of a 5 dB penalty to site specific $L_{Aeq\ T}$ levels measured during daytime or evening hours. During night-time hours, the EPA prohibits tones and impulses entirely, stating that such characteristics should not be 'clearly audible or measurable'. With respect to short term impulsive sources, the WHO recommends a night-time L_{Amax} limit of 60 dB outside bedroom windows during night-time hours. No L_{Amax} limit is recommended for daytime periods.

The above criteria, summarised in Table 10-5, are considered relevant to commercial sources at the Proposed Development. A measurement interval of 15 minutes is considered appropriate. Rather than allowing daytime and evening levels to be rated for tonal or impulsive features, the table assumes that such features are avoided at all times. Criteria apply externally at receptors.

Table 10-5 Noise criteria appropriate to commercial emissions

Period	Parameter	Limit
0700-1900 h	$L_{Aeq\ 15\ min}$	55 dB
1900-2300 h	$L_{Aeq\ 15\ min}$	50 dB
2300-0700 h	$L_{Aeq\ 15\ min}$	45 dB
2300-0700 h	L_{AFmax}	60 dB

The WHO document *Environmental Noise Guidelines for The European Region (2018)* updates their guidance with respect to certain sources. Of relevance here are updated guidelines in relation to traffic. In this regard, the document states:

> *'For average noise exposure, the GDG (Guideline Development Group) strongly recommends reducing noise levels produced by road traffic below 53 decibels (dB) L_{den}, as road traffic noise above this level is associated with adverse health effects.*
>
> *For night noise exposure, the GDG strongly recommends reducing noise levels produced by road traffic during night-time below 45 dB L_{night}, as night-time road traffic noise above this level is associated with adverse effects on sleep.'*

It is noted that the 53 L_{den} and 45 dB L_{night} criteria recommended in the 2018 document are lower than criteria set out in other documents. In this regard, the 2018 guidelines are considered aspirational, and are likely to form the basis of national and local policy over the next two decades.

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In addition to the absolute criteria above, the impact of noise emissions from commercial sources may be assessed by reference to relative criteria. The most commonly applied standard here is British Standard BS 4142:2014 *Methods for Rating and Assessing Industrial and Commercial Sound (2014)*[6] which provides for the comparison of specific $L_{Aeq\ T}$ levels (i.e., noise levels attributable to the source in question) with background levels and provides an indication of impact depending on the difference. Specific levels may be rated to take tonal, impulsive and other characteristics into account. The standard notes that the background noise environment may include existing industrial emissions unrelated to the specific source.

BS 4142:2014 states that a difference between specific and background levels of 10 dB or more is indicative of a significant adverse impact. A difference of 5 dB suggests an adverse impact, with lower differences suggesting reduced impacts. The standard adds that the perception of impact will be increased or reduced depending on local context.

10.2.4 Inward Noise Impacts

10.2.5 Inward noise

The assessment of inward noise impacts on proposed residential developments is a relatively new feature in the Irish planning system, and no national guidance has been issued to date. In the absence of Irish guidance, assessments are typically undertaken in accordance with UK guidance. Most UK assessments are now carried out using *ProPg Planning & Noise: Professional Practice Guidance On Planning & Noise – New Residential Development* (2017[7]), jointly issued by the Association of Noise Consultants, the Institute of Acoustics and the Chartered Institute of Environmental Health. ProPG provides for good acoustic design through a five step process:

- Stage 1: Initial noise risk assessment of the proposed development site.
- Stage 2 element 1: Demonstrating a good acoustic design process.
- Stage 2 element 2: Observing internal noise level guidelines.
- Stage 2 element 3: Undertaking an external amenity area noise assessment.
- Stage 2 element 4: Consideration of other relevant issues.

Internal noise guidelines recommended by ProPG, drawn from *British Standard BS 8233:2014 Guidance On Sound Insulation And Noise Reduction For Buildings* (2014), are presented in Table 10-6.

Table 10-6 Recommended internal criteria from BS 8233:2014 and ProPG

Activity	Location	0700-2300 h	2300-0700 h
Resting	Living room	$L_{Aeq\ 16\ h}$ 35 dB	-
Dining	Dining area	$L_{Aeq\ 16\ h}$ 40 dB	-
Sleeping or daytime resting	Bedroom	$L_{Aeq\ 16\ h}$ 35 dB	$L_{Aeq\ 8\ h}$ 30 dB

BS 8233:2014 adds that:

> *'Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the*

[6] *Methods for Rating and Assessing Industrial and Commercial Sound (2014)*
[7] *ProPg Planning & Noise: Professional Practice Guidance On Planning & Noise – New Residential Development (2017)*

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character and number of events per night. Sporadic noise events could require separate values.'

ProPG adds further advice here:

'In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used to that individual noise events to not normally exceed 45 dB L_{AmaxF} more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events.'

With respect to external amenity areas such as gardens in the curtilage of dwellings, BS 8233:2014 states:

'For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq\ T}$, with an upper guideline value of 55 dB $L_{Aeq\ T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such a city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces, but should not be prohibited.'

With respect to the proposed creche, there are no specific creche criteria in force. Reference may be made to Technical Guidance Document TGD-021-5: Acoustic Performance In New Primary & Post Primary School Buildings (Department of Education & Skills, 2015). The document recommends an indoor ambient $L_{Aeq\ 30\ min}$ level of 35 dB. This criterion is applied in this assessment. The document adds that where the external $L_{Aeq\ 30\ min}$ level does not exceed 51-55 dB (range dependent on ventilation type) at the façade, opening windows and vents may be suitable.

BS 8233:2014 includes recommendations regarding noise levels in office buildings. An internal $L_{Aeq\ T}$ level of 45-50 dB is recommended with respect to open plan offices.

Specialist Services Health Technical Memorandum 08-01: Acoustics[8] (UK Department of Health, 2013) recommends several noise criteria for healthcare room types. The strictest daytime criterion is 40 dB $L_{Aeq\ 1\ h}$. The lowest night-time criterion is 35 dB $L_{Aeq\ 1\ h}$, with an L_{AFmax} recommendation of 45 dB.

Achieving compliance with the above recommendations in internal spaces at the Proposed Development will require consideration at detailed design stage, particularly in relation to internal transmission between rooms. The chief consideration with respect to the planning application stage is to identify if external noise levels due to road traffic are elevated, thus indicating that enhanced building fabric treatments including glazing will be required.

10.2.6 Meath Noise Action Plan

The *County Meath Noise Action Plan* (Meath County Council, 2019) describes a strategic plan based on noise mapping undertaken in 2017 ('round 3' mapping). Preparation of the plan is a requirement of *Directive 2002/49/EC Of The European Parliament And Of The Council Relating To The Assessment And Management Of Environmental Noise* (2002)[9], transposed into Irish law by the *European*

[8] *Specialist Services Health Technical Memorandum 08-01: Acoustics*
[9] *Directive 2002/49/EC Of The European Parliament And Of The Council Relating To The Assessment And Management Of Environmental Noise (2002)*

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Communities (Environmental Noise) Regulations 2018 [10](SI No. 549/2018). The Directive requires preparation of noise plans for all roads with annual traffic volumes over 3 million vehicles. The nearest roads subject to mapping are the M4 motorway (2.5 km south of the proposed development site), and regional route R148 (850 m south of the site, in Kildare County Council's functional area). Larger rail lines are also subject to mapping, including the Dublin-Galway line 1 km south of the site. The R157 is not subject to mapping, although segments of the road have been mapped (see Figures 10-3 and 10-4 below).

The Noise Action Plan does not specify noise criteria to which future developments will be subject. The plan instead refers to criteria set out in *Guidance Note For Noise Action Planning* (EPA, 2009)[11], which recommends the following threshold values for the assessment of noise mitigation measures for road traffic noise (i.e. reduction of noise levels):

- 70 dB L_{den}.
- 57 dB L_{night}.

With respect to the assessment of noise preservation measures (i.e. protection of the future noise climate), the guidance document recommends the following thresholds:

- 55 dB L_{den}.
- 45 dB L_{night}.

10.2.7 Kildare Noise Action Plan

Like the Meath Noise Action Plan, the *Third Noise Action Plan 2019-2023* (Kildare County Council, 2019) refers to 'arbitrary threshold values' taken from *Guidance Note For Noise Action Planning* (EPA, 2009) as follows:

- 70 dB L_{den}.
- 57 dB L_{night}.

The plan also states:

> *'In the scenario where new residential properties or other noise sensitive premises are introduced into an existing climate of environmental noise, there is currently no clear national planning guidance on noise from the Department of Housing, Planning and Local Government. Kildare Local Authority may develop and publish its own set of guidance on noise assessment and control which would be applicable throughout the county. In the interim, Kildare Local Authority shall require quantifiable noise assessments to be carried where any part of the residential developments is located with 150m of a rail corridor or adjacent to the 'Major Roads' within the county. The quantifiable assessment of environmental noise shall include, inter alia, the situation internally with open windows and externally in the amenity areas of development.'*
>
> *Whilst the control of external levels of environmental noise constitutes one aspect of noise management within planning and aims to provide benefit to amenity spaces, the control of noise levels within residential properties and other noise sensitive premises also plays an important role. In the scenario where new noise sensitive premises are introduced to locations already exposed to significant levels of long-term environmental noise as set out in the Environmental Noise Regulations, i.e. 70 dB (A) Lden and 57 dB (A) Lnight, it is considered appropriate to consider aiming to achieve target internal noise levels within noise sensitive rooms, such as living rooms and bedrooms.'*

[10] *European Communities (Environmental Noise) Regulations 2018*
[11] *Guidance Note For Noise Action Planning (EPA, 2009)*

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Given that the Proposed Development does not include any proposed residential elements in the functional area of Kildare County Council, the Kildare Noise Action Plan is not directly relevant to the Proposed Development.

10.2.8 Summary of Criteria

Noise and vibration criteria relevant to the construction phase are summarised in Table 10-7.

Table 10-7 Summary of construction phase noise and vibration criteria

Type	Parameter	Criterion	Period	Comment
Noise	$L_{Aeq\ 1\ h}$	General: 65 dB MOOR: 70 dB	M-Sa working hours	Externally at offsite receptors
Vibration	PPV	<10 Hz: 8 mm/s 10-50 Hz: 12.5 mm/s >50 Hz: 20 mm/s	Working hours	Offsite buildings & structures

Noise criteria relevant to the operational development are listed in Table 10-8. Vibration criteria are not relevant as the Proposed Development once operational will not result in any increased vibration impacts.

Table 10-8 Summary of operational phase noise criteria

Type	Parameter	Criterion	Period	Comment
Traffic	$L_{Aeq\ T}$	Minimal increase over existing	All periods	Externally at offsite receptors
Inward	$L_{Aeq\ 16\ h}$	35 dB	0700-2300 h	Internally in proposed living rooms
Inward	$L_{Aeq\ 16\ h}$	40 dB	0700-2300 h	Internally in proposed dining areas
Inward	$L_{Aeq\ 16\ h}$	35 dB	0700-2300 h	Internally in proposed bedrooms
Inward	$L_{Aeq\ 8\ h}$	30 dB	2300-0700 h	Internally in proposed bedrooms
Inward	L_{AFmax}	45 dB	2300-0700 h	Preferably <10 such events in proposed bedrooms at night
Inward	$L_{Aeq\ 16\ h}$	50-55 dB	0700-2300 h	External amenity areas
Inward	$L_{Aeq\ 30\ min}$	35 dB	Daytime	Internal creche rooms
Inward		51-55 dB	Daytime	External creche facade
Inward	L_{den}	70 dB	24 h	Noise action plan mitigation external criterion for road noise
Inward	L_{night}	57 dB	2300-0700 h	Noise action plan mitigation external criterion for road noise

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Inward	$L_{Aeq\ 1\ h}$	45 dB	0700-1900 h	Internally in proposed offices
Inward	$L_{Aeq\ 1\ h}$	40 dB	0700-2300 h	Internally in proposed healthcare rooms
Inward	$L_{Aeq\ 1\ h}$	35 dB	2300-0700 h	Internally in proposed healthcare rooms
Inward	L_{AFmax}	45 dB	2300-0700 h	Internally in proposed healthcare rooms
Traffic	$L_{Aeq\ T}$	Minimal increase over existing	All periods	Externally at offsite receptors
Commercial	$L_{Aeq\ 15\ min}$	55 dB	0700-1900 h	Externally at offsite receptors
Commercial	$L_{Aeq\ 15\ min}$	50 dB	1900-2300 h	Externally at offsite receptors
Commercial	$L_{Aeq\ 15\ min}$	45 dB	2300-0700 h	Externally at offsite receptors
Commercial	L_{AFmax}	60 dB	2300-0700 h	Externally at offsite receptors
Commercial	$L_{Aeq\ T}$	Minimal increase over existing	All periods	Externally at offsite receptors

10.3 Baseline

10.3.1 Location and land use

The Proposed Development site consists of 12 fields on the northeast fringes of Maynooth. The site is divided into two northern and southern halves by local roads L22143 and L6219 which runs through the site. The northern half is in turn divided into two by the L2214 which meets the L6219 near the site centre. Regional route R157 runs along the eastern boundary of the site. The southern boundary is formed by the River Rye Water watercourse, which also marks the boundary between counties Meath and Kildare. Residential development at Maynooth has pushed northeast towards the opposite bank of the Rye River watercourse in recent years. The western and norther sides of the site adjoin agricultural land.

The topography is relatively level across most of the site. Along the southern margins, the ground level falls quickly towards the River Rye Water watercourse. The site is currently under a mixture of pasture and hedgerows. An existing period dwelling, known as Moygaddy House and associated outbuildings and gardens lies at the site centre. The area to the north, northwest and northeast is also under pasture/tillage. To the southwest, the landscape quickly becomes urban. Carton Demesne lies to the east, on the opposite side of the R157.

10.3.2 Receptors

There are two dwellings on the development site. The first of these is Moygaddy House, a vacant period dwelling with extensive outbuildings located near the L2214-L6219 junction. This will be retained as part of the development. The second is a small dwelling located nearby, 90 m north of the junction. Although currently occupied, it is understood that the resident intends to vacate the dwelling

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prior to the commencement of construction. Neither of the dwellings on the site is therefore a noise sensitive receptor.

Offsite, receptors exist in several directions as follows:

- To the north, one-off dwellings have proliferated along the L2214. A cluster of these lie immediately outside the northern boundary of the Moygaddy Masterplan area. Seven of these lie within 100 m of the site boundary, with a number of other dwellings continuing northwards.
- To the northeast, a dwelling alongside the R157 lies 180 m from the northeast corner of the site. Set back from the road, a period dwelling lies 480 m further northeast.
- At Carton Demesne to the east of the site, a large number of receptors have been constructed in recent years, including residential dwellings and a hotel. The nearest receptor here, the hotel, lies approximately 500 m from the site boundary.
- Two dwellings lies immediately outside the southeast corner of the site, on the opposite bank of the Rye river. Further south and southwest, ongoing residential developments at Maynooth at Mariavilla are gradually approaching this area, with the nearest development currently approximately 350 m from the boundary.
- Similarly, residential developments further west approach to within 120 m of the southwest side of the site.
- Four one-off dwellings lie along the L6219 in proximity to the western corner of the Moygaddy Masterplan area. One of these immediately adjoins the Moygaddy Masterplan site boundary.

The nearest offsite receptors are shown in Figure 10-2. Apart from the Carton House Hotel, all identified receptors within 500 m consist of residential dwellings. No other receptors such as creches, schools, care centres or nursing homes have been identified.

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Figure 10-2 Nearest offsite receptors to Moygaddy Masterplan boundary (shown red)

10.3.3 Noise mapping

The Meath County Council and Kildare County Council noise action plans include maps relating to the road network in the vicinity of Maynooth (M4 motorway and regional routes R406, R148 and R157), as required by Directive 2002/49/EC Relating to The Assessment And Management Of Environmental Noise. Relevant traffic mapping is shown in Figures 10-3 and 10-4.

The maps indicate that L_{den} levels along the R157 verge marginally exceed 60 dB. The 55 dB contour extends 100 m into the site, parallel to the R157. The 45 dB L_{night} contour extends approximately 50 m into the Proposed Development site. Traffic volumes on the L2214 and L6219 are lower than mapping thresholds. Mapping undertaken by Iarnrod Eireann with respect to the national rail network does not extend to Maynooth.

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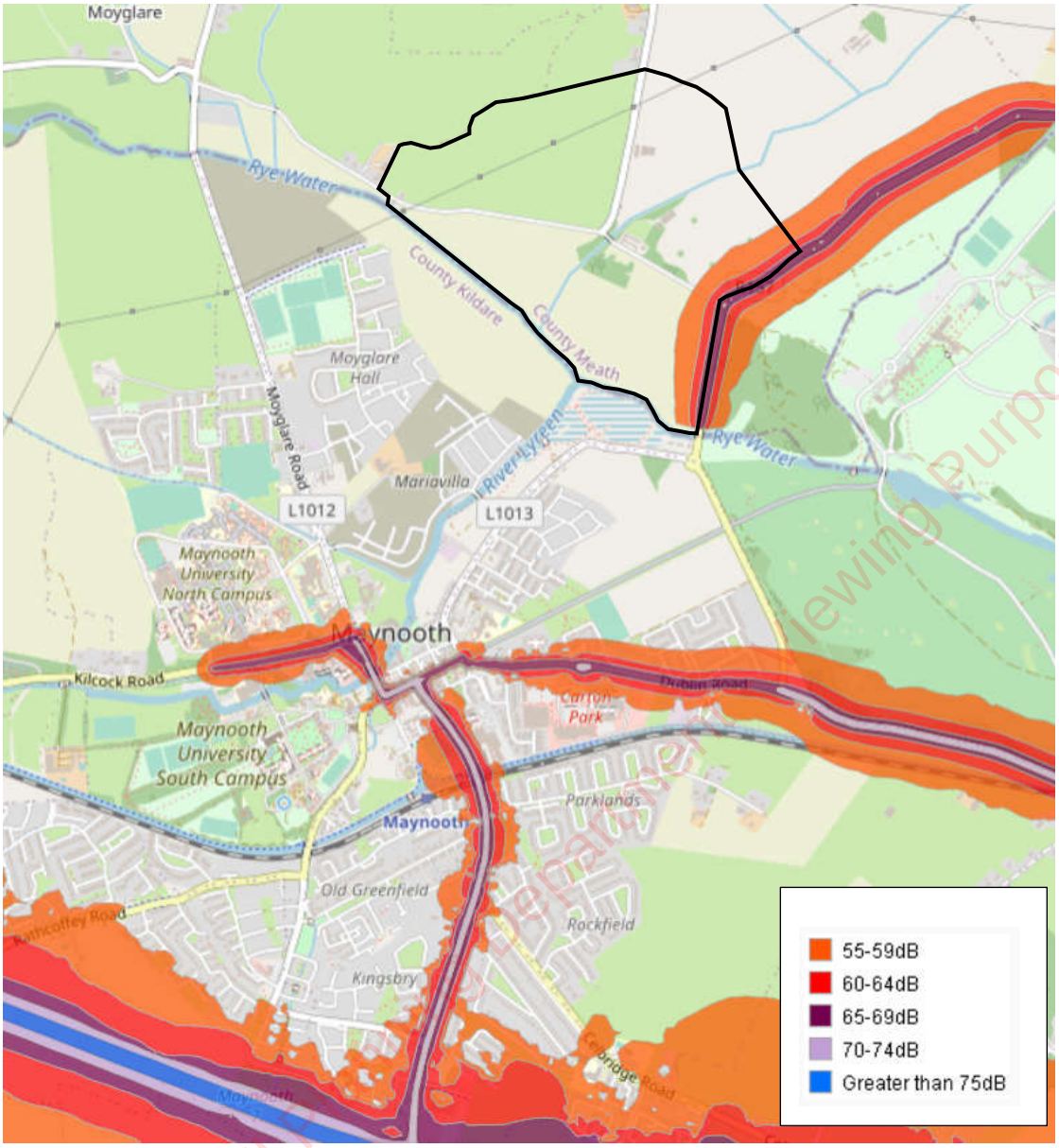

Figure 10-3 Road traffic Lden contours, with Moygaddy Masterplan area delineated black

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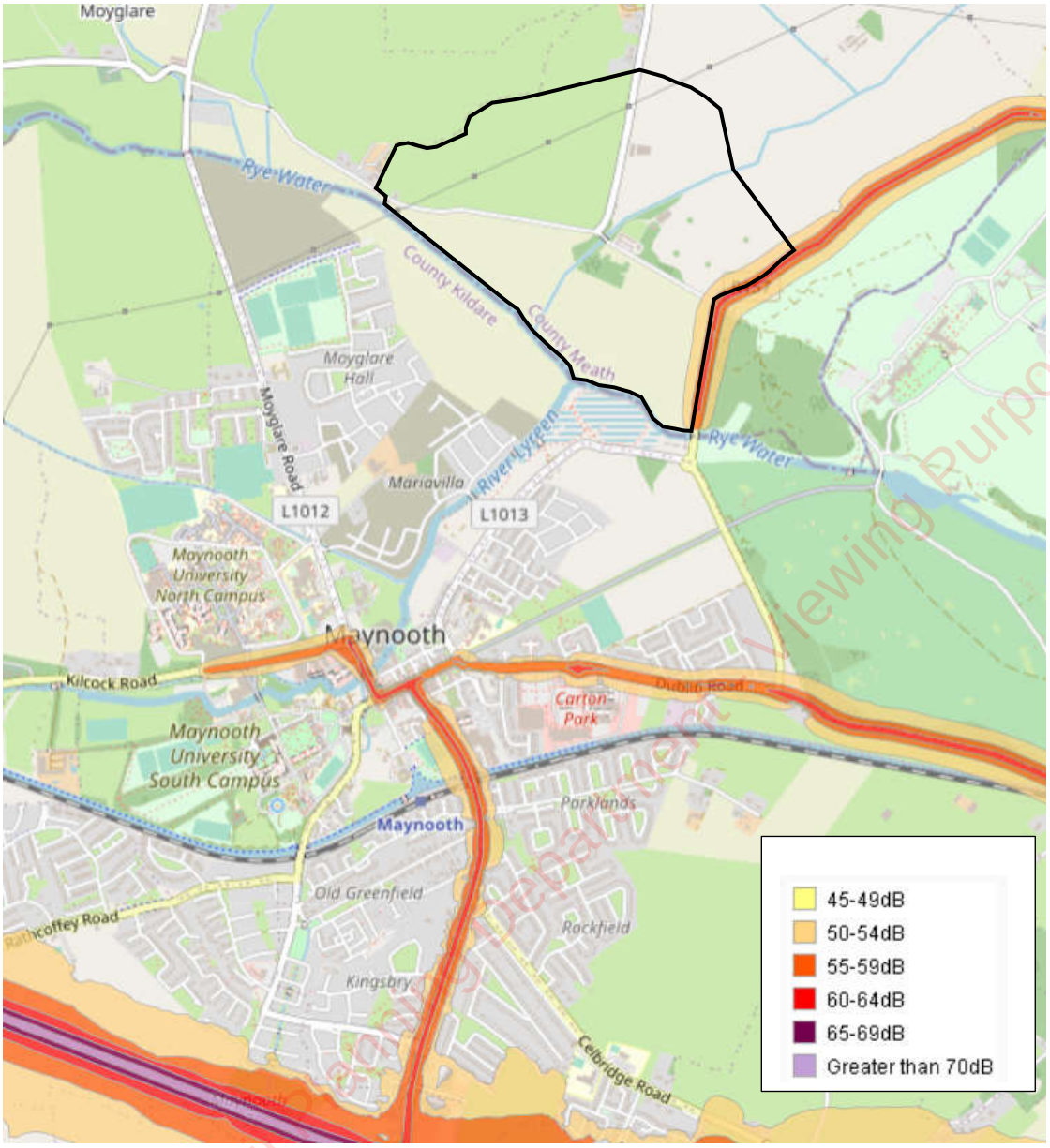

Figure 10-4 Road traffic Lnight contours, with Moygaddy Masterplan area delineated black

10.3.4 Noise survey

A baseline noise survey was carried out at the proposed development site over a 24 h period beginning Tuesday 20/07.21. The purpose of the survey was to provide up to date ambient noise data, and to allow subsequent calibration of the noise model. Monitoring was carried out at five onsite locations shown in Figure 10-5 and Plates 101 to 10-5, and described in Table 10-9. Survey methodology, equipment specifications and weather conditions are listed in Appendix 10-1. Recorded time history profiles are shown in Figures 10-6 to 10-10. Noise data are presented in Appendix 10-2, and summarised in Table 10-10.

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Figure 10-5 Baseline noise stations

Plate 10-1 N1, looking east

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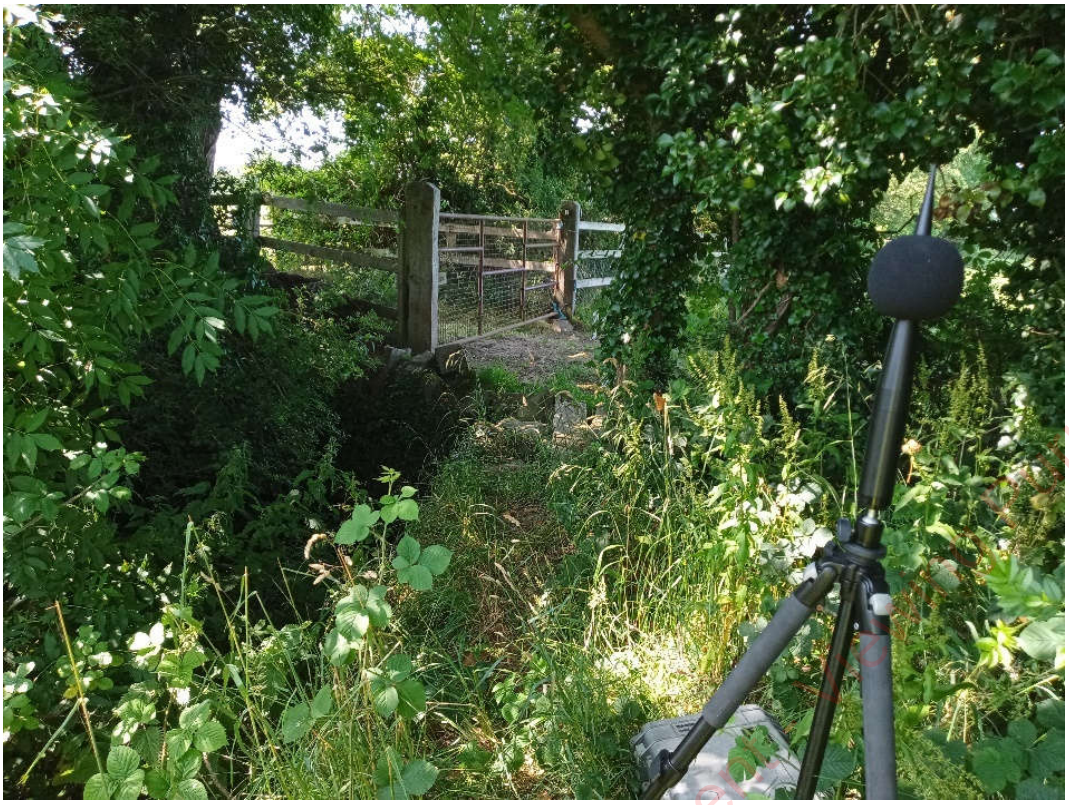

Plate 10-2 N2, looking northwest.

Plate 10-3 N3, looking northeast.

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Plate 10-4 N4, looking west.

Plate 10-5 N5, looking north.

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Table 10-9 Baseline noise stations

Station	NGR	Reason for selection
N1	693698 739319	To provide an indication of the soundscape in the vicinity of residential estates to the southwest, and to assess the impact of L6219 traffic noise
N2	693848 739422	To quantify baseline noise levels in the vicinity of dwellings outside the western boundary of the Moygaddy Masterplan area, particularly back from the L6219
N3	694440 739804	To quantify baseline noise levels at dwellings along the L2214 outside the northern boundary of the Moygaddy Masterplan area
N4	694992 739213	To provide an indication of baseline noise levels at the nearest receptor to the northeast adjacent to the R157
N5	694654 738611	To provide an indication of baseline noise levels at dwellings outside the southeast corner of the Proposed Development site

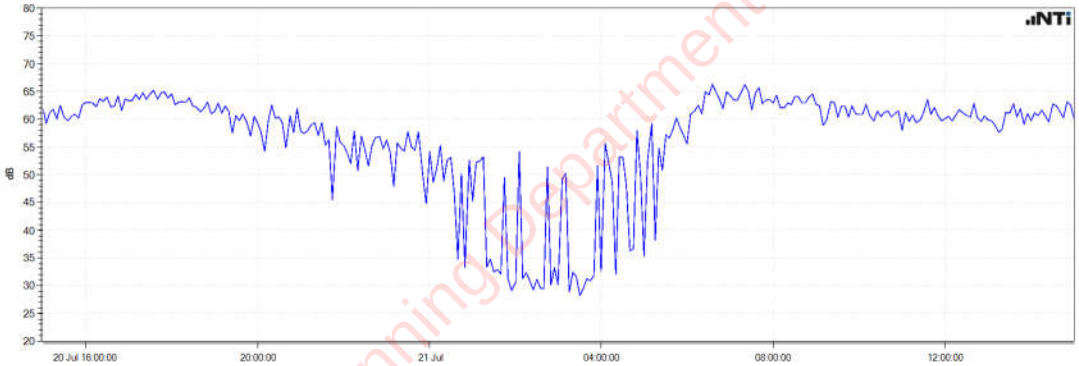

Figure 10-6 LAeq 1 s profile at N1

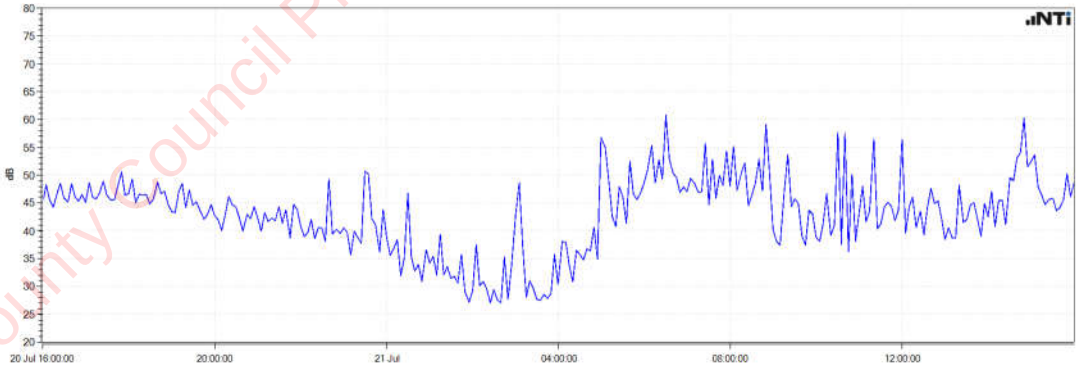

Figure 10-7 LAeq 1 s profile at N2

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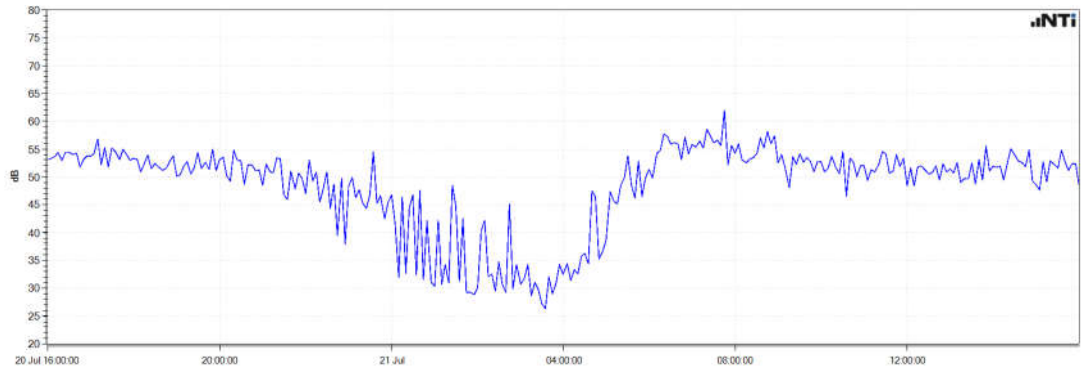

Figure 10-8 LAeq 1 s profile at N3

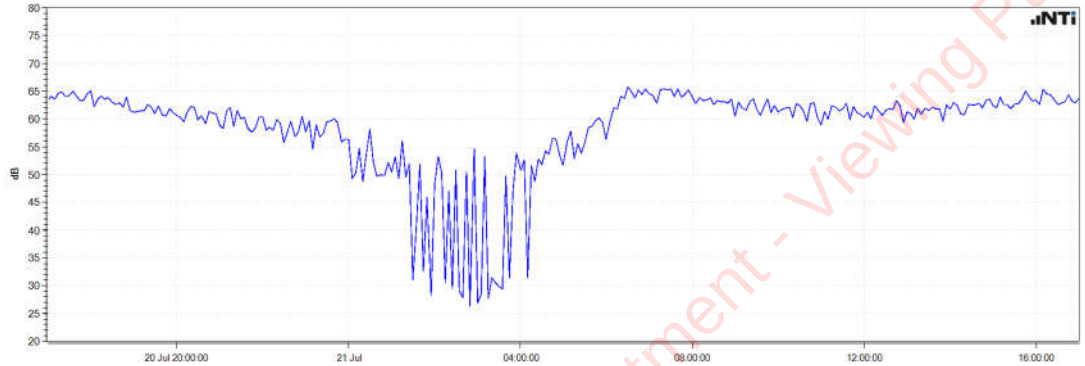

Figure 10-9 LAeq 1 s profile at N4

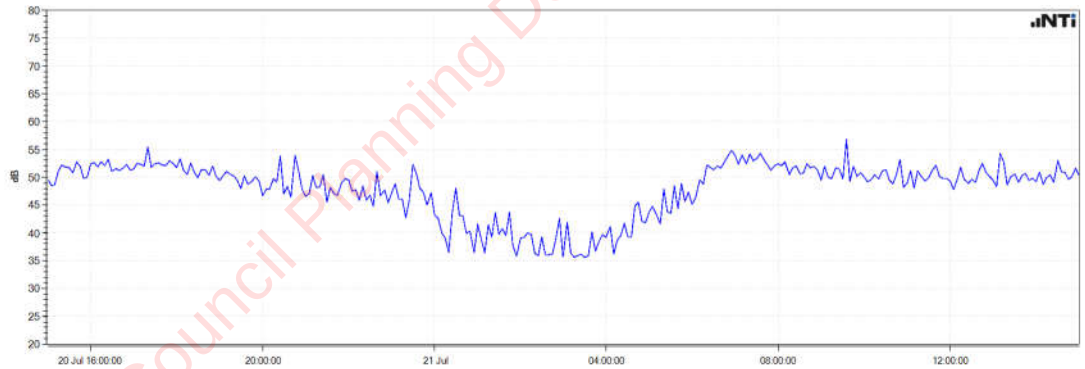

Figure 10-10 LAeq 1 s profile at N5

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Table 10-10 Noise data summary

Period	Parameter	N1	N2	N3	N4	N5
20/07/2021 15:00	$L_{Aeq\ 1\ h}$	61	-	-	-	51
20/07/2021 16:00	$L_{Aeq\ 1\ h}$	63	47	54	-	52
20/07/2021 17:00	$L_{Aeq\ 1\ h}$	64	47	54	64	53
20/07/2021 18:00	$L_{Aeq\ 1\ h}$	63	47	52	63	51
20/07/2021 19:00	$L_{Aeq\ 1\ h}$	61	45	52	62	50
20/07/2021 20:00	$L_{Aeq\ 1\ h}$	60	43	52	61	50
20/07/2021 21:00	$L_{Aeq\ 1\ h}$	57	43	51	60	49
20/07/2021 22:00	$L_{Aeq\ 1\ h}$	55	42	49	59	47
20/07/2021 23:00	$L_{Aeq\ 1\ h}$	55	44	48	58	48
21/07/2021	$L_{Aeq\ 1\ h}$	51	38	43	53	42
21/07/2021 01:00	$L_{Aeq\ 1\ h}$	47	34	41	50	40
21/07/2021 02:00	$L_{Aeq\ 1\ h}$	45	35	38	49	39
21/07/2021 03:00	$L_{Aeq\ 1\ h}$	45	39	31	48	38
21/07/2021 04:00	$L_{Aeq\ 1\ h}$	52	46	41	53	42
21/07/2021 05:00	$L_{Aeq\ 1\ h}$	57	49	50	58	46
21/07/2021 06:00	$L_{Aeq\ 1\ h}$	64	53	56	64	52
21/07/2021 07:00	$L_{Aeq\ 1\ h}$	64	51	57	65	53
21/07/2021 08:00	$L_{Aeq\ 1\ h}$	63	52	55	63	52
21/07/2021 09:00	$L_{Aeq\ 1\ h}$	62	46	53	62	52
21/07/2021 10:00	$L_{Aeq\ 1\ h}$	61	51	52	62	50
21/07/2021 11:00	$L_{Aeq\ 1\ h}$	61	50	52	61	50
21/07/2021 12:00	$L_{Aeq\ 1\ h}$	61	44	51	62	50
21/07/2021 13:00	$L_{Aeq\ 1\ h}$	60	43	52	62	51
21/07/2021 14:00	$L_{Aeq\ 1\ h}$	62	53	52	63	51
21/07/2021 15:00	$L_{Aeq\ 1\ h}$	-	48	52	63	-
21/07/2021 16:00	$L_{Aeq\ 1\ h}$	-	-	-	64	-
0700-1900 h	$L_{Aeq\ 15\ min}$ range	59-65	39-57	50-59	61-65	49-54

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0700-1900 h	$L_{Aeq\ 15\ min}$ average	62	47	53	63	51
0700-1900 h	$L_{AF90\ 15\ min}$ range	34-48	32-44	32-44	33-48	37-46
0700-1900 h	$L_{AF90\ 15\ min}$ average	40	37	36	41	40
1900-2300 h	$L_{Aeq\ 15\ min}$ range	54-62	40-47	46-54	58-62	47-51
1900-2300 h	$L_{Aeq\ 15\ min}$ average	58	43	51	60	49
1900-2300 h	$L_{AF90\ 15\ min}$ range	35-40	34-38	34-39	32-41	37-41
1900-2300 h	$L_{AF90\ 15\ min}$ average	38	36	36	37	38
2300-0700 h	$L_{Aeq\ 15\ min}$ range	30-65	28-57	30-57	31-65	36-54
2300-0700 h	$L_{Aeq\ 15\ min}$ average	49	40	42	53	43
2300-0700 h	$L_{AF90\ 15\ min}$ range	26-45	24-44	25-45	25-49	35-44
2300-0700 h	$L_{AF90\ 15\ min}$ average	32	31	31	31	37
24 h	L_{den}	64	53	56	65	54
0700-2300 h	$L_{Aeq\ 16\ h}$	62	48	53	62	51
2300-0700 h	L_{night}	58	47	49	57	46

The main noise source audible at all five stations was distant traffic on the wider road network, which was continuously audible at all times in the background throughout daytime, evening and night-time periods. Stations N1, N3, N4 and N5 were additionally affected by local traffic on adjacent roads. Other noise sources of significance were birdsong and aircraft.

Stations N4 and N5 are the only stations located adjacent to a public road (R157 Regional Road) which has been included in local authority strategic noise mapping (Meath Noise Action Plan). L_{den} and L_{night} levels determined at N4 are consistent with mapped levels shown in Figures 10-3 and 10-4. In contrast, levels determined at N5 are considerably lower than mapped levels. This discrepancy is most likely due to the elevation of the R157 above the southeast corner of Site B within the Proposed Development, resulting in attenuation of traffic noise at the measurement position. Measured data are considered more relevant than mapped data as an indicator of baseline noise levels at the dwellings outside the southeast corner of the site.

Measured data suggest that L_{AFmax} levels due to passing traffic exceed 60 dB approximately 100 m into the EIAR site, and the number of such movements considerably exceeds 10 movements during night-time hours. As demonstrated through recorded noise levels at stations N4 and N5, L_{AFmax} levels are likely to approach 80 dB for all onsite areas of the Proposed Development within 10 m of the existing R157 Regional Road.

10.3.5 Noise risk assessment

The ProPG document includes guidance on undertaking a risk assessment with respect to inward noise affecting a proposed development site. The ProPG risk assessment is based on Figure 10-11. Data presented in Table 10-10 suggest that the entire site is 'low risk', increasing to medium risk at N1 and

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N4 i.e. the site is low risk in its entirety, apart from positions immediately adjacent to the L6219 and R157. In this regard, ProPG states that:

> *'...the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an acoustic design statement which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.'*

ProPG notes that the risk category of a particular site will be influenced by the number of L_{AFmax} events which exceed 60 dB externally during night-time hours. Where the number of such events exceeds 10, mitigation may be required even where L_{night} levels are below relevant criteria. Measured data suggest that L_{AFmax} levels due to passing traffic exceed 60 dB approximately 100 m into the site, and the number of such movements considerably exceeds 10 during night-time hours. At positions immediately adjacent to roads, L_{AFmax} levels approach 80 dB, within 10 m of the road network.

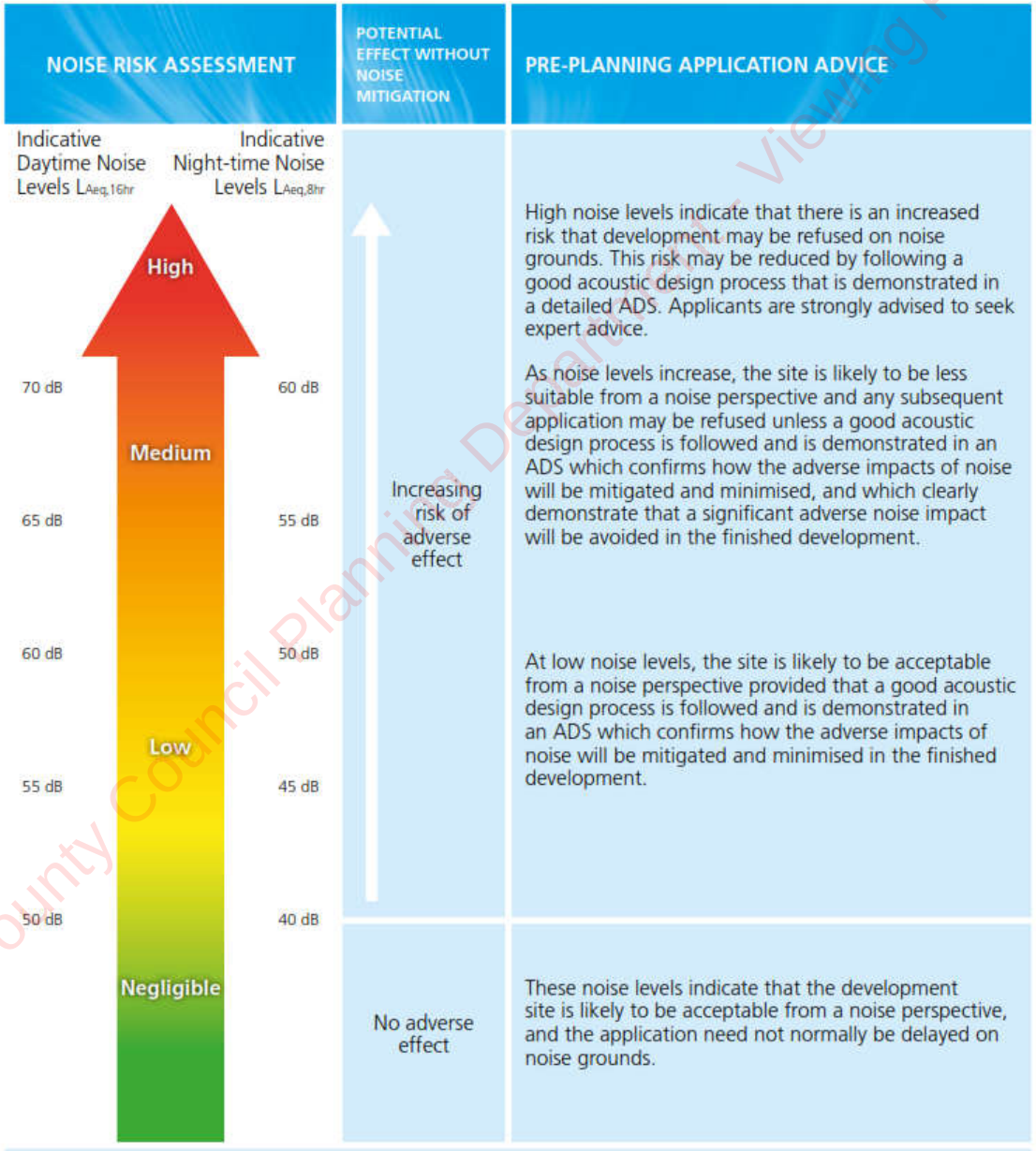

Figure 10-11 ProPG risk assessment

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10.3.6 Future trends

EPA EIAR guidance recommends that a noise impact assessment should include a description of the likely evolution of the future receiving acoustic environment in the absence of the Proposed Development. The local noise environment is semi-urban in character, with the chief background noise sources being local and distant traffic. In the medium term, traffic noise levels are likely to increase across the study area, due to continuing development across Maynooth, and its ongoing expansion. While engine noise emissions will reduce due to increasing take-up of electric vehicles, it is noted that traffic noise above 40-50 km/h arises chiefly from tyre noise, and such tyre noise is unlikely to be less in electric vehicles. The planned development of a relief road around the northeast side of the town is likely to alter the soundscape considerably.

With respect to the development site itself, it is expected that, should the Proposed Development not proceed (the 'do nothing' scenario), no noise emissions are expected to arise other than those from land management practices, depending on how the site is used into the future.

10.4 Potential Effects and Associated Mitigation Measures

10.4.1 Do Nothing Scenario

Should the proposed development not proceed (the 'do nothing' scenario), no noise emissions are expected from within the site other than those associated with land management practices, depending on how the site is used into the future. If the Proposed Development were not to proceed, the potential for additional investment, employment and housing in the area in relation to the construction and operation of the Proposed Development would be lost. It is considered that the 'Do-Nothing' impact would be permanent, negative and slight as the Proposed Development lands are already zoned for Community Infrastructure and Strategic Employment and Housing.

10.4.2 Construction Phase

10.4.2.1 Site A Strategic Employment Zone

Pre Mitigation Impact

Site A (Strategic Employment Zone) will consist of three office buildings, car parking, road realignment works, and approximately 365m of the MOOR.

Construction will be undertaken on a phased basis, beginning within six months of grant of planning permission, and will be managed from a temporary site compound. Construction will be confined to daytime hours Monday-Friday 07:00 to 19.000 and on Saturday 8:00 to 16.00. Full details are presented in Chapter 4 of the EIAR.

Construction works will include the following activities, undertaken variously throughout the construction phase and in different areas of the site:

- Soil stripping & temporary stockpiling.
- Installation of temporary site compound.
- Provision of hardcore stone on onsite roadways.
- Excavation of foundations.
- Excavation of ground services trenches.
- Installation of services including sewerage network.

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- Steel frame erection.
- Pouring & floating of concrete floor slabs.
- Block work and roof work.
- Building finishing (windows, doors, etc.).
- Internal fit out in buildings.
- Laying of asphalt.
- Site landscaping.

During the construction phase, the chief source of noise emissions will be plant used onsite. Construction plant required onsite at various stages of the project are listed in Table 10-11. The table includes details of typical sound pressure levels, taken from BS 5228-1:2009+A1:2014.

Table 10-11 Expected Site A construction plant (dB at 10 m)

Plant	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Total L_{Aeq}
Asphalt paving machine with tipper truck	78	77	72	72	71	69	62	56	75
Discharging concrete mixer truck	80	69	66	70	71	69	64	58	75
Tracked excavator (22 t)	80	83	76	73	72	70	69	66	78
Wheeled backhoe loader (9 t)	68	67	63	62	62	61	54	47	67
Consaw	73	67	70	68	73	78	78	77	84
Lifting platform	78	76	62	63	60	59	58	49	67
Mobile generator	78	71	66	62	59	55	56	49	65
Mobile crane (35 t)	80	76	71	63	64	63	56	50	70
Dumper	84	81	74	73	72	68	61	53	76
Vibro-roller	88	83	69	68	67	65	62	59	74
Telescopic handler	85	79	69	67	64	62	56	47	71
Truck (driving)	73	78	78	78	74	73	68	66	80

Noise emissions arising during the construction phase of the Proposed Development will vary considerably due to several reasons:

- The site is relatively large. Emissions will arise from plant operating across the site, and thus the site will not constitute a single point source.
- The large construction area will result in differing propagation conditions with respect to receptors at different locations.
- The construction phase will last several years. During this time, plant associated with different activities will relocate around the site as required.
- Different plant will be required at different times, and construction operations will vary on a daily basis. There may be extended periods during the construction phase with minimal noise emissions.

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- Each machine item may operate under different loading conditions or be in varying states of repair.
- Construction works may be concentrated for certain periods, followed by periods of inactivity. Localised works may require several hours of intense activity.
- During later stages of the construction phase, emissions from some operations will be screened by previously completed buildings.
- As buildings near completion, activity will gradually relocate indoors.
- A number of different construction firms are likely to be contracted, each using different plant.
- With respect to particular plant, the models selected will change depending on requirements. The method of construction may be modified shortly before commencement, resulting in the need to import different equipment. Construction projects tend to be fluid in nature, with plant requirements changing as the site is progressed and circumstances change on the ground. The need for specific plant may often be established only following the start of a project.

From the foregoing, it is clear that construction phase noise emissions will vary in time and location, and it is not possible to determine a single overall noise output figure for the construction phase. The most appropriate approach here is to assess a worst case scenario emission. An extreme worst case scenario consists of construction activity simultaneously occurring at the nearest points to offsite receptors, involving plant with the greatest noise output. In this scenario, operations may occur simultaneously at the northwest, northeast and southeast corners of Site A.

For the purposes of modelling, it is assumed that operations at each of the three zones will involve a tracked excavator, discharging mixer truck, consaw, dumper and telescopic handler in simultaneous use, at the nearest point of the works zone, and all positioned within a 100 m wide operations area. Such a scenario is unlikely to arise, but is applied here to represent an extreme worst case scenario.

Noise emissions from the above were modelled using DGMR iNoise v2022 software. Input parameters were as follows:

- Model algorithm: *International Standard ISO 9613-2:1996 Acoustics: Attenuation Of Sound During Propagation Outdoors – Part 2 General Method Of Calculation* (1996).
- Hard ground assumed throughout (bare and compacted).
- No screening.
- Receiver height: 4 m.
- Plant output data taken from Table 10-11.
- 31.5 Hz levels (not provided in BS 5228) assumed to be same as 63 Hz levels.
- Plant on-times per hour: excavator (80 %), mixer truck (50 %), consaw (10 %).
- Dumper and handler movements continuous

The model output is shown in Figure 10-12. $L_{Aeq\ 1\ h}$ levels predicted at the nearest receptors, close to their facades, will be 49 dB at the dwelling to the northeast. Levels at all other receptors, including Carton House Hotel, will be markedly lower. Predicted noise levels are much lower than construction phase noise limit criteria of 65 dB discussed above.

Throughout the construction phase, vehicles will arrive at, and depart from, the site during the working day. Vehicle movements will be associated with workers' arrival and departure, and delivery of materials. The approximate numbers of workers employed onsite over the entire construction period will fluctuate depending on schedules.

Personnel and deliveries will access the Proposed Development site via the surrounding road network, with the majority of vehicles expected to access the site via the R157. Construction traffic volumes presented in the Traffic Impact Assessment indicate that construction traffic volumes will be inconsequential in the context of existing traffic volumes. Thus, construction phase traffic noise impacts will be imperceptible.

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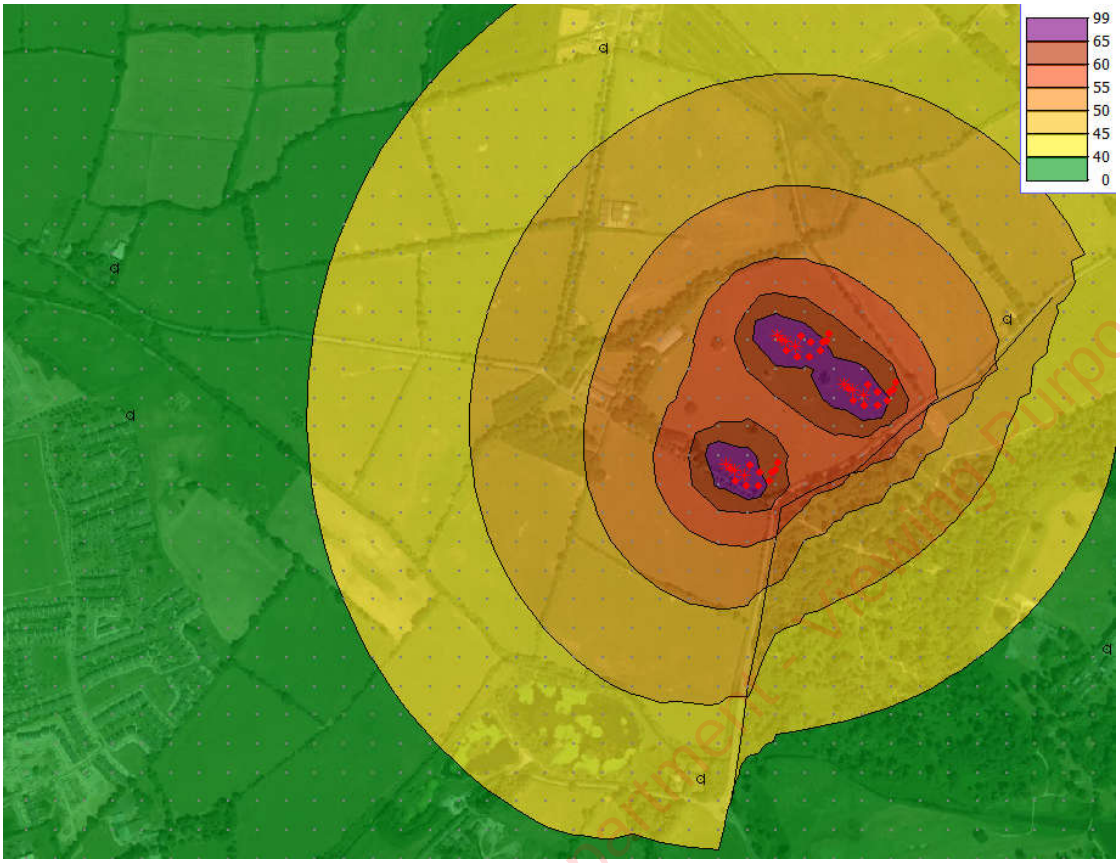

Figure 10-12 Predicted Site A construction phase LAeq 1 h

Potential sources of ground borne vibration during the construction phase are as follows:

- Delivery truck movements: Trucks may give rise to vibration at positions adjacent to the road. However, such emissions are typically imperceptible beyond 10 m, and are highly unlikely to be perceptible at dwellings alongside site access routes.
- Plant movements: The movement of plant onsite is not considered to constitute a source of ground borne vibration and is not listed in typical vibration documents such as BS 5228-2:2009. In addition, plant machinery used onsite is likely to be small to mid-sized, and similar to those used on other urban construction projects.
- Ground works: Excavation of trenches and pits for foundation and services will be required. These activities are not typically associated with offsite ground-borne vibration impacts. It is noted that piling is not proposed. In addition, rock breaking is unlikely to be required.

On the basis of the above, no construction vibration impacts are expected at offsite receptors.

Proposed Mitigation Measures

Construction phase $L_{Aeq\ 1\ h}$ levels will not exceed the 65 dB criterion recommended by BS 5228-1:2009+A1:2014 with respect to construction activity, and the 70 dB National Roads Authority criterion relevant to the road construction. At most offsite receptors, $L_{Aeq\ 1\ h}$ levels will be markedly lower than 45 dB.

Although construction phase noise emissions will be short term, and will not exceed construction phase criteria, the applicant nonetheless proposes to apply the following mitigation measures throughout the construction phase:

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- Construction operations will in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 0800-1600 h.
- Where it is proposed to operate plant during the period 0700-0800 h at locations within 100 m of offsite receptors, standard 'beeper' reversing alarms will be replaced with flat spectrum alarms.
- Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoiding hooting at all times.
- Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced.
- Queuing of trucks near offsite receptors will be prohibited.
- Machinery not in active use will be shut down.
- A site representative will be appointed as a liaison officer with the local community.
- Where evening or night-time operations are required, local residents will be notified through the liaison officer.
- All complaints of noise received during the construction phase will be logged in a register and investigated immediately. Details of follow-up action will be included in the register.
- Where it is proposed to import potentially noisy plant to the site, the potential impact of noise emissions will be assessed in advance.
- Guidance set out in British Standard BS 5228-1:2009+A1:2014 with respect to noise control will be applied throughout the construction phase.

Residual Impact

Noise impacts will be short term and imperceptible to not significant. No vibration impacts are expected.

10.4.2.2 Site B Healthcare Facilities

Pre Mitigation Impact

Site B (Healthcare Facilities) will consist of a nursing home and primary care centre as well as road realignment works and car parking. Construction will begin within six months of grant of planning permission, and will be managed from a temporary site compound. Construction will be confined to daytime hours Monday-Friday, with some additional works on Saturday. Full details are presented in Chapter 4 of the EIAR.

Construction works will include the following activities, undertaken variously throughout the construction phase and in different areas of the site:

- Soil stripping & temporary stockpiling.
- Installation of temporary site compound.
- Provision of hardcore stone on onsite roadways.
- Excavation of foundations.
- Excavation of ground services trenches.
- Installation of services including sewerage network.
- Steel frame erection.
- Pouring & floating of concrete floor slabs.
- Block work and roof work.
- Building finishing (windows, doors, etc.).
- Internal fit out in buildings.
- Laying of asphalt.

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- Site landscaping.

During the construction phase, the chief source of noise emissions will be plant used onsite. Construction plant required onsite at various stages of the project are listed in Table 10-12. The table includes details of typical sound pressure levels, taken from BS 5228-1:2009+A1:2014.

Table 10-12 Expected Site B construction plant (dB at 10 m)

Plant	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Total L_{Aeq}
Asphalt paving machine with tipper truck	78	77	72	72	71	69	62	56	75
Discharging concrete mixer truck	80	69	66	70	71	69	64	58	75
Tracked excavator (22 t)	80	83	76	73	72	70	69	66	78
Wheeled backhoe loader (9 t)	68	67	63	62	62	61	54	47	67
Consaw	73	67	70	68	73	78	78	77	84
Lifting platform	78	76	62	63	60	59	58	49	67
Mobile generator	78	71	66	62	59	55	56	49	65
Mobile crane (35 t)	80	76	71	63	64	63	56	50	70
Dumper	84	81	74	73	72	68	61	53	76
Vibro-roller	88	83	69	68	67	65	62	59	74
Telescopic handler	85	79	69	67	64	62	56	47	71
Truck (driving)	73	78	78	78	74	73	68	66	80

Noise emissions arising during the construction phase of the Proposed Development will vary considerably due to several reasons:

- The site will not constitute a single point source.
- The construction area will result in differing propagation conditions with respect to receptors at different locations.
- The construction phase will last several years. During this time, plant associated with different activities will relocate around the site as required.
- Different plant will be required at different times, and construction operations will vary on a daily basis. There may be extended periods during the construction phase with minimal noise emissions.
- Each machine item may operate under different loading conditions or be in varying states of repair.
- Construction works may be concentrated for certain periods, followed by periods of inactivity. Localised works may require several hours of intense activity.
- As buildings near completion, activity will gradually relocate indoors.
- With respect to particular plant, the models selected will change depending on requirements. The method of construction may be modified shortly before

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commencement, resulting in the need to import different equipment. Construction projects tend to be fluid in nature, with plant requirements changing as the site is progressed and circumstances change on the ground. The need for specific plant may often be established only following the start of a project.

From the foregoing, it is clear that construction phase noise emissions will vary in time and location, and it is not possible to determine a single overall noise output figure for the construction phase. The most appropriate approach here is to assess a worst case scenario emission. An extreme worst case scenario consists of construction activity simultaneously occurring at the northeast and southeast corners of the site, involving plant with the greatest noise output. For the purposes of modelling, it is assumed that works in these zones will involve a tracked excavator, discharging mixer truck, consaw, dumper and telescopic handler in simultaneous use, at the nearest point of the works zone, and all positioned within a 100 m wide operations area. Such a scenario is unlikely to arise, but is applied here to represent an extreme worst case scenario.

Noise emissions from the above were modelled using DGMR iNoise v2022 software. Input parameters were as follows:

- Model algorithm: *International Standard ISO 9613-2:1996 Acoustics: Attenuation Of Sound During Propagation Outdoors – Part 2 General Method Of Calculation* (1996).
- Hard ground assumed throughout (bare and compacted).
- No screening.
- Receiver height: 4 m.
- Plant output data taken from Table 10-11.
- 31.5 Hz levels (not provided in BS 5228) assumed to be same as 63 Hz levels.
- Plant on-times per hour: excavator (80 %), mixer truck (50 %), consaw (10 %).
- Dumper and handler movements continuous

The model output is shown in Figure 10-13. $L_{Aeq\ 1\ h}$ levels predicted at the nearest receptors outside the southeast corner will be 58 dB. Levels at all other receptors, including Carton House Hotel, will be markedly lower. Predicted noise levels are much lower than construction phase noise limit criteria of 65 dB discussed above.

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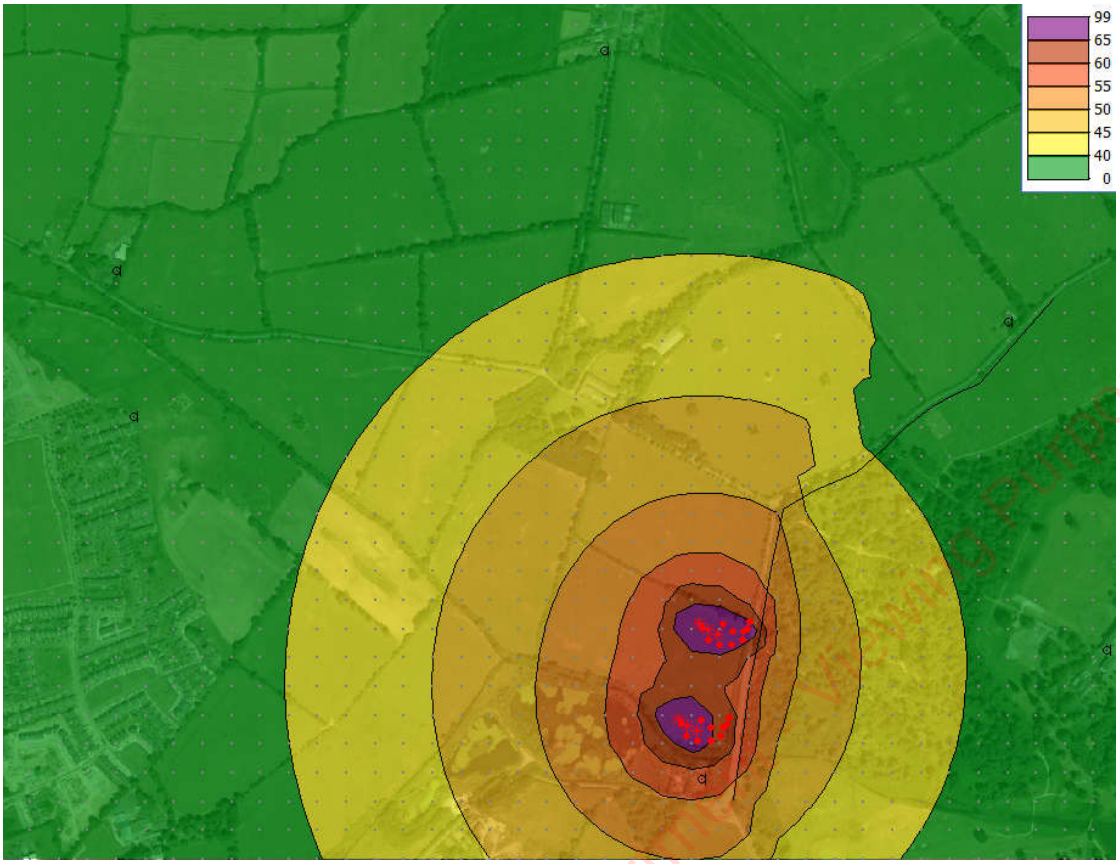

Figure 10-13 Predicted Site B construction phase LAeq 1 h

Throughout the construction phase, vehicles will arrive at, and depart from, the site during the working day. Vehicle movements will be associated with workers' arrival and departure, and delivery of materials. The approximate numbers of workers employed onsite over the entire construction period will fluctuate depending on schedules.

Personnel and deliveries will access the Proposed Development site via the surrounding road network, with the majority of vehicles expected to access the site via the R157. Construction traffic volumes presented in the Traffic Impact Assessment indicate that construction traffic volumes will be inconsequential in the context of existing traffic volumes. Thus, construction phase traffic noise impacts will be imperceptible.

Potential sources of ground borne vibration during the Site B construction phase are as follows:

- Delivery truck movements: Trucks may give rise to vibration at positions adjacent to the road. However, such emissions are typically imperceptible beyond 10 m, and are highly unlikely to be perceptible at dwellings alongside site access routes.
- Plant movements: The movement of plant onsite is not considered to constitute a source of ground borne vibration and is not listed in typical vibration documents such as BS 5228-2:2009. In addition, plant machinery used onsite is likely to be small to mid-sized, and similar to those used on other urban construction projects.
- Ground works: Excavation of trenches and pits for foundation and services will be required. These activities are not typically associated with offsite ground-borne vibration impacts. It is noted that piling is not proposed. In addition, rock breaking is unlikely to be required.

On the basis of the above, no construction vibration impacts are expected at offsite receptors.

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Proposed Mitigation Measures

Construction phase $L_{Aeq\ 1\ h}$ levels will not exceed the 65 dB criterion recommended by BS 5228-1:2009+A1:2014 with respect to construction activity, and the 70 dB National Roads Authority criterion relevant to the road construction. At most offsite receptors, $L_{Aeq\ 1\ h}$ levels will be markedly lower than 45 dB.

Although construction phase noise emissions will be short term, and will not exceed construction phase criteria, the applicant nonetheless proposes to apply the following mitigation measures throughout the construction phase:

- Construction operations will in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 0800-1600 h.
- Where it is proposed to operate plant during the period 0700-0800 h at locations within 100 m of offsite receptors, standard 'beeper' reversing alarms will be replaced with flat spectrum alarms.
- Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoiding hooting at all times.
- Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced.
- Queuing of trucks near offsite receptors will be prohibited.
- Machinery not in active use will be shut down.
- A site representative will be appointed as a liaison officer with the local community.
- Where evening or night-time operations are required, local residents will be notified through the liaison officer.
- All complaints of noise received during the construction phase will be logged in a register and investigated immediately. Details of follow-up action will be included in the register.
- Where it is proposed to import potentially noisy plant to the site, the potential impact of noise emissions will be assessed in advance.
- Guidance set out in British Standard BS 5228-1:2009+A1:2014 with respect to noise control will be applied throughout the construction phase.

Residual Impact

Noise impacts will be short term and imperceptible to slight. No vibration impacts are expected.

10.4.2.3 Site C Strategic Housing Development

Pre Mitigation Impact

Site C (Strategic Housing Development) will consist of 360 residential homes across a mix of dwelling types, a creche and roadways. Construction will be undertaken on a phased basis, beginning within six months of grant of planning permission, and will be managed from a temporary site compound. Construction will be confined to daytime hours Monday-Friday, with some additional works on Saturday. Full details are presented in Chapter 4 of the EIAR.

Construction works will include the following activities, undertaken variously throughout the construction phase and in different areas of the site:

- Soil stripping & temporary stockpiling.
- Installation of temporary site compound.
- Provision of hardcore stone on onsite roadways.
- Excavation of foundations.

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- Excavation of ground services trenches.
- Installation of services including sewerage network.
- Steel frame erection in larger buildings.
- Pouring & floating of concrete floor slabs.
- Block work and roof work.
- Building finishing (windows, doors, etc.).
- Internal fit out in buildings.
- Laying of asphalt.
- Site landscaping.

During the construction phase, the chief source of noise emissions will be plant used onsite. Construction plant required onsite at various stages of the project are listed in Table 10-13. The table includes details of typical sound pressure levels, taken from BS 5228-1:2009+A1:2014.

Table 10-13 Expected Site C construction plant (dB at 10 m)

Plant	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Total L_{Aeq}
Asphalt paving machine with tipper truck	78	77	72	72	71	69	62	56	75
Discharging concrete mixer truck	80	69	66	70	71	69	64	58	75
Tracked excavator (22 t)	80	83	76	73	72	70	69	66	78
Wheeled backhoe loader (9 t)	68	67	63	62	62	61	54	47	67
Consaw	73	67	70	68	73	78	78	77	84
Lifting platform	78	76	62	63	60	59	58	49	67
Mobile generator	78	71	66	62	59	55	56	49	65
Mobile crane (35 t)	80	76	71	63	64	63	56	50	70
Dumper	84	81	74	73	72	68	61	53	76
Vibro-roller	88	83	69	68	67	65	62	59	74
Telescopic handler	85	79	69	67	64	62	56	47	71
Truck (driving)	73	78	78	78	74	73	68	66	80

Noise emissions arising during the construction phase of the Proposed Development will vary considerably due to several reasons:

- The site is relatively large. Emissions will arise from plant operating across the site, and thus the site will not constitute a single point source.
- The large construction area will result in differing propagation conditions with respect to receptors at different locations.
- The construction phase will last several years. During this time, plant associated with different activities will relocate around the site as required.

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- Different plant will be required at different times, and construction operations will vary on a daily basis. There may be extended periods during the construction phase with minimal noise emissions.
- Each machine item may operate under different loading conditions or be in varying states of repair.
- Construction works may be concentrated for certain periods, followed by periods of inactivity. Localised works may require several hours of intense activity.
- During later stages of the construction phase, emissions from some operations will be screened by previously completed buildings.
- As buildings near completion, activity will gradually relocate indoors.
- A number of different construction firms are likely to be contracted, each using different plant.
- With respect to particular plant, the models selected will change depending on requirements. The method of construction may be modified shortly before commencement, resulting in the need to import different equipment. Construction projects tend to be fluid in nature, with plant requirements changing as the site is progressed and circumstances change on the ground. The need for specific plant may often be established only following the start of a project.

From the foregoing, it is clear that construction phase noise emissions will vary in time and location, and it is not possible to determine a single overall noise output figure for the construction phase. The most appropriate approach here is to assess a worst case scenario emission. An extreme worst case scenario consists of construction activity simultaneously occurring at the nearest points to offsite receptors, involving plant with the greatest noise output. In this scenario, operations may occur simultaneously at the western extremity, the eastern extremity, and midway along the southern boundary.

For the purposes of modelling, it is assumed that operations in each of the three zones will involve a tracked excavator, discharging mixer truck, consaw, dumper and telescopic handler in simultaneous use, at the nearest point of the works zone, and all positioned within a 100 m wide operations area. Such a scenario is unlikely to arise, but is applied here to represent an extreme worst case scenario.

Noise emissions from the above were modelled using DGMR iNoise v2022 software. Input parameters were as follows:

- Model algorithm: *International Standard ISO 9613-2:1996 Acoustics: Attenuation Of Sound During Propagation Outdoors – Part 2 General Method Of Calculation* (1996).
- Hard ground assumed throughout (bare and compacted).
- No screening.
- Receiver height: 4 m.
- Plant output data taken from Table 10-11.
- 31.5 Hz levels (not provided in BS 5228) assumed to be same as 63 Hz levels.
- Plant on-times per hour: excavator (80 %), mixer truck (50 %), consaw (10 %).
- Dumper and handler movements continuous

The model output is shown in Figure 10-14. $L_{Aeq\ 1\ h}$ levels predicted at the nearest receptors, close to their facades, will be 53-54 dB. Levels at all other receptors will be lower. Predicted noise levels are much lower than construction phase noise limit criteria of 65 dB discussed above.

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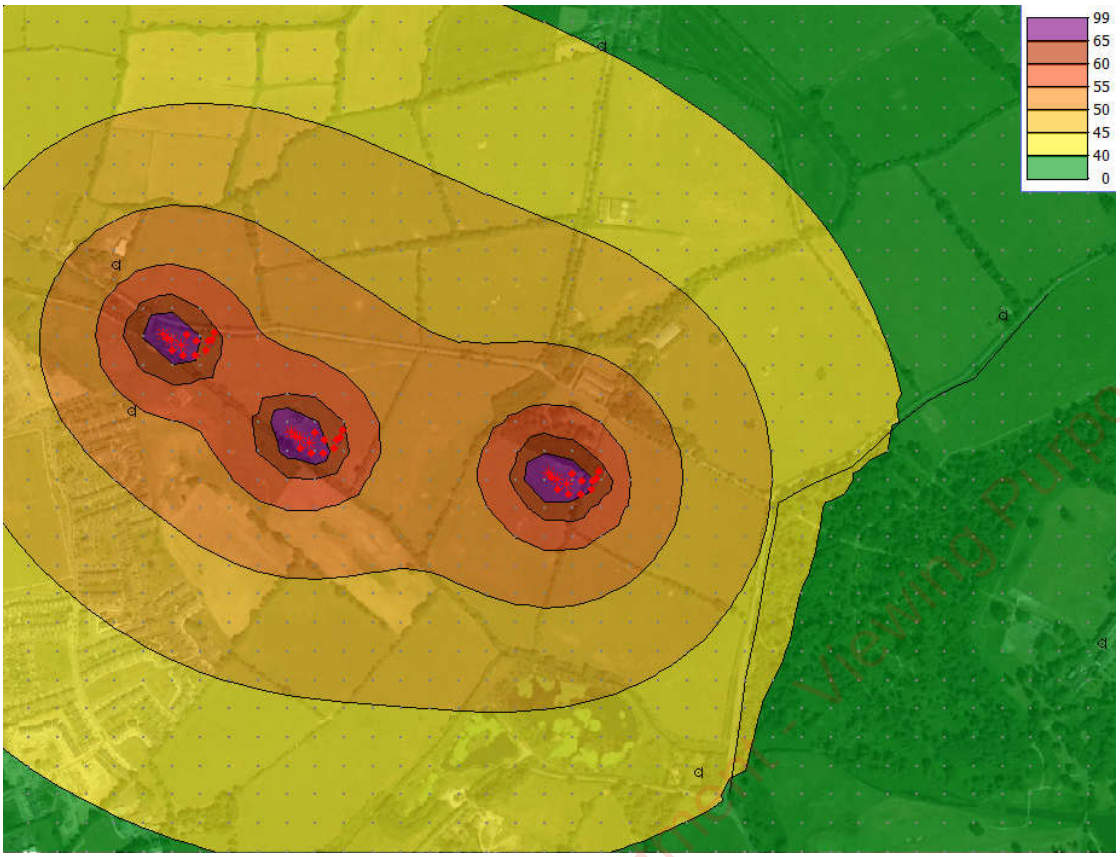

Figure 10-14 Predicted Site C construction phase LAeq 1 h

Throughout the construction phase, vehicles will arrive at, and depart from, the site during the working day. Vehicle movements will be associated with workers' arrival and departure, and delivery of materials. The approximate numbers of workers employed onsite over the entire construction period will fluctuate depending on schedules.

Personnel and deliveries will access the Proposed Development site via the surrounding road network, with the majority of vehicles expected to access the site via the R157. Construction traffic volumes presented in the Traffic Impact Assessment indicate that construction traffic volumes will be inconsequential in the context of existing traffic volumes. Thus, construction phase traffic noise impacts will be imperceptible.

Potential sources of ground borne vibration during the Site C construction phase are as follows:

- Delivery truck movements: Trucks may give rise to vibration at positions adjacent to the road. However, such emissions are typically imperceptible beyond 10 m, and are highly unlikely to be perceptible at dwellings alongside site access routes.
- Plant movements: The movement of plant onsite is not considered to constitute a source of ground borne vibration and is not listed in typical vibration documents such as BS 5228-2:2009. In addition, plant machinery used onsite is likely to be small to mid-sized, and similar to those used on other urban construction projects.
- Ground works: Excavation of trenches and pits for foundation and services will be required. These activities are not typically associated with offsite ground-borne vibration impacts. It is noted that piling is not proposed. In addition, rock breaking is unlikely to be required in relation to Sites A, B or C.

On the basis of the above, no construction vibration impacts are expected at offsite receptors.

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Proposed Mitigation Measures

Construction phase $L_{Aeq\ 1\ h}$ levels will not exceed the 65 dB criterion recommended by BS 5228-1:2009+A1:2014 with respect to construction activity, and the 70 dB National Roads Authority criterion relevant to the road construction. At most offsite receptors, $L_{Aeq\ 1\ h}$ levels will be markedly lower than 45 dB.

Although construction phase noise emissions will be short term, and will not exceed construction phase criteria, the applicant nonetheless proposes to apply the following mitigation measures throughout the construction phase:

- Construction operations will in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 0800-1600 h.
- Where it is proposed to operate plant during the period 0700-0800 h at locations within 100 m of offsite receptors, standard 'beeper' reversing alarms will be replaced with flat spectrum alarms.
- Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoiding hooting at all times.
- Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced.
- Queuing of trucks near offsite receptors will be prohibited.
- Machinery not in active use will be shut down.
- A site representative will be appointed as a liaison officer with the local community.
- Where evening or night-time operations are required, local residents will be notified through the liaison officer.
- All complaints of noise received during the construction phase will be logged in a register and investigated immediately. Details of follow-up action will be included in the register.
- Where it is proposed to import potentially noisy plant to the site, the potential impact of noise emissions will be assessed in advance.
- Guidance set out in British Standard BS 5228-1:2009+A1:2014 with respect to noise control will be applied throughout the construction phase.

Residual Impact

Noise impacts will be short term and imperceptible to not significant. No vibration impacts are expected.

10.4.2.4 MOOR

Pre Mitigation Impact

The proposed MOOR will consist of a 1.5 km distributor road linking the R157 to the Moyglare Hall road. The MOOR will run through the site in a curve, connecting the R157 to a partially constructed road at Poundhill to the southwest. The MOOR will intercept the L2214 in the northern half of the site, The MOOR will also intercept the L6219. Here, however, the former will be given priority, and the L6219 will be realigned. The proposed development site will be served by a network of onsite roads connecting to the existing road network and the proposed MOOR.

Construction will be confined to daytime hours Monday-Friday, with some additional works on Saturday. Full details are presented in Chapter 4 of the EIAR. Construction of the proposed MOOR

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will most likely require plant listed in Table 10-14. Plant noise levels are taken from BS 5228-1:2009+A1:2014.

Table 10-14 Expected MOOR construction plant (dB at 10 m)

Plant	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Total L_{Aeq}
Asphalt paving machine with tipper truck	78	77	72	72	71	69	62	56	75
Dozer	83	81	76	77	82	70	65	58	83
Tracked excavator (22 t)	80	83	76	73	72	70	69	66	78
Hydraulic breaker	86	80	78	77	81	83	82	81	88
Dump truck	88	90	80	79	76	71	65	61	81
Vibro-roller	90	84	77	81	73	68	65	61	80
Roller	87	85	75	73	75	73	69	63	80
Truck (driving)	73	78	78	78	74	73	68	66	80

During the road construction phase, operations will initially consist of civil engineering works along the road route, followed by placement of hardcore and services, asphalt laying, and final landscaping. Works will occur over a narrow corridor. With respect to surrounding noise sensitive receptors, worst case scenario emissions will arise when localised works are undertaken close to their respective boundaries.

Construction noise emissions will vary in time and location, and it is not possible to determine a single overall noise output figure for the entire road construction project. The simplest approach is to assess worst case scenario noise emissions at the northern, eastern and western extents of the MOOR, as these locations are closest to offsite receptors. An extreme worst case scenario consists of simultaneous operation of the loudest plant at these three positions. For the purposes of modelling, the loudest plant likely to operate simultaneous are a dozer, excavator and breaker, and the model assumes that this cluster of plant will operate at the same time at the northern, eastern and western extents. In addition, the model assumes that several 6x6 dump trucks will track back and forth along the road corridor.

Noise emissions were modelled using DGMR iNoise v2022 software. Input parameters were as follows:

- Model algorithm: *International Standard ISO 9613-2:1996 Acoustics: Attenuation Of Sound During Propagation Outdoors – Part 2 General Method Of Calculation* (1996).
- Hard ground assumed throughout (bare and compacted).
- No screening.
- Receiver height: 4 m.
- Plant output data taken from Table 10-12.
- 31.5 Hz levels (not provided in BS 5228) assumed to be same as 63 Hz levels.
- Plant on-times per hour: 100%.

The model output is shown in Figure 10-15. $L_{Aeq\ 1\ h}$ levels predicted at surrounding receptors (close to their respective facades) will be highest at the dwellings outside the northern boundary adjacent to the L2214, where $L_{Aeq\ 1\ h}$ levels will reach 59 dB. Levels at the dwellings near the southwest corner will reach 58 dB. Levels at all other receptors, including Carton House Hotel, will be considerably lower.

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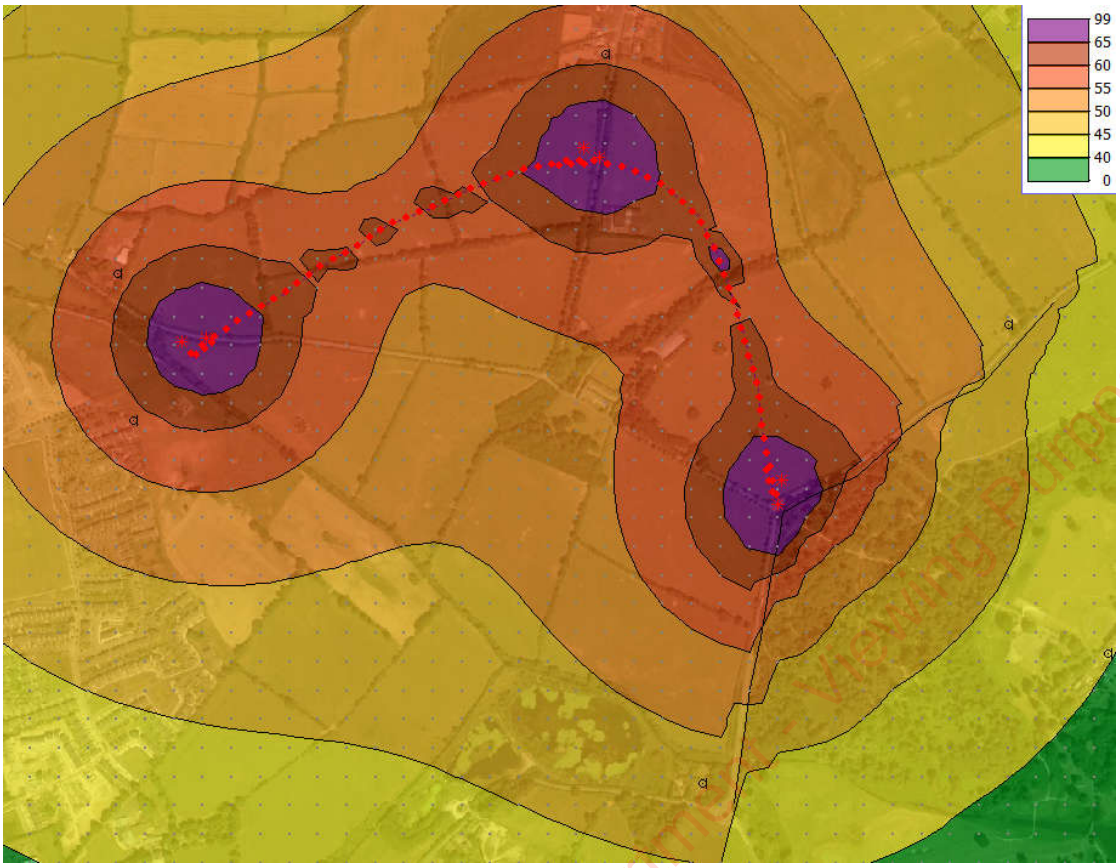

Figure 10-15 Predicted MOOR construction phase LAeq 1 h

During the road construction phase, a number of trucks will arrive regularly at the site, used to import stone and asphalt. The number of truck movements will be inconsequential in the context of existing traffic volumes, and it follows that impacts will be minimal at offsite receptors.

Construction of the road is not expected to give rise to measurable ground borne vibration beyond 50 m from the road corridor. The road will not run through any cuttings, and thus blasting will not be required. Plant movements along the corridor during construction are highly unlikely to give rise to vibration outside the corridor. While the vibro-roller will generate high levels of vibration at the point of operation, experience at other sites indicates that such vibration is typically immeasurable beyond 50 m.

At certain locations, chiefly where the proposed road will tie in to the existing network, breaking of rock and asphalt may be required. This will be carried out using a hydraulic breaker mounted on a tracked excavator. Breaking may give rise to vibration close to the breaking zone. The vibration tends to contain relatively little energy in the lower frequencies at which buildings and occupants are most vulnerable. In addition, higher frequencies attenuate more rapidly than low frequencies, thus minimising the impact zone. For this reason, most vibration guidance documents such as BS 5228-2:2009 ignore breaking vibration. Table 10-15 lists PPV levels measured at sites where hydraulic rock breaking has been undertaken. The range in levels noted reflects variations in equipment power and rock type.

Table 10-15 Previously measured rock breaking PPV levels

Distance	5 m	10 m	20 m	50 m
PPV	0.2-4.5 mm/s	0.06-3.0 mm/s	0.02-1.5 mm/s	0.1-0.3 mm/s

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Breaking vibration levels quoted above are significantly lower than criteria listed in Tables 10-1, 10-2 and 10-3. Thus breaking, if required, is unlikely to give rise perceptible ground borne vibration at offsite receptors. It follows that road construction operations are unlikely to be perceptible offsite, or to cause cosmetic or structural damage to buildings.

Proposed Mitigation Measures

Construction phase $L_{Aeq\ 1\ h}$ levels will not exceed the 65 dB criterion recommended by BS 5228-1:2009+A1:2014 with respect to construction activity, and the 70 dB National Roads Authority criterion relevant to the road construction of the section of the MOOR. At most offsite receptors, $L_{Aeq\ 1\ h}$ levels will be markedly lower than 55 dB.

Although construction phase noise emissions will be short term, and will not exceed construction phase criteria, the applicant nonetheless proposes to apply the following mitigation measures throughout the construction phase:

- Construction operations will in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 0800-1600 h.
- Where it is proposed to operate plant during the period 0700-0800 h at locations within 100 m of offsite receptors, standard 'beeper' reversing alarms will be replaced with flat spectrum alarms.
- Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoiding hooting at all times.
- Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced.
- Queuing of trucks near offsite receptors will be prohibited.
- Machinery not in active use will be shut down.
- A site representative will be appointed as a liaison officer with the local community.
- Where evening or night-time operations are required, local residents will be notified through the liaison officer.
- All complaints of noise received during the construction phase will be logged in a register and investigated immediately. Details of follow-up action will be included in the register.
- Where it is proposed to import potentially noisy plant to the site, the potential impact of noise emissions will be assessed in advance.
- Where generators or compressors are required within 100 m of offsite receptors, or previously completed receptors onsite, these will be fitted with manufacturers' acoustic enclosures, or alternatively will be screened by a local acoustic screen or subsoil stockpile.
- Guidance set out in British Standard BS 5228-1:2009+A1:2014 with respect to noise control will be applied throughout the construction phase.

Residual Impact

Construction phase activities associated with MOOR construction are not expected to give rise to perceptible ground borne vibration at offsite receptors. Construction traffic volumes are likely to be negligible in the context of existing traffic volumes on the surrounding road network.

Construction phase noise levels at all receptors due to onsite construction works will be considerably lower than the 65 dB criterion recommended by BS 5228-1:2009+A1:2014. Noise impacts will be imperceptible to not significant, and temporary.

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10.4.2.5 Kildare Bridge

Pre Mitigation Impact

The proposed Kildare Bridge works will be located at the southeast corner of the Moygaddy Masterplan area. Construction will be confined to daytime hours Monday-Friday, with some additional works on Saturday. Full details are presented in Chapter 4 of the EIAR.

Bridge construction will most likely require plant listed in Table 10-16. Plant noise levels are taken from BS 5228-1:2009+A1:2014.

Table 10-16 Expected Kildare Bridge construction plant (dB at 10 m)

Plant	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Total L_{Aeq}
Asphalt paving machine with tipper truck	78	77	72	72	71	69	62	56	75
Discharging concrete mixer truck	80	69	66	70	71	69	64	58	75
Tracked excavator (22 t)	80	83	76	73	72	70	69	66	78
Consaw	73	67	70	68	73	78	78	77	84
Hydraulic breaker	86	80	78	77	81	83	82	81	88
Dump truck	88	90	80	79	76	71	65	61	81
Mobile crane (35 t)	80	76	71	63	64	63	56	50	70
Vibro-roller	90	84	77	81	73	68	65	61	80
Roller	87	85	75	73	75	73	69	63	80
Truck (driving)	73	78	78	78	74	73	68	66	80

Two dwellings are located in proximity to these works, both located to the immediate west of the works zone. Modelling was undertaken in relation to bridge construction works involving simultaneous use of a tracked excavator, breaker and dump truck in a confined area near the bridge, these being the loudest sources likely to operate simultaneously.

Noise emissions were modelled using DGMR iNoise v2022 software. Input parameters were as follows:

- Model algorithm: *International Standard ISO 9613-2:1996 Acoustics: Attenuation Of Sound During Propagation Outdoors – Part 2 General Method Of Calculation* (1996).
- Hard ground assumed throughout (bare and compacted).
- No screening.
- Receiver height: 4 m.
- Plant output data taken from Table 10-14.

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- 31.5 Hz levels (not provided in BS 5228) assumed to be same as 63 Hz levels.
- Plant on-times per hour: 80%.

The model output is shown in Figure 10-16. $L_{Aeq\ 1\ h}$ levels predicted at the nearby dwellings will be 65-70 dB, being higher at the more easterly dwelling. Levels will not exceed the 70 dB criterion recommended in the National Roads Authority document *Good practice guidance for the treatment of noise during the planning of national road schemes* (2014) with respect to road projects.

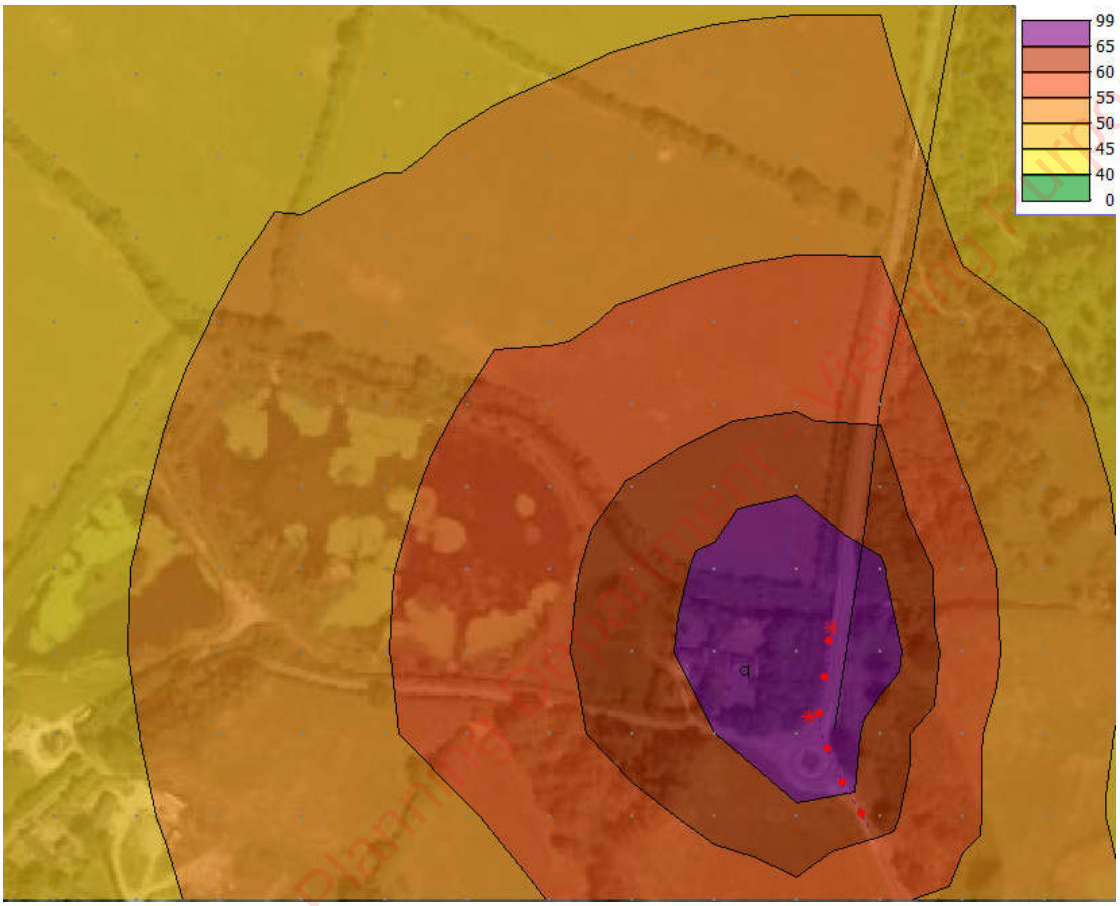

Figure 10-16 Predicted Kildare Bridge construction phase LAeq 1 h

Instillation of the proposed rising main will require road trenching works over a total distance of approximately 1 km. The route will directly pass several dwellings located adjacent to the public road, as well as residential estates to the southwest. Plant involved will include an excavator or backhoe loader, and a truck. A consaw will be required to cut the trench surface. A small roller will be required to consolidate backfill.

The rising main installation procedure will involve localised works moving linearly along the proposed route, with a typical progression rate of 100-200 m per day. Noise emissions will be localised to the active trenching area, and will move gradually along the route. Experience at other sites indicates that sound pressure levels within 20 m of the works zone will typically reach 65-70 dB at their highest, this being the typical separation distance to roadside receptors. These emissions will be audible at each receptor for several hours as the trenching operation moves past. Levels are highly unlikely to exceed the 70 dB criterion recommended by the NRA in relation to road projects.

The proposed realignment works and rising main installation may give rise to local ground borne vibration. Significant sources of construction vibration such as blasting and pile driving will not be required.

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Experience with other construction projects suggests that PPV levels during road trenching works are highly unlikely to exceed 1 mm/s at a distance beyond 20 m. PPV levels will almost certainly be less than 1 mm/s at the nearest receptors to the proposed works zones. Such levels are likely to be undetectable, and will not damage buildings or structures.

Proposed Mitigation Measures

Bridge construction phase $L_{Aeq\ 1\ h}$ levels will reach 65-70 dB at their highest at the nearest two dwellings. Levels will not exceed the 70 dB National Roads Authority criterion relevant to road construction.

Although construction phase noise emissions will be short term, and will not exceed the 70 dB criterion, the applicant nonetheless proposes to apply the following mitigation measures throughout the construction phase:

- Construction operations will in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 0800-1600 h.
- Where it is proposed to operate plant during the period 0700-0800 h at locations within 100 m of offsite receptors, standard 'beeper' reversing alarms will be replaced with flat spectrum alarms.
- Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoiding hooting at all times.
- Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced.
- Queuing of trucks near offsite receptors will be prohibited.
- Machinery not in active use will be shut down.
- A site representative will be appointed as a liaison officer with the local community.
- Where evening or night-time operations are required, local residents will be notified through the liaison officer.
- All complaints of noise received during the construction phase will be logged in a register and investigated immediately. Details of follow-up action will be included in the register.
- Where it is proposed to import potentially noisy plant to the site, the potential impact of noise emissions will be assessed in advance.
- Where generators or compressors are required within 100 m of offsite receptors, or previously completed receptors onsite, these will be fitted with manufacturers' acoustic enclosures, or alternatively will be screened by a local acoustic screen or subsoil stockpile.
- Guidance set out in British Standard BS 5228-1:2009+A1:2014 with respect to noise control will be applied throughout the construction phase.

Residual Impact

Noise impacts associated with bridge construction and road trenching are likely to be slight to moderate at nearby receptors. Impacts will be temporary. No vibration impacts are expected.

10.4.2.6 Moyglare Bridge

Pre Mitigation Impact

The proposed Moyglare Bridge and Moyglare Hall road will be located at the southwest corner of the Moygaddy Masterplan area. Construction will be confined to daytime hours Monday-Friday, with some

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additional works on Saturday. Full details are presented in Chapter 4 of the EIAR. Construction will most likely require plant listed in Table 10-17. Plant noise levels are taken from BS 5228-1:2009+A1:2014.

Table 10-17 Expected Moyglare Bridge construction plant (dB at 10 m)

Plant	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Total L_{Aeq}
Asphalt paving machine with tipper truck	78	77	72	72	71	69	62	56	75
Tracked excavator (22 t)	80	83	76	73	72	70	69	66	78
Discharging concrete mixer truck	80	69	66	70	71	69	64	58	75
Consaw	73	67	70	68	73	78	78	77	84
Hydraulic breaker	86	80	78	77	81	83	82	81	88
Dump truck	88	90	80	79	76	71	65	61	81
Mobile crane (35 t)	80	76	71	63	64	63	56	50	70
Vibro-roller	90	84	77	81	73	68	65	61	80
Roller	87	85	75	73	75	73	69	63	80
Truck (driving)	73	78	78	78	74	73	68	66	80

Modelling was undertaken in relation to a likely worst case scenario involving simultaneous operation of a tracked excavator, discharging mixer truck, consaw and dumper in simultaneous use at the works zone. Noise emissions were modelled using DGMR iNoise v2022 software. Input parameters were as follows:

- Model algorithm: *International Standard ISO 9613-2:1996 Acoustics: Attenuation Of Sound During Propagation Outdoors – Part 2 General Method Of Calculation* (1996).
- Hard ground assumed throughout (bare and compacted).
- No screening.
- Receiver height: 4 m.
- Plant output data taken from Table 10-11.
- 31.5 Hz levels (not provided in BS 5228) assumed to be same as 63 Hz levels.
- Plant on-times per hour: excavator (80 %), mixer truck (50 %), consaw (10 %).
- Dumper movements continuous

The model output is shown in Figure 10-17. $L_{Aeq\ 1\ h}$ levels predicted at the nearby dwellings will be 57 dB at dwellings to the northwest, and will reach 61 dB at the nearest dwellings across the river. Levels will not exceed the 70 dB criterion recommended in the National Roads Authority document *Good practice guidance for the treatment of noise during the planning of national road schemes* (2014) with respect to road projects.

Throughout the construction phase, vehicles will arrive at, and depart from, the site during the working day. Vehicle movements will be associated with workers' arrival and departure, and delivery of

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materials. The approximate numbers of workers employed onsite over the entire construction period will fluctuate depending on schedules.

Personnel and deliveries will access the Proposed Development site via the surrounding road network, with the majority of vehicles expected to access the site via the R157. Construction traffic volumes presented in the Traffic Impact Assessment indicate that construction traffic volumes will be inconsequential in the context of existing traffic volumes. Thus, construction phase traffic noise impacts will be imperceptible.

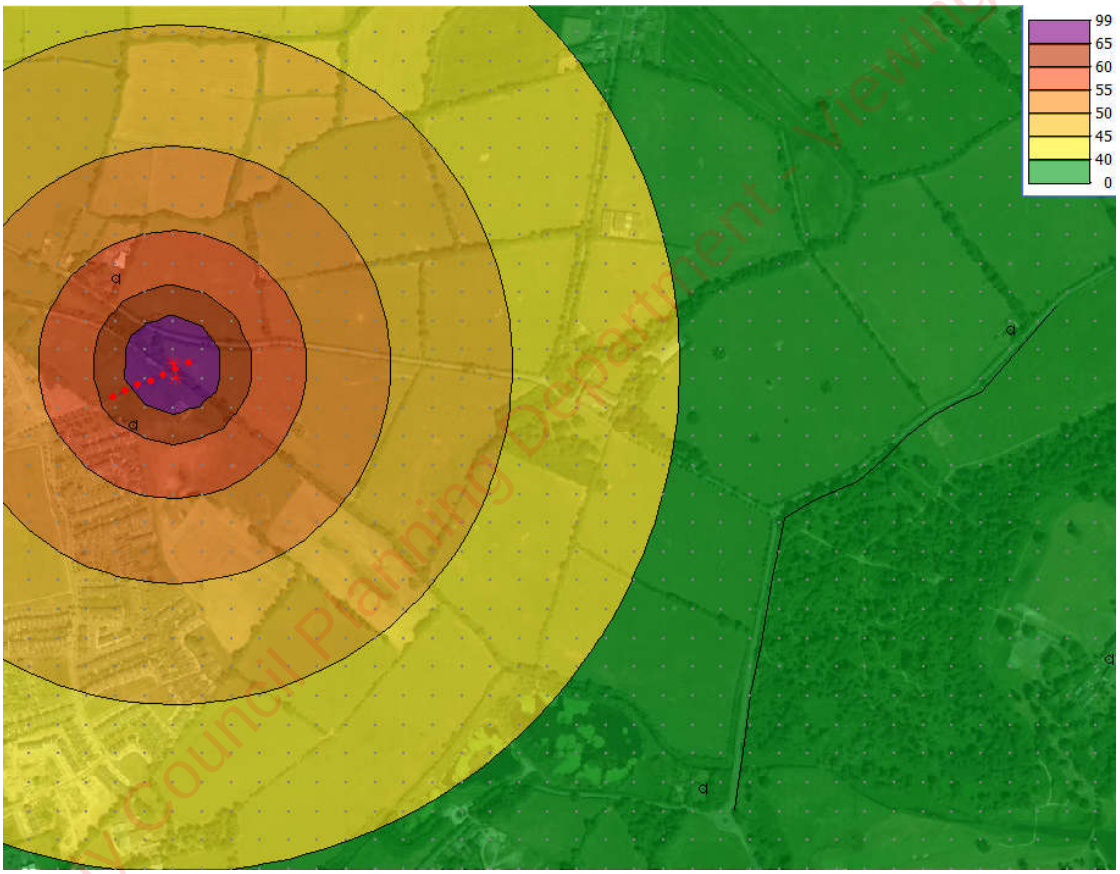

Figure 10-17 Predicted Moyglare Bridge construction phase LAeq 1 h

Potential sources of ground borne vibration during the Moyglare Bridge construction phase are as follows:

- Delivery truck movements: Trucks may give rise to vibration at positions adjacent to the road. However, such emissions are typically imperceptible beyond 10 m, and are highly unlikely to be perceptible at dwellings alongside site access routes.
- Plant movements: The movement of plant onsite is not considered to constitute a source of ground borne vibration and is not listed in typical vibration documents such as BS 5228-2:2009. In addition, plant machinery used onsite is likely to be small to mid-sized, and similar to those used on other urban construction projects.

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- Ground works: Excavation of trenches and pits for foundation and services will be required. These activities are not typically associated with offsite ground-borne vibration impacts. It is noted that piling is not proposed. In addition, rock breaking is unlikely to be required in relation to Sites A, B or C.

On the basis of the above, no construction vibration impacts are expected at offsite receptors.

Proposed Mitigation Measures

Bridge construction phase $L_{Aeq\ 1\ h}$ levels will reach 61 dB at their highest at the nearest dwellings. Levels will not exceed the 70 dB National Roads Authority criterion relevant to road construction.

Although construction phase noise emissions will be short term, and will not exceed the 70 dB criterion, the applicant nonetheless proposes to apply the following mitigation measures throughout the construction phase:

- Construction operations will in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 0800-1600 h.
- Where it is proposed to operate plant during the period 0700-0800 h at locations within 100 m of offsite receptors, standard 'beeper' reversing alarms will be replaced with flat spectrum alarms.
- Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoiding hooting at all times.
- Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced.
- Queuing of trucks near offsite receptors will be prohibited.
- Machinery not in active use will be shut down.
- A site representative will be appointed as a liaison officer with the local community.
- Where evening or night-time operations are required, local residents will be notified through the liaison officer.
- All complaints of noise received during the construction phase will be logged in a register and investigated immediately. Details of follow-up action will be included in the register.
- Where it is proposed to import potentially noisy plant to the site, the potential impact of noise emissions will be assessed in advance.
- Where generators or compressors are required within 100 m of offsite receptors, or previously completed receptors onsite, these will be fitted with manufacturers' acoustic enclosures, or alternatively will be screened by a local acoustic screen or subsoil stockpile.
- Guidance set out in British Standard BS 5228-1:2009+A1:2014 with respect to noise control will be applied throughout the construction phase.

Residual Impact

Noise impacts associated with bridge and Moyglare Hall road construction are likely to be imperceptible to slight at nearby receptors. Impacts will be temporary. No vibration impacts are expected.

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10.4.3 Operational Phase

10.4.3.1 Site A Strategic Employment Zone

Pre Mitigation Impact

At the strategic employment zone, buildings will be used to provide office space, and thus all noise emissions will be internal. External noise emissions may arise from air handling units (AHUs) such as fans, vents and air conditioning cassettes installed on external walls. Emissions from these are highly unlikely to be audible beyond 20 m, and emissions will therefore be negligible.

External emissions will arise from vans and trucks associated with deliveries, and waste collection trucks. All such emissions are highly unlikely to be significant onsite or offsite. Onsite traffic speeds will be low, thus minimising tyre noise.

On the basis of the foregoing, it is highly unlikely that noise emissions from onsite sources will be audible beyond the site boundaries. It follows that these sources will not be audible at receptors in the surrounding area, and thus noise levels are likely to be considerably lower than criteria identified in Table 10-5. Given that emissions are highly unlikely to be audible at offsite receptors, no increase in baseline noise levels is expected, and thus impacts when assessed using BS 4142:2014 and EPA guidance will be imperceptible.

The proposed site layout will incorporate open spaces which will be grassed and planted with trees. It is likely that a maintenance contract will be awarded to one or more local landscaping companies. Maintenance activities undertaken at the proposed site will chiefly include regular mowing of open green areas. While mower emissions are likely to be audible at the nearest receptors, such emissions will blend into the urban soundscape, particularly during the summer when the daytime/evening noise environment in any urban area tends to include at least one mower audible in the distance at any time.

The Proposed Development once operational will give rise to increased traffic on the local road network. Noise impacts at offsite receptors attributable to car movements on roadways within Site A are expected to be imperceptible due to a combination of low traffic speeds, relatively low numbers of movements, screening by buildings and separation distance.

While impacts may arise at offsite dwellings due to increased traffic on public roads in the vicinity, the increase (652 daily movements) will be negligible in the context of existing and future offsite traffic road volumes.

Proposed Mitigation Measures

No mitigation measures are required in relation to the operational Site A.

Residual Impact

Noise impacts associated with onsite emissions including onsite traffic will be imperceptible at offsite receptors.

10.4.3.2 Site B Healthcare Facilities

Pre Mitigation Impact

Noise emissions at the healthcare zone will be chiefly internal, with external sources most likely consisting of AHUs. Emissions from these are highly unlikely to be audible beyond 20 m, and

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emissions will therefore be negligible. External emissions will arise from vans and trucks associated with deliveries, and waste collection trucks. All such emissions are highly unlikely to be significant onsite or offsite. Onsite traffic speeds will be low, thus minimising tyre noise.

On the basis of the foregoing, it is highly unlikely that noise emissions from onsite sources will be audible beyond the site boundaries. It follows that these sources will not be audible at receptors in the surrounding area, and thus noise levels are likely to be considerably lower than criteria identified in Table 10-5. Given that emissions are highly unlikely to be audible at offsite receptors, no increase in baseline noise levels is expected, and thus impacts when assessed using BS 4142:2014 and EPA guidance will be imperceptible.

The proposed site layout will incorporate open spaces which will be grassed and planted with trees. It is likely that a maintenance contract will be awarded to one or more local landscaping companies. Maintenance activities undertaken at the proposed site will chiefly include regular mowing of open green areas. While mower emissions are likely to be audible at the nearest receptors, such emissions will blend into the urban soundscape, particularly during the summer when the daytime/evening noise environment in any urban area tends to include at least one mower audible in the distance at any time.

The Proposed Development once operational will give rise to increased traffic on the local road network. Noise impacts at offsite receptors attributable to car movements on roadways within Site B are expected to be imperceptible due to a combination of low traffic speeds, relatively low numbers of movements, screening by buildings and separation distance.

While impacts may arise at offsite dwellings due to increased traffic on public roads in the vicinity, the increase (803 daily movements) will be negligible in the context of existing and future offsite traffic road volumes.

Proposed Mitigation Measures

No mitigation measures are required in relation to the operational Site B.

Residual Impact

Noise impacts associated with onsite emissions including onsite traffic will be imperceptible at offsite receptors.

10.4.3.3 Site C Strategic Housing Development

Pre Mitigation Impact

Across Site C, noise emissions will consist of typical residential estate sources such as playing children, lawnmowers, heat pumps where installed, and car movements. Emissions will also arise from vans associated with deliveries, and waste collection trucks. All such emissions are highly unlikely to be significant onsite or offsite. Onsite traffic speeds will be low, thus minimising tyre noise. There will be no commercial emissions.

The proposed site layout will incorporate open spaces which will be grassed and planted with trees. It is likely that a maintenance contract will be awarded to one or more local landscaping companies. Maintenance activities undertaken at the proposed site will chiefly include regular mowing of open green areas. While mower emissions are likely to be audible at the nearest receptors, such emissions will blend into the urban soundscape, particularly during the summer when the daytime/evening noise environment in any urban area tends to include at least one mower audible in the distance at any time.

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Noise impacts at offsite receptors attributable to car movements on roadways within the completed site are expected to be imperceptible due to a combination of low traffic speeds, relatively low numbers of movements, screening by buildings and separation distance. However, impacts may arise at offsite dwellings due to increased traffic on public roads in the vicinity. Dwellings most vulnerable here are located outside the western end of Site C.

A review of the traffic impact assessment report indicates that the number of daily vehicle movements generated by the fully completed development will be 1048 from residential areas. These will be dispersed across the day, and will arrive/depart to/from the site using different roads. The traffic assessment suggests that the Proposed Development will result in a minor increase in traffic volumes. As a worst cases scenario, it is likely that the project will result in a doubling of traffic volumes on some local roads in the vicinity of offsite receptors. Such a doubling will result in an increase of 3 dB in traffic noise levels. A 3 dB increase is generally considered to be the smallest change perceptible by the human ear. From Table 10-4 above, such increases will be borderline perceptible, and the resulting impact will be not significant.

An inward noise impact assessment is presented separately in Section 10.4.4.

Proposed Mitigation Measures

No mitigation measures are required in relation to the completed Site C, apart from those relating to inward noise impacts as discussed in Section 10.4.4 below.

Residual Impact

Noise impacts associated with onsite emissions including onsite traffic will be imperceptible at offsite receptors.

10.4.3.4 MOOR

Pre Mitigation Impact

Traffic volumes will be altered locally as a result of completion of the proposed MOOR, which will serve as a bypass around the northeastern side of Maynooth. Most traffic arising on the MOOR will consist of through traffic from the R148 and R157 on the eastern and southeastern side of the site, and Moyglare Road to the west side. Impacts may arise at offsite dwellings due to increased traffic on public roads in the vicinity. Dwellings most vulnerable here are a cluster located along the L2214 outside the northern tip of the Moygaddy Masterplan area, dwellings located outside the western end of Site C, a dwelling located adjacent to the R157 approximately 180m northeast of Site A, and two dwellings close to the southeast corner of Site B, on the opposing riverbank.

Although completion of the MOOR will result in an increase in local traffic, the MOOR will not reach full capacity until completion of Moyglare Bridge at its western end, addressed separately below. Prior to completion of Moyglare Bridge, and Kildare Bridge at its eastern end, MOOR traffic is likely to relocate from the existing L2214 and L6219. Increases in local traffic volumes are unlikely to be significant. Given that a doubling of traffic volumes is required before increased traffic noise is perceptible to the human ear, it is not expected that any changes in local traffic noise levels due to MOOR completion will be perceptible at the nearest receptors.

Proposed Mitigation Measures

No mitigation measures are warranted with respect to the completed MOOR in isolation.

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Residual Impact

Impacts associated with MOOR traffic noise will be imperceptible to not significant.

10.4.3.5 Kildare Bridge

Pre Mitigation Impact

Completion of Kildare Bridge works in isolation is unlikely to result in any increases of significance in local road traffic volumes, or traffic noise levels affecting the nearest receptors. In addition, there will be no noise emissions from the completed pipeline.

Proposed Mitigation Measures

No mitigation measures are required in relation to the bridge or the pipeline.

Residual Impact

Given that the proposed pedestrian and cycle bridge is unlikely to result in any changes in traffic volumes, noise impacts will be imperceptible. Impacts associated with the completed pipeline will also be imperceptible.

10.4.3.6 Moyglare Bridge

Pre Mitigation Impact

Completion of Moyglare Bridge will result in the introduction of traffic noise close to the northwest corner of Moyglare residential estate, 120 m from the nearest dwellings. However, the resulting increase in traffic noise levels will be minimal for two reasons:

- This area is currently subject to traffic noise from the L6219, which runs within 50 m of the proposed bridge.
- Noise emissions from the proposed bridge, in isolation, will be minimal, given its short span.

It follows that noise emissions from the proposed bridge will be negligible in the context of surrounding traffic noise levels.

Proposed Mitigation Measures

No mitigation measures are required in relation to the proposed bridge.

Residual Impact

Given that noise emissions associated with the proposed bridge will be negligible in the context of surrounding traffic noise, noise impacts will be imperceptible.

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10.4.4 Cumulative Effects Resulting from Interactions between Various Elements of the Proposed Development

Construction Phase

Construction phase noise emissions will vary, and it is not possible or practical to calculate a single sound power output figure for the entire site. With respect to surrounding noise sensitive receptors, worst case scenario emissions will arise when localised works are undertaken close to their respective boundaries. An extreme worst case scenario consists of construction activity simultaneously occurring at the nearest points to offsite receptors, involving plant with the greatest noise output. In this scenario, operations may occur simultaneously in six zones:

- Site A: At the western extremity, eastern extremity, and southern boundary.
- Site B: At the northeast and southeast corners.
- Site C: At the northern, eastern and southern corners.
- MOOR: Works along the route, concentrated near the L2214 & L2214-3.
- Kildare Bridge.
- Moyglare Bridge

For the purposes of modelling, it is assumed that works at Sites A, B and C will involve a tracked excavator, discharging mixer truck, consaw, dumper and telescopic handler in simultaneous use, at the nearest point of the works zone, and all positioned within a 100 m wide operations area. It is assumed that bridge works will involve simultaneous use of a tracked excavator, breaker and dump truck in a confined area near the bridges. MOOR works will involve dump trucks tracking back and forth, in addition to a tracked excavator. Such a scenario is unlikely to arise, but is applied here to represent an extreme worst case scenario.

Noise emissions from the above were modelled using DGMR iNoise v2022 software. Input parameters were as follows:

- Model algorithm: *International Standard ISO 9613-2:1996 Acoustics: Attenuation Of Sound During Propagation Outdoors – Part 2 General Method Of Calculation* (1996).
- Hard ground assumed throughout (bare and compacted).
- No screening.
- Receiver height: 4 m.
- Plant on-times per hour: excavator (80 %), mixer truck (50 %), consaw (10 %).
- Dumper and handler movements continuous

The model output is shown in Figure 10-18. The highest $L_{Aeq\ 1\ h}$ levels during this worst case scenario will arise at the dwellings adjacent to Kildare Bridge, where levels will reach 70 dB at the easterly dwelling. Levels will reach 61 dB at the nearest dwellings at Moyglare Hall. Levels associated with road and bridge construction works will not exceed the 70 dB criterion recommended in the National Roads Authority document *Good practice guidance for the treatment of noise during the planning of national road schemes* (2014) with respect to road projects. Impacts associated with these works are likely to be slight to moderate, although temporary, and decreasing to imperceptible at more distant receptors. Impacts will be offset by improvements to local infrastructure.

Levels associated with Site A, Site B and Site C works will be lower than the construction phase noise criterion of 65 dB discussed above.

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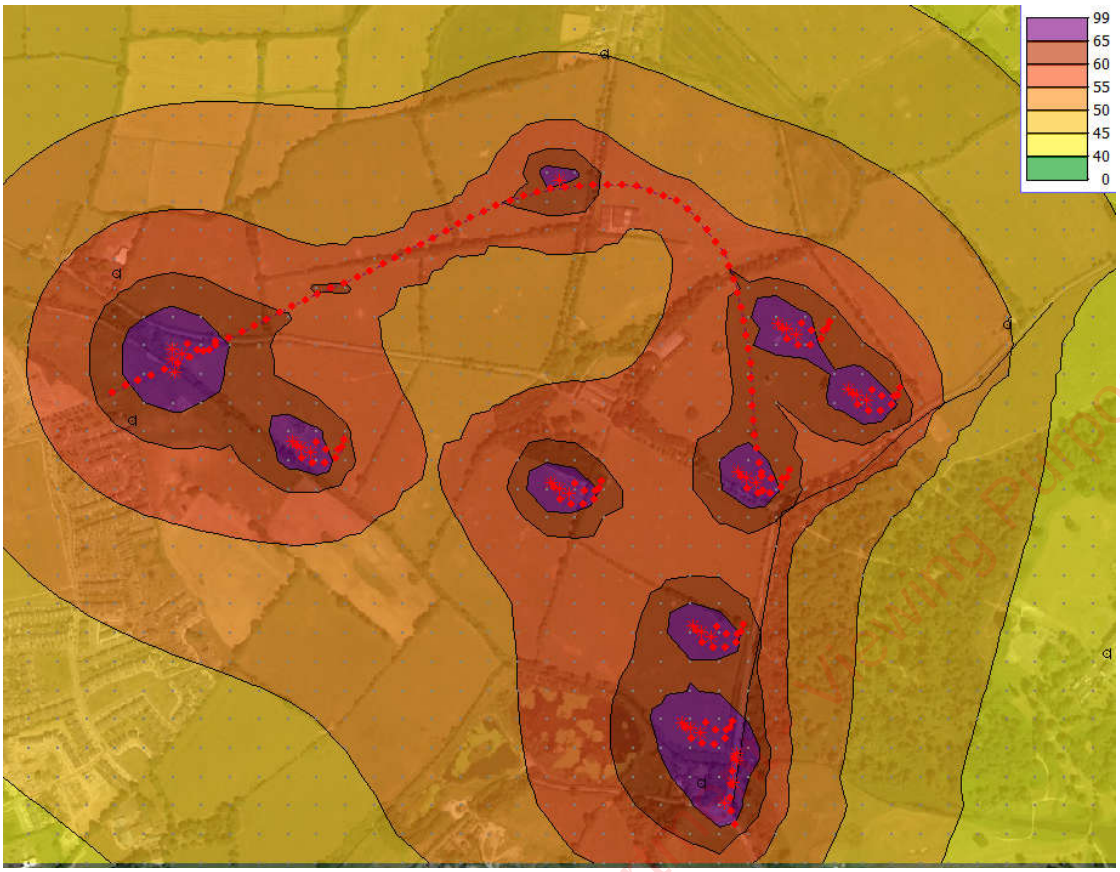

Figure 10-18 Predicted cumulative construction phase LAeq 1 h

With respect to rising main installation, impacts at local receptors will be significant, albeit on a particularly temporary basis, likely to last for several hours at most in proximity to any particular receptor. Levels will not exceed the 70 dB NRA criterion.

Throughout the construction phase, vehicles will arrive at, and depart from, the site during the working day. Vehicle movements will be associated with workers' arrival and departure, and delivery of materials. The approximate numbers of workers employed onsite over the entire construction period will fluctuate depending on schedules.

Personnel and deliveries will access the Proposed Development site via the surrounding road network, with the majority of vehicles expected to access the site via the R157. Construction traffic volumes presented in the Traffic Impact Assessment indicate that construction traffic volumes will be inconsequential in the context of existing traffic volumes. Thus, construction phase traffic noise impacts will be imperceptible.

Potential sources of ground borne vibration during the cumulative construction phase are as follows:

- Delivery truck movements: Trucks may give rise to vibration at positions adjacent to the road. However, such emissions are typically imperceptible beyond 10 m, and are highly unlikely to be perceptible at dwellings alongside site access routes.
- Plant movements: The movement of plant onsite is not considered to constitute a source of ground borne vibration and is not listed in typical vibration documents such as BS 5228-2:2009. In addition, plant machinery used onsite is likely to be small to mid-sized, and similar to those used on other urban construction projects.
- Ground works: Excavation of trenches and pits for foundation and services will be required. These activities are not typically associated with offsite ground-borne vibration

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impacts. It is noted that piling is not proposed. In addition, rock breaking is unlikely to be required in relation to Sites A, B or C.

On the basis of the above, no construction vibration impacts are expected at offsite receptors.

Operational Phase

No cumulative impacts are expected in relation to noise emissions from the completed Sites A, B and C. Noise emissions from these sites will be negligible. In contrast, cumulative emissions will arise from traffic using the completed MOOR and proposed bridges.

The Proposed Development once operational will give rise to increased traffic on the local road network. Traffic volumes will additionally be altered as a result of completion of the proposed MOOR, which will serve as a bypass around the northeastern side of Maynooth. Most traffic arising on the MOOR will consist of through traffic from the R148 and R157 on the eastern and southeastern side of the site, and Moyglare Road to the west side.

Noise impacts at offsite receptors attributable to car movements on roadways within the completed site are expected to be imperceptible due to a combination of low traffic speeds, relatively low numbers of movements, screening by buildings and separation distance. However, impacts may arise at offsite dwellings due to increased traffic on public roads in the vicinity. Dwellings most vulnerable here are a cluster located along the L2214 outside the northern tip of the Moygaddy Masterplan area, dwellings located outside the western end of Site C, a dwelling located adjacent to the R157 approximately 180m northeast of the proposed strategic employment zone, and two dwellings close to the southeast corner of the healthcare zone, on the opposing riverbank.

A review of the traffic impact assessment report indicates that the number of daily vehicle movements generated by the fully completed development will be 1048 from Site C, 803 from Site B and 652 from the Site A, totalling 2,503 daily traffic movements for the Proposed Development once operational.

While traffic noise levels at receptors across the surrounding area are likely to increase following completion of the project, much of this increase will be associated with traffic movements on the MOOR not related to the proposed development i.e. through traffic bypassing Maynooth centre. In addition, increases will arise due to continuing expansion of Maynooth, including ongoing residential developments such as Mariavilla to the southwest, as well as expansion at primary and secondary schools on Moyglare Road.

While the finished project will generate 2,503 vehicle movements each day, these will be dispersed across the wider site, and will arrive/depart to/from the site using different roads. Thus a proportion of the proposed traffic will use Moyglare Road, while other users are likely to use the R148 or R157. These roads will see increases by the design year 2039 regardless of whether the proposed development proceeds.

The traffic assessment suggests that the proposed development itself will result in a minor increase in traffic volumes, outside of increases unrelated to the project. This increase will be offset by reduced traffic speeds due to road realignment and speed restrictions. Moreover, certain road segments will see a reduction in traffic following completion of the MOOR road. As a worst cases scenario, it is likely that the project will result in a doubling of traffic volumes on some local roads in the vicinity of offsite receptors. Such a doubling will result in an increase of 3 dB in traffic noise levels. A 3 dB increase is generally considered to be the smallest change perceptible by the human ear. From Table 10-4 above, such increases will be borderline perceptible, and the resulting impact will be not significant.

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Inward impacts

Inward impacts relate to noise emissions received at a receptor due to emissions emitted by one or more sources. Emerging best practice provides for the design of new developments such that the occupants of residential elements are not subject to high internal noise due to existing (and potential future) external noise sources. Such sources usually consist of transport (road, rail and aircraft), and industry. Internal and external criteria considered appropriate to new residential developments are identified below. Impacts at the proposed creche are also assessed.

It is also considered prudent here to briefly assess potential inward impacts on the proposed office buildings and healthcare buildings. The objective here is to ensure that offsite road traffic noise levels do not render the development site unsuitable for the uses proposed, and that internal criteria in the proposed buildings can be readily achieved. These criteria are:

- Strategic Employment Zone: Daytime internal $L_{Aeq\ T}$ level of 45 dB.
- Healthcare Facilities: Daytime internal $L_{Aeq\ 1\ h}$ of 40 dB, and night-time $L_{Aeq\ 1\ h}$ level of 35 dB $L_{Aeq\ 1\ h}$, with night-time L_{AFmax} recommendation of 45 dB.

At the Proposed Development site, inward noise will arise from the following sources:

- Onsite vehicle movements associated with residents at Site C, employees at Site A, and staff and visitors at Site B. Noise emissions from these will be relatively low at onsite receptors due to low traffic speeds. Inward noise impacts are typically associated with rolling noise at higher speeds, and such emissions are unlikely to arise onsite.
- Noise from delivery vehicles across the site and from waste management vehicles will be similarly low due to low speed.
- The nearest road of significance is the R157 which runs along the eastern side of the proposed development site. This road sees traffic throughout the day, evening and night.
- Local road L6219 runs through the site centre. This road will be realigned in the western margins of the site.
- Local road L2214 runs north from the L6219.
- Dillow's Road runs close near the southeast corner of the site over a short section before turning away from the site.
- The proposed MOOR road will run in a curve through the northern side of the site, connecting the R157 to Moyglare Hall, intercepting the L2214. The L6219 will be realigned to provide a staggered junction where it meets the MOOR.
- Inward traffic noise also arises from distant roads, including the R148, the M4, and roads around Maynooth.

All sources of inward noise are road traffic. Rail noise is not audible at the site. Aircraft noise is also not a major contributor. There are no industrial or commercial sources of significance locally.

Noise levels measured at the site indicate that L_{den} levels close to the R157 and L6219 rise to 64-65 dB, with L_{night} levels reaching 57-58 dB. Levels falls with increasing distance from surrounding roads, with L_{den} and L_{night} levels falling below 54 and 48 dB respectively in quieter parts. L_{den} and L_{night} levels across the site are currently lower than Noise Action Plan thresholds. While the L_{night} level adjacent to the R6219 marginally exceeds the threshold, the level is likely to reduce following the proposed road realignment. The ProPG risk assessment concludes that the proposed development site is low risk across almost all areas, increasing to medium risk at positions immediately adjacent to the L6219 and R157. It is also concluded that night-time L_{AFmax} levels require consideration at positions within approximately 100 m of public roads.

In order to quantify noise levels across the site, predictive modelling was undertaken using DGMR iNoise v2022 software. The following input parameters were applied:

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- Model algorithm: *International Standard ISO 9613-2:1996 Acoustics: Attenuation Of Sound During Propagation Outdoors – Part 2 General Method Of Calculation* (1996).
- Contours taken from mapping.
- Modelled heights: 2 m to allow comparison with measured values.
- Road traffic volumes taken from the traffic count data provided by the design team. The count measured daytime data only (0700-1900 h). Additional evening (1900-2300 h) and night-time (2300-0700 h) flows of 10 % each were assumed.
- Light vehicle and HGV noise emissions taken from CNOSSUS-EU database.
- Traffic speeds 60-80 km/h, depending on road (adjusted where required to improve accuracy).

The model output is shown in Figures 10-19 and 10-20. Table 10-18 presents a comparison between modelled and measured L_{den} and L_{night} levels. Modelled levels at four measurement positions are within 2 dB of measured levels. At N5, the slightly larger discrepancy (2-3 dB) is most likely a result of the complicated topography in this area. The model is considered reasonably valid for the purposes of this assessment.

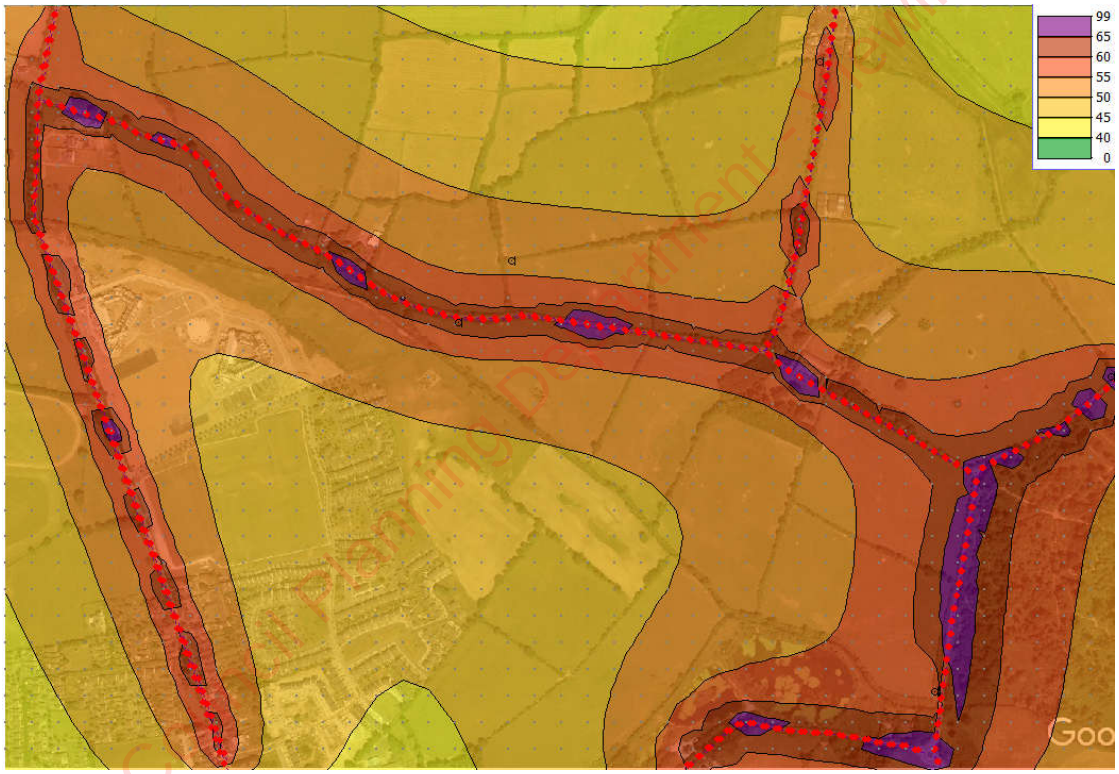

Figure 10-19 Baseline Lden levels at 2 m

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Figure 10-20 Baseline Lnight levels at 2 m

Table 10-18 Modelled and measured baseline Lden and Lnight levels.

Parameter		N1	N2	N3	N4	N5
L_{den}	Measured	64	53	56	65	54
	Modelled	65	54	55	65	57
L_{night}	Measured	58	47	49	57	46
	Modelled	57	46	47	57	48

In order to provide for future increases in noise levels, the model was modified to include future traffic volumes (overall road traffic across the local area) predicted by the project traffic team with respect to the design year 2038/2039. Proposed buildings at Sites A, B and C were added to the model, as well as traffic on the proposed MOOR and bridges as completed. The model was run at a height of 4 m, to provide an indication of future traffic noise levels at upper floors of the proposed buildings. The model output is shown in Figures 10-21 to 10-25. Parameters modelled are $L_{Aeq\ 16\ h}$, L_{night}, L_{den}, daytime $L_{Aeq\ 1\ h}$ and night-time $L_{Aeq\ 1\ h}$, as these relate to identified criteria.

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Figure 10-21 Design year 2039 LAeq 16 h levels at 4 m

Figure 10-22 Design year 2039 Lnight levels at 4 m

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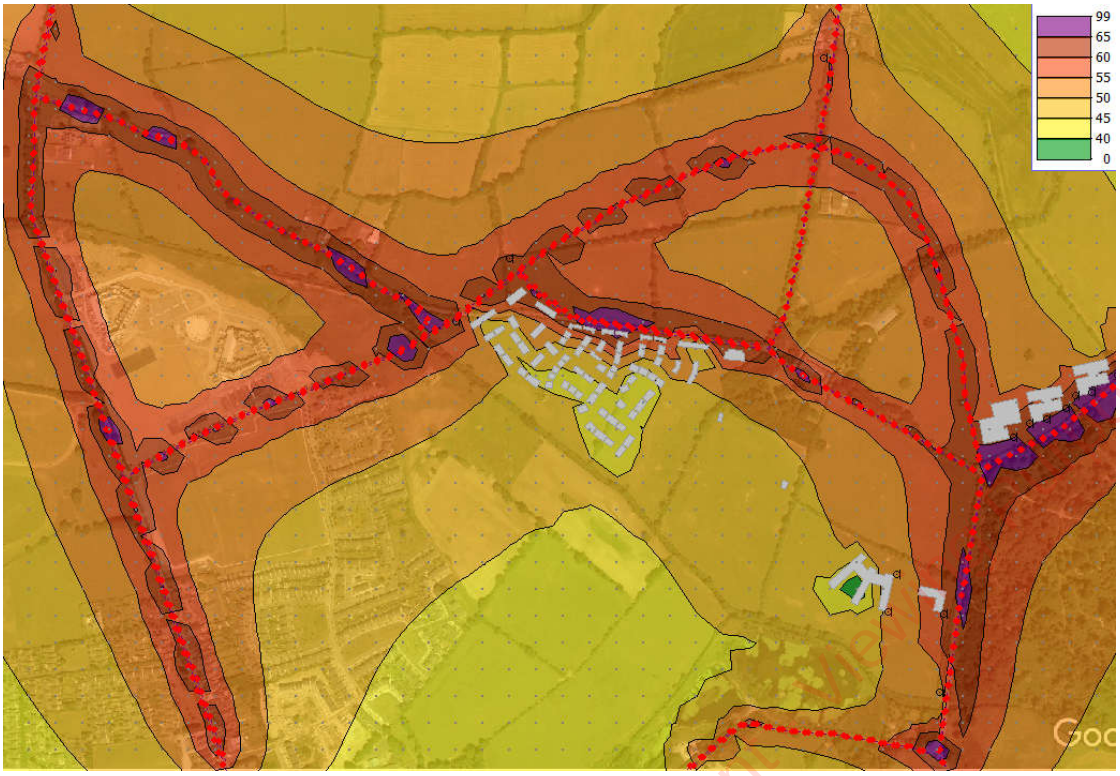

Figure 10-23 Design year 2039 Lden levels at 4 m

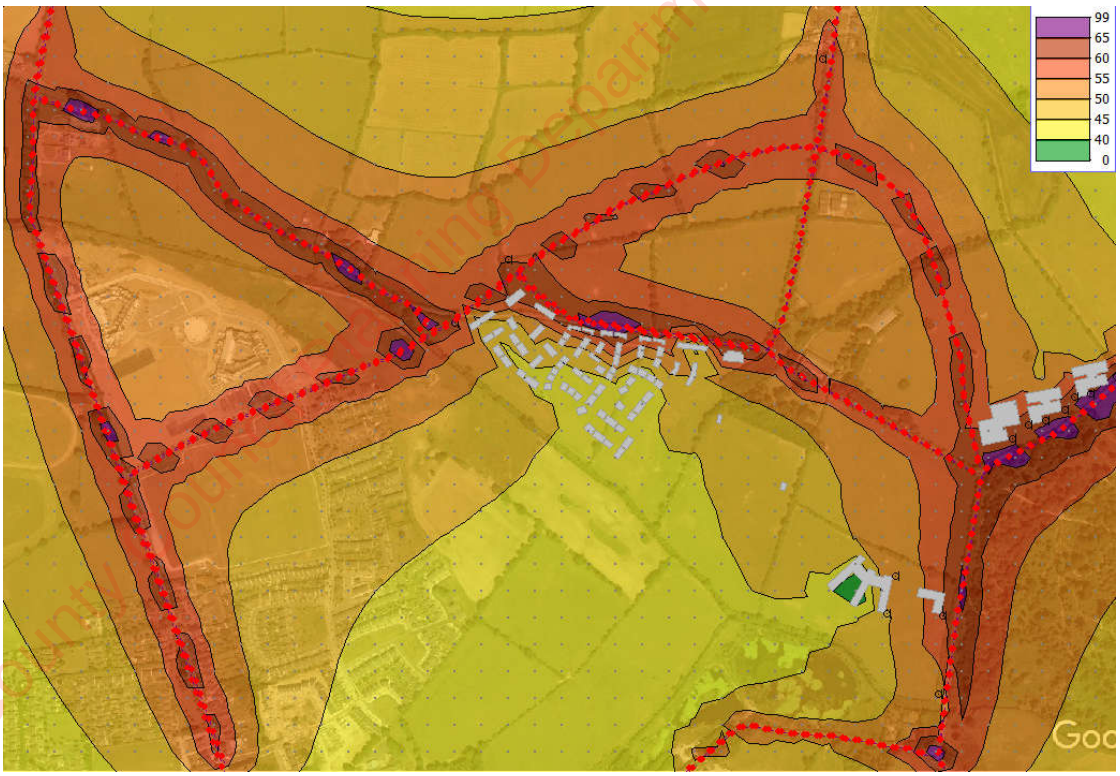

Figure 10-24 Design year 2039 daytime LAeq 1 h levels at 4 m

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Figure 10-25 Design year 2039 night-time LAeq 1 h levels at 4 m

Noise levels predicted externally may be used to predict likely internal noise levels with offices and rooms at the proposed Strategic Employment Zone and the Healthcare Facilities. Calculations are presented in Table 10-19. The calculations assume a likely noise reduction of 25 dB through building glazing, which is expected to be the weakest façade element. The 25 dB attenuation factor is the minimum provided by standard thermal glazing. Calculations relate to a windows-closed scenario, as whole-building ventilation will be provided by mechanical units across the development. The strictest criteria relevant to the buildings are applied.

Table 10-19 Likely internal LAeq 1 h levels at road-facing facades.

Building		Incident $L_{Aeq\ 1\ h}$	Minimum glazing Rw	Internal $L_{Aeq\ 1\ h}$	Criterion $L_{Aeq\ 1\ h}$	Achieved
SEZ – W building	Daytime	62-64	25	37-39	45	Yes
	Night-time	54-55	25	29-30	-	N/A
SEZ – central building	Daytime	62-64	25	37-39	45	Yes
	Night-time	55-57	25	30-32	-	N/A
SEZ – E building	Daytime	65-68	25	40-43	45	Yes
	Night-time	55-61	25	30-36	-	N/A
Nursing home	Daytime	47-51	25	22-26	40	Yes
	Night-time	40-46	25	15-21	35	Yes
	Daytime	55-62	25	30-37	40	Yes

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Primary care centre	Night-time	48-54	25	23-29	35	Yes

On the basis of Table 10-19, it is evident that internal noise criteria in the proposed employment zone and healthcare zone will be readily achieved using standard thermal glazing, and that no additional noise treatment is required.

Specialist Services Health Technical Memorandum 08-01: Acoustics (UK Department of Health, 2013) recommends an internal L_{AFmax} limit of 45 dB during night-time hours. Measured data suggest that external L_{AFmax} levels due to passing traffic exceed 60 dB approximately 100 m into the site, and approach 80 dB within 10 m of the road network. This is of relevance solely to the proposed primary care centre which will lie within 30 m of the R157. The separation distance to the proposed nursing home will allow L_{AFmax} levels to attenuate before reaching the façade.

Data indicate that typical external L_{AFmax} levels at the road-facing façade of the primary care centre building will be approximately 72 dB. In order to reduce internal L_{AFmax} levels below 45 dB at this façade, a minimum attenuation of 27 dB will be required. A minimum of 30 dB is recommended. At detailed design stage, it will be necessary to factor such an attenuation into glazing specifications. It will be prudent to extend this consideration to the north-facing façade as well as the south-facing façade of the southern wing. Standard glazing will provide sufficient attenuation at other facades, as well as facades on the western building.

Site C Pro-PG Stage 1: Risk assessment

The model indicates that future noise levels, based on increased traffic and the introduction of MOOR traffic, will result in incident $L_{Aeq\ 16\ h}$ levels which reach 65-65 dB at units facing the L6219, and 59-61 dB at units facing the MOOR. Levels across the majority of the residential area will be lower.

L_{night} levels across most of the residential area will be lower than 45 dB. Levels will be higher at facades close to the road network, reaching 60 dB at units facing the L6219. Units facing the MOOR road will receive L_{night} levels approaching 55 dB. Most of the residential area will continue to be 'low risk' into the future, with risk increasing to 'medium' at units fronting the MOOR and the L6219.

ProPG notes that the risk category will be influenced by the number of L_{AFmax} events which exceed 60 dB externally during night-time hours. Measured data suggest that L_{AFmax} levels due to passing traffic exceed 60 dB approximately 100 m into the site, and the number of such movements considerably exceeds 10 during night-time hours. It follows that, bedrooms on façades which face the MOOR and the L6219 (eastern and western segments) are likely to receive more than 10 L_{AFmax} events above 60 dB during night-time hours. Bedrooms of facades which are less than 90 degrees to these roads are likely to be similarly exposed. Such L_{AFmax} events require consideration in the design of glazing requirements.

Bedrooms on other facades, and across the wider residential area, are likely to be satisfactory in this context, with any L_{AFmax} events likely to be entirely due to traffic movements within the development site.

Site C Pro-PG Stage 2 element 1: Good acoustic design process

In designing the overall site layout, the following principles of good acoustic design have been applied:

- The majority of the proposed residential units are located deep within the residential area, away from the public road network. A small proportion of facades will face the public road network.
- The proposed L6219 realignment where it meets the MOOR road will reduce traffic speeds and thus traffic noise.

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- The proposed residential area incorporates several green spaces, in addition to large open expanses in the wider development.

Site C Pro-PG Stage 2 element 2: Internal noise level guidelines

Internal noise criteria are discussed above. Assuming a 15 dB reduction through an open window (the conventionally accepted value, identified in *NANR116: Open/Closed Window Research – Sound Insulation Through Ventilated Domestic Windows* (prepared by the Napier University Building Performance Centre for DEFRA, 2007)), the following conclusions are drawn:

- Recommended internal daytime $L_{Aeq\ 16\ h}$ criteria are 35-40 dB. These criteria will be met with open windows where incident levels do not exceed 50-55 dB. The criteria will be met across most of the residential area with windows open.
- At dwellings and apartments fronting the L6219 and the MOOR, standard thermal glazing is likely to allow compliance with criteria with windows closed. However, it will be prudent to install marginally enhanced windows (R_W value of 33) in living rooms, dining rooms and bedrooms which face the L6219 and the MOOR, or are within 90 degrees.
- The recommended L_{night} criterion in bedroom is 30 dB. As before, this criterion will be met across most of the residential area with windows open. Installation of the marginally enhanced glazing identified in the previous paragraph will allow internal night-time criteria to be achieved at bedrooms facing the L6219 and the MOOR.
- Facades within 100 m of the L6129 and the MOOR will be exposed to more than 10 L_{AFmax} events at night which exceed 60 dB. The World Health Organisation (1999) recommends that L_{AFmax} levels in bedrooms should not exceed 45 dB to prevent sleep disturbance. Where the number of events exceeds 10 per night, the objective is thus to ensure than internal L_{AFmax} levels with windows closed remain below 45 dB. Standard thermal glazing will reduce internal L_{AFmax} levels below 45 dB at almost all bedrooms across the site, including most units within the 100 m corridor along the L6219 and the MOOR. At units directly fronting these roads, external L_{AFmax} levels may reach 80 dB, and standard thermal glazing will be insufficient. Morover, the R_W 33 dB recommendation above will also be insufficient, and it will be necessary to further increase R_W values here. A conservative R_W value of 38 dB is recommended at bedrooms within 20 m of the L6219 and the MOOR. Standard thermal glazing will be sufficient at other facades.

At site C, operational phase mitigation required onsite relates solely to inward impacts associated with L6219 and MOOR traffic noise. Internal $L_{Aeq\ T}$ criteria will be met at most residential units using standard thermal glazing. However, certain facades will require enhanced glazing to meet ProPG and BS 8233:2014 criteria. The facades in question are shown in Figure 10-26. At these façades, it is proposed to install glazing with a minimum R_W value of 33 dB in living rooms and dining rooms, and 38 dB on bedrooms. Standard glazing will suffice in kitchens, bathrooms, hallways and stairwells. Table 10-20 shows recommended glazing specifications, along with ventilation requirements.

Table 10-20 specifications are readily achievable, and a number of suppliers offer suitable products. It is necessary that the glazing R_W value is guaranteed by the window supplier rather than by the individual glazing and frame manufacturers. Potential suppliers should be advised that levels in each octave band should be achieved as a minimum. Compliance with the overall R_W value should only be assessed by reference to the R_W+C_{tr} value, typically 4-5 dB higher than the R_W value alone.

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Table 10-20 Site C glazing and ventilation requirements at facades shown in Figure 10-26

Band	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	Total
Dining & living glazing	15 dB	17 dB	21 dB	30 dB	38 dB	36 dB	35 dB	35 dB	33 dB R_W
Dining & living trickle vent	36 dB	36 dB	34 dB	31 dB	34 dB	38 dB	38 dB	38 dB	35 dB $D_{n,e}$
Bedroom glazing	25 dB	28 dB	28 dB	34 dB	40 dB	41 dB	43 dB	45 dB	38 dB
Bedroom trickle vent	35 dB	40 dB	38 dB	32 dB	47 dB	53 dB	53 dB	53 dB	38 dB $D_{n,e}$

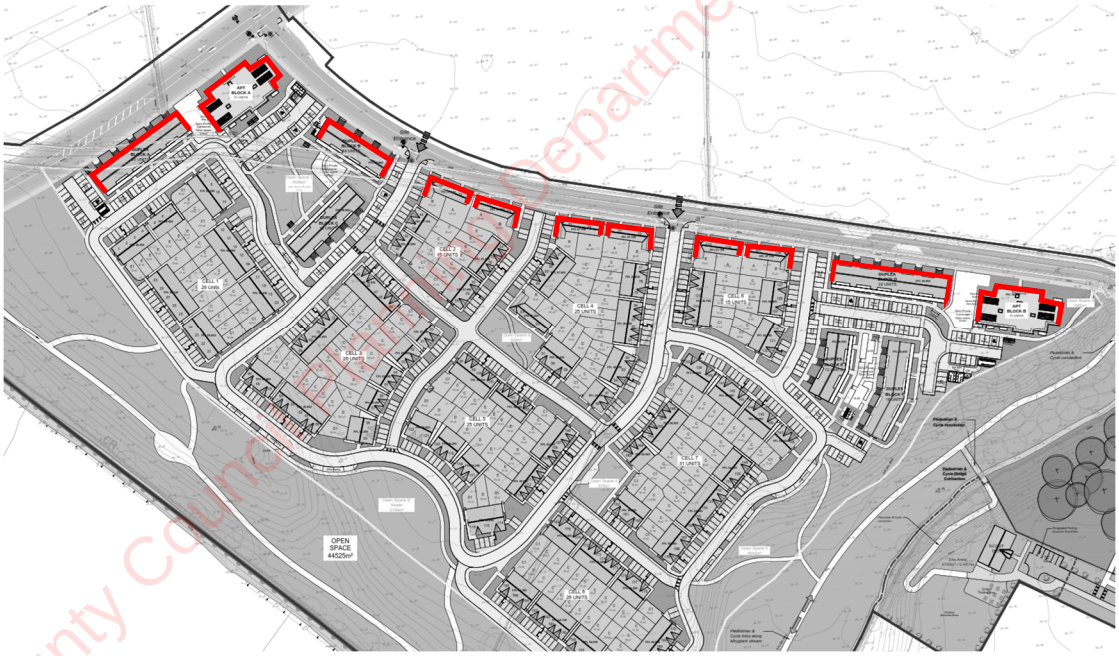

Figure 10-26 Site C facades requiring enhanced glazing (shown red)

External amenity areas will be satisfactory in the context of WHO and ProPG criteria. At the proposed creche, received $L_{Aeq\ 16\ h}$ levels will be satisfactory in the context of Technical Guidance Document TGD-021-5, and specific mitigation measures are not required. Standard thermal glazing is expected to be sufficient to meet an internal ambient $L_{Aeq\ 30\ min}$ criterion of 35 dB.

At Sites A and B, operational phase mitigation required onsite relates to road-facing facades of the proposed primary care centre, where moderately enhanced glazing will be required to reduce internal L_{AFmax} levels (with windows closed) below 45 dB. The facades in question are shown in Figure 10-27. At these façades, it will be necessary to install glazing with a minimum R_W value of 33 dB in rooms

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which will see night-time use (other than common areas such as canteens, bathrooms, hallways and stairwells.

The R_W 33 dB specification is readily achievable, and a number of suppliers offer suitable products. It is necessary that the glazing R_W value is guaranteed by the window supplier rather than by the individual glazing and frame manufacturers. Compliance with the overall R_W value should only be assessed by reference to the R_W+C_{tr} value, typically 4-5 dB higher than the R_W value alone.

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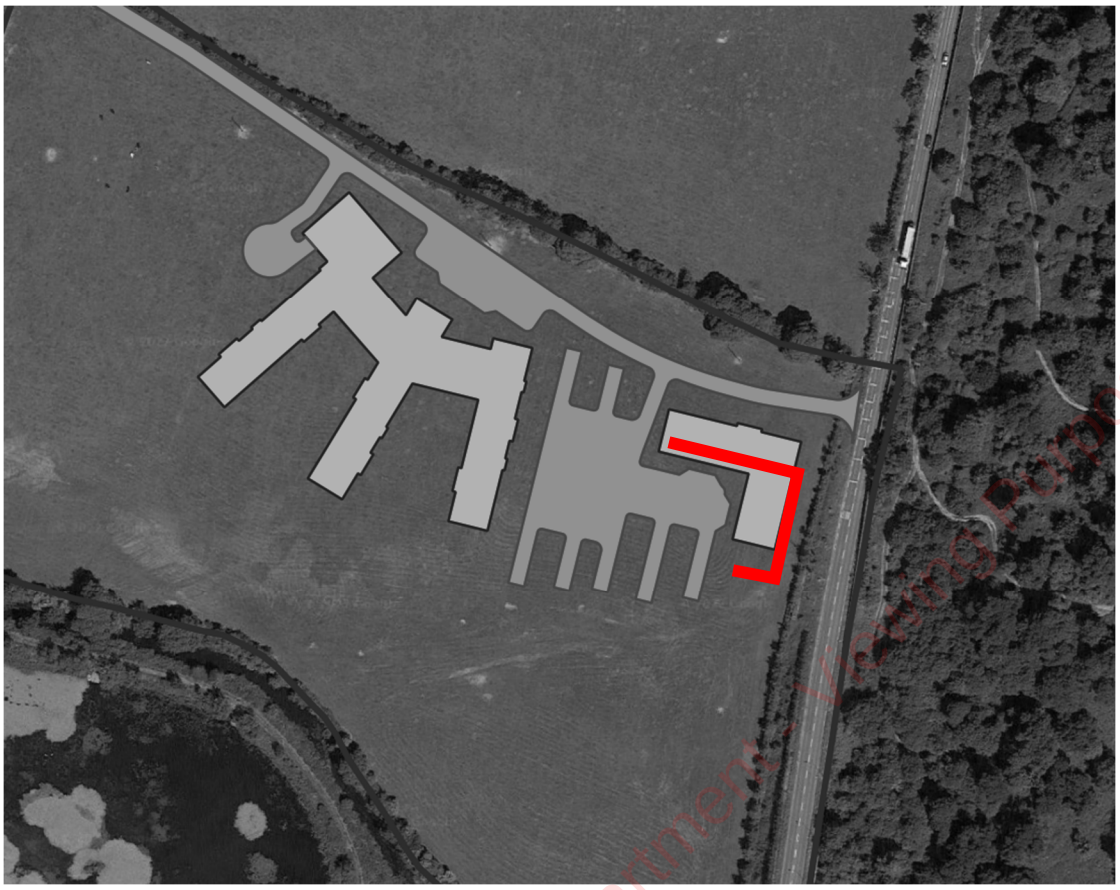

Figure 10-27 Primary care centre facades requiring enhanced glazing (shown red)

Site C Pro-PG Stage 2 element 3: External amenity area noise assessment

BS 8233:2014 recommends that $L_{Aeq\ 16\ h}$ levels should ideally not exceed 50-55 dB in external amenity areas. This criterion will be met in rear gardens of all housing units. The criterion will be exceeded at the balconies of both proposed apartment buildings, where $L_{Aeq\ 16\ h}$ levels will reach 62 dB at balconies overlooking the MOOR and L6219.

Where $L_{Aeq\ 16\ h}$ levels in amenity areas exceed 50-55 dB, BS 8233:2014 states that:

> *'These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited.'*

In this regard, ProPG adds:

> *'Where, despite following a good acoustic design process, significant adverse noise impacts remain on any private external amenity space (e.g. garden or balcony) then that impact may be partially off-set if the residents are provided, through the design of the development or the planning process, with access to...a relatively quiet, protected, publically accessible, external amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance).'*

The residential area will incorporate a number of onsite open green spaces, all within several minutes' walk. The spaces will include a large riverside area extending along the entire southern side of the residential area, as well as a landscaped public part at the eastern end of the area. Furthermore, the public part will extend northeast into the amenity and tourism element of the Moygaddy Masterplan area. These areas will be contiguous, and will be linked by a network of paths. Residents of all units,

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including apartment buildings, will therefore benefit from provision of an extensive open, accessible and quiet onsite realm. On this basis, noise levels in amenity areas including apartment balconies will be satisfactory.

Site C Pro-PG Stage 2 element 4: Assessment of other relevant issues

Other issues assessed, as recommended by ProPG, include the following:

- Compliance with relevant national and local policy: The most relevant policies are those set out in the County Meath Noise Action Plan. The plan proposes that mitigation will be applied where L_{den} levels exceed 70 dB, and L_{night} levels exceed 57 dB. Onsite L_{den} noise levels do not exceed the 70 dB criteria, and are not expected to exceed them in the future. L_{night} levels are also lower than the 57 dB criterion across most of the site, although will marginally exceed this limit along the L6219 in the future. The local authority may consider mitigation measures with respect to the L6219 in the future, including measures to reduce traffic speed.
- Magnitude and extend of compliance with ProPG: $L_{Aeq\ 16\ h}$ and L_{night} levels in almost all proposed units will meet identified criteria without specific acoustic mitigation measures. Measures required relate solely to units fronting the L6219 and the MOOR, and are discussed below.
- Likely occupants of the development: The proposed development is expected to be occupied by a typical sample of the population, and is unlikely to see a predominance of one particularly sensitive group.
- Acoustic design versus unintended adverse consequences: No adverse consequences have been identified.
- Acoustic design versus wider planning objectives: No issues have been identified.

At the proposed creche, incident $L_{Aeq\ 16\ h}$ levels will be considerably lower than the 51-55 dB range suggested by Technical Guidance Document TGD-021-5.

10.4.5 Cumulative In-Combination Effects (Proposed Development & developments located within the area)

Construction Phase

Potential cumulative noise impacts may arise during the construction phase due to possible overlap of onsite construction activity with the construction phase of offsite residential developments to the west and south.

$L_{Aeq\ 1\ h}$ levels at offsite dwellings near the western and southern boundaries of the Proposed Development site will be lower than the identified 65 dB criterion during onsite construction. Levels at two dwellings near Kildare Bridge will not exceed the 70 dB NRA criterion applicable to road projects.

In the event that other construction projects are undertaken in the surrounding area while construction at the Proposed Development site is underway, offsite receptors may be simultaneously subject to noise emissions from all concurrent projects. An entirely worst-case scenario would result in a doubling of noise levels at receptors where construction activities are underway at more than one local site. Although such a scenario and such an increase is unlikely, this assumption provides an entirely worst-case scenario which simplifies assessment. In this scenario, a doubling of noise levels would result $L_{Aeq\ 1\ h}$ levels which remain lower at all times than 65 dB at all receptors apart from the two dwellings

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adjacent to Kildare Bridge. On this basis, it is concluded that cumulative $L_{Aeq\ 1\ h}$ levels due to concurrent construction activities across the surrounding area including the Proposed Development site are highly likely to remain below the 65 dB criterion recommended by BS 5228-1:2014.

At the dwellings adjacent to Kildare Bridge, $L_{Aeq\ 1\ h}$ levels due to bridge works may approach 70 dB, and these works are likely to dominate the local soundscape when present. Where other works are undertaken in the local area, $L_{Aeq\ 1\ h}$ levels attributable to same would be required to exceed 60 dB before combined levels would exceed 70 dB. It is highly unlikely that any works would arise in the local area which would give rise to $L_{Aeq\ 1\ h}$ levels over 60 dB at the two dwellings adjacent to Kildare Bridge, and thus cumulative levels include bridge works would be highly unlikely to increase over the 70 dB NRA criterion.

Operational Phase

With respect to potential cumulative impacts associated with the operational phase of the Proposed Development, such impacts relate only to traffic noise. Cumulative impacts may arise from road traffic associated with the proposed Strategic Housing Development, Strone and Healthcare Facilities, as well as the complete delivery of the MOOR and developments across the remainder of the Moygaddy Masterplan area subject to separate future planning applications. Increases in road traffic on the surrounding road network due to other developments in the local area will also contribute to cumulative noise impacts.

A review of the traffic impact assessment report indicates that the number of daily vehicle movements generated by the fully completed Moygaddy Masterplan developments, as envisaged, will be 803 from Site B, 652 from Site A, 1048 from Site C, as well as an additional 7400 movements from the remainder of the proposed Masterplan area in the design year 2038-2039. Only a small proportion of these will arise from the Proposed Development subject to the current planning applications considered within this EIAR.

While traffic noise levels at receptors across the surrounding area are likely to increase following completion of the project, much of this increase will be associated with traffic movements on the MOOR not related to the Proposed Development i.e., through traffic bypassing Maynooth centre. In addition, increases will arise due to continuing expansion of Maynooth, including ongoing residential developments such as Mariavilla to the southwest, as well as expansion at primary and secondary schools on Moyglare Road.

While the finished Masterplan project will generate 9,913 vehicle movements each day, these will be dispersed across the wider site, and will arrive/depart to/from the site using different roads. Thus, a proportion of the proposed traffic will use Moyglare Road, while other users are likely to use the existing R148 or R157. These roads will see increases by the design year 2038-2039 regardless of whether the Proposed Development proceeds or not.

The overall Moygaddy Masterplan will result in a doubling of traffic volumes on the road network in the vicinity of offsite receptors in the local area. Such a doubling will result in an increase of 3 dB in traffic noise levels. A 3 dB increase is generally considered to be the smallest change perceptible by the human ear (see Table 10-4 above). Such increases will be imperceptible, and the resulting impact will be an imperceptible to not significant negative impact.

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10.5 Residual Impacts

10.5.1 Population & Human Health

The assessment of impacts on human health is typically undertaken by reference to WHO guidance, which has been revised over the last four decades according as noise and health studies have been published. The WHO currently recommends the following:

- In residential settings, a daytime/evening $L_{Aeq\ 16\ h}$ level of 50 dB is an indicator of moderate annoyance.
- A night-time $L_{Aeq\ 8\ h}$ level of 45 dB is recommended to prevent sleep disturbance.
- With respect to short term impulsive sources, the WHO recommends a night-time L_{Amax} limit of 60 dB outside bedroom windows during night-time hours.

Impacts assessed above may be reviewed in light of the WHO recommendations, as follows:

- Following completion and occupation of the completed development, daytime and night-time WHO criteria are not expected to be exceeded at any offsite receptor as a result of onsite emissions.
- Traffic noise arising from public roads in the vicinity will increase slightly as a result of the proposed development. Increases will also arise due to completion of the MOOR, which will be used by traffic bypassing Maynooth. The increase will be slight, and unlikely to be higher than 3 dB at local receptors outside the site boundary.
- With respect to inward impacts, external noise levels will be generally satisfactory in the context of WHO. However, residential units close to the L6219 and the MOOR will be exposed to $L_{Aeq\ 16\ h}$ and $L_{Aeq\ 8\ h}$ levels which exceed WHO criteria. Nonetheless, internal noise levels at these units will be satisfactory, subject to installation of marginally enhanced glazing required to attenuate $L_{Aeq\ 16\ h}$, $L_{Aeq\ 8\ h}$ as well as L_{AFmax} events.
- At the primary care centre, noise levels will be satisfactory in the context of WHO criteria, subject to installation of marginally enhanced glazing required to attenuate L_{Amax} events at road-facing facades.

On this basis, it is considered that there will be no adverse noise impact on the local population or on human health.

10.5.2 Overall Residual Impacts

Following completion, noise emissions arising within the completed development will be identical in character to emissions arising across the nearby fringes of Maynooth. Emissions will be urban-residential in character, and will not give rise to offsite impacts.

Noise impacts at offsite receptors attributable to vehicle movements on roadways within the completed site will be imperceptible. While increases in traffic on the surrounding road network will arise as a result of the development, much of the increase will be attributable to traffic using the proposed MOOR which will benefit the wider town. Increases associated with onsite traffic directly will be less than 2 dB, resulting in noise impacts at nearby receptors which are imperceptible. Increases associated with the MOOR will be approximately 3 dB at most, resulting in noise impacts at nearby receptors which are imperceptible to not significant.

At the completed development, inward noise emissions will arise from the surrounding road network, including the MOOR. The future noise risk is low across most of the site when assessed using ProPG guidance, increasing to medium at units directly fronting the MOOR road and the L6219. These properties will benefit from moderately enhanced glazing on units facing these roads. Road-facing

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facades at the primary care centre will also benefit from moderately enhanced glazing in order to attenuate night-time L_{AFmax} levels.

Noise levels in amenity areas and at the proposed creche will be lower than relevant criteria. Apartment residents will benefit from onsite green spaces, thus offsetting traffic noise levels on balconies facing roadways.

EPA document *Guidelines On The Information To Be Contained In Environmental Impact Assessment Reports* (2022) sets out a scheme by which environmental noise impacts may be assessed. Operational phase environmental impacts are assessed in this regard in Table 10.21. This assessment scheme is not applicable to inward noise impacts, which are assessed separately through the ProPG procedure set out above.

Table 10-21 Assessment of offsite noise impacts from completed development

Criterion	Impact at offsite receptors
Quality of effects	Activities within the development: Neutral effects Onsite traffic: Imperceptible effects MOOR & bridge traffic: Negative effects
Significance of effects	Activities within the development: Imperceptible effects Onsite traffic: Imperceptible effects MOOR & bridge traffic: Imperceptible to not significant effects
Extent & context of effects	Activities within the development: Minimal extent, as almost all onsite sources will be inaudible offsite. Effects will conform with baseline environment which is urban-fringe in character. Onsite traffic: Extent extends throughout surrounding area. Effects will conform with baseline soundscape which is dominated by road traffic. MOOR & bridge traffic: Extent extends throughout surrounding area. Effects will conform with baseline soundscape which is dominated by road traffic.
Probability of effects	Activities within the development: Effects likely to occur Onsite traffic: Effects likely to occur MOOR & bridge traffic: Effects likely to occur
Duration & frequency of effects	Activities within the development: Permanent, irreversible, daily Onsite traffic: Permanent, irreversible, daily MOOR & bridge traffic: Permanent, irreversible, daily
Types of effects	Indirect effects: None identified at offsite receptors Cumulative effects: Discussed below

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	Do-nothing effects: None identified at offsite receptors Worst case effects: None identified at offsite receptors Indeterminable effects: None identified at offsite receptors Irreversible effects: Effects will be irreversible Residual effects: None identified at offsite receptors Synergistic effects: None identified at offsite receptors

10.5.3 Monitoring

It is not considered necessary to undertake environmental noise or vibration monitoring during the construction phase or post-completion at offsite receptors. However, it is considered prudent to undertake vibration monitoring at Moygaddy House and the ancillary stone buildings during periods when ground works are being undertaken within 100 m. Monitoring will be undertaken by reference to British Standard BS 5228-2:2009+A1:2014 Code Of Practice For Noise And Vibration Control On Construction And Open Sites – Part 2: Vibration (2014) and Measurement And Assessment Of Ground borne Noise And Vibration (Association Of Noise Consultants (2012). The purpose of this monitoring will be to ensure that PPV levels at the structures do not exceed criteria set out in Tables 10-2 and 10-3 above.

10.6 Glossary

Ambient: Total noise environment at a location, including all sounds present.

A-weighting: Weighting or adjustment applied to sound level to approximate non-linear frequency response of human ear. Denoted by suffix A in parameters such as $L_{Aeq\ T}$, $L_{AF10\ T}$, etc.

Background level: A-weighted sound pressure level of residual noise exceeded for 90 % of time interval T. Denoted $L_{AF90\ T}$.

Broadband: Noise which contains roughly equal energy across frequency spectrum. Does not contain tones, and is generally less annoying than tonal noise.

Decibel (dB): Unit of noise measurement scale. Based on logarithmic scale so cannot be simply added or subtracted. 3 dB difference is smallest change perceptible to human ear. 10 dB difference is perceived as doubling or halving of sound level. Examples of decibel levels are as follows: 20 dB: very quiet room; 30-35 dB: night-time rural environment; 55-65 dB: conversation; 80 dB: busy pub; 100 dB: nightclub. Throughout this report noise levels are presented as decibels relative to 20 µPa.

$D_{n,e}$ (dB): Insulation value provided by trickle vent.

Effect: Consequence of an impact.

Emissions: Noise originating from source under consideration, spreading spherically, hemispherically or otherwise into surrounding environment.

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Fast response: 0.125 seconds response time of sound level meter to changing noise levels. Denoted by suffix F in parameters such as $L_{AF10\ T}$, $L_{AF90\ T}$, etc.

Free field: Measurement position removed from acoustically reflective surfaces other than ground.

Frequency: Number of cycles per second of a sound or vibration wave. Low frequency noise may be perceived as hum, while whine represents higher frequency. Range of human hearing approaches 20-20,000 Hertz.

Hertz (Hz): Unit of frequency measurement.

Immissions: Inward noise received at receptor, whether from all sources (ambient) or source under consideration (specific).

Impact: Change resulting from an action, such as implementation of a project.

Impulse: Noise which is of short duration, typically less than one second, sound pressure level of which is significantly higher than background.

Incident level: Noise level at façade or other structure which would arise if façade was absent. Thus ignores façade reflections. May be measured directly, or calculated from measurements at specified distance from façade.

Interval: Time period T over which noise parameters are measured at position. Denoted by T in $L_{Aeq\ T}$, $L_{AF90\ T}$, etc.

$L_{Aeq\ T}$: Equivalent continuous sound pressure level during interval T, effectively representing average A-weighted noise level of ambient noise environment.

$L_{AF90\ T}$: Sound pressure level exceeded for 90% of interval T, usually used to quantify background noise. May also be used to describe noise level from continuous steady or almost-steady source, particularly where local noise environment fluctuates.

L_{AFmax}: Maximum A-weighted sound pressure level occurring during measurement interval.

L_{day}: The A-weighted long term average incident sound pressure level determined over all the daytime periods of a year, where the daytime period is typically 0700-1900 h.

L_{den}: Day-evening-night noise level. Calculated from separate L_{day}, $L_{evening}$ and L_{night} levels using formula specified in EU Directive 2002/49/EC.

$L_{evening}$: The A-weighted long term average incident sound pressure level determined over all the evening periods of a year, where the evening period is typically 1900-2300 h.

L_{night}: The A-weighted long term average incident sound pressure level determined over all the night-time periods of a year, where the night-time period is typically 2300-0700 h.

Noise sensitive location: Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires absence of noise at nuisance levels.

Octave band: Frequency spectrum may be divided into octave bands. Upper limit of each octave is twice lower limit.

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Peak particle velocity (PPV): Rate of change of displacement of particles in solid medium due to vibration, measured as mm/s. Usually used to assess vibration in relation to activities such as blasting as correlates well with human perception of vibration and property damage.

Residual level: Noise level remaining when specific source is absent or does not contribute to ambient.

R_w: Overall sound reduction index provided across a range of frequencies, determined from laboratory measured sound insulating properties of material or building element in each frequency band.

Sound pressure: Deviation over ambient atmospheric pressure due to passing sound wave. Human ear is sound pressure detector, and thus acoustic parameters ultimately relate to sound pressure. Sound pressure level is ratio of measured sound pressure to reference value.

Soundscape: Acoustic environment as perceived, experienced or understood by listeners, taking context into account.

Specific level: $L_{Aeq\,T}$ level produced by specific noise source under consideration during interval T, measured directly or by estimation or calculation.

Tone: Character of noise caused by dominance of one or more frequencies which may result in increased noise nuisance.

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11. LANDSCAPE AND VISUAL

11.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) addresses the potential landscape and visual impacts of the Proposed Development. The full description of the Proposed Development is provided in Chapter 4 of this EIAR. The emphasis in this chapter is on the likely significant direct and indirect effects of the Proposed Development. The chapter includes the Landscape and Visual Impact Assessment (LVIA) methodology, a description of the Proposed Development and the existing baseline landscape, as well as landscape policy and relevant guidance. It includes a description of Meath and Kildare County Council's landscape policy and relevant policy contained in the Maynooth Local Area Plan pertaining to the landscape setting in which the Proposed Development is located.

The landscape of the site and wider area is described in terms of its existing character, which includes a description of landscape value, the susceptibility of the landscape to change and a determination of landscape sensitivity. The landscape and visual impact assessment of the Proposed Development uses representative viewpoints and photomontages. The potential impacts in both landscape and visual terms are then assessed, including cumulative impacts.

This chapter comprises the following sections:

- **Introduction** – Includes a description of the Proposed Development, its location and essential aspects requiring the most consideration from an LVIA perspective.
- **Methodology and Assessment Criteria** – An outline of the methodology and guidance used to conduct the LVIA.
- **Landscape Baseline –** A review of the landscape policy context and landscape designations pertinent to the site; a description of the baseline landscape conditions and character of the Proposed Development site and wider landscape setting; as well as identification of landscape value and landscape sensitivities.
- **Visual Baseline –** An appraisal of likely visibility of the Proposed Development from prominent visual receptors located within 3km of the Proposed Development site, including a description of visibility from designated scenic amenity designations. The visual baseline identifies key visual receptors and locations selected as photomontage viewpoints.
- **Cumulative Baseline –** Identification and description of other planned or permitted large scale developments in the surrounding area.
- **Landscape and Visual Effects** - A determination of the likely significant landscape and visual effects of the Proposed Development, including an assessment of likely cumulative landscape and visual effects. Assessment of effects is informed by a site visit and production of photomontages. Cumulative and in-combination effects are also assessed, addressing the interactions of the various development elements under assessment in this EIAR as well as other permitted and planned developments in the wider landscape area.

11.1.1 Statement of Authority

MKO has developed extensive expertise and experience over the last 15 years in the Landscape and Visual Impact Assessment of a range of projects, including residential developments, quarries, road schemes, wind energy developments and a range of other projects.

This chapter was written by Jack Workman, a Technician Member with the British Landscape Institute (TMLI). Jack is the Landscape & Visual Team manager at MKO, he is an Environmental Scientist and Landscape and Visual Impact Assessment (LVIA) specialist. Jack's primary role at MKO is producing

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the LVIA chapter of EIA reports for large infrastructure developments. Jack holds an MSc. in Coastal and Marine Environments and a BSc. In Psychology, membership with the Landscape Research Group, as well as membership with the Chartered Institute of Water and Environmental Management.

This chapter was reviewed by Michael Watson. Michael is Project Director and head of the Environmental Team at MKO, an Irish planning and environmental consultancy. Michael has extensive expertise conducting LVIAs and 20 years' professional consultancy experience as a project director, project manager and lead coordinator of environmental impact assessments for large-scale infrastructure projects.

11.1.2 'Do Nothing' Scenario

If the Proposed Development were not to proceed, no changes would be made to the current land-use practice. The site would continue to be managed under the existing farming and agricultural practices and the existing road networks would remain as they are. No landscape and visual impact would occur.

11.1.3 Proposed Development Description

A comprehensive description of the Proposed Development is included in Chapter 4 of this EIAR. The Proposed Development which is the subject of this LVIA consists of six planning applications encompassing the following development components:

- A Strategic Employment Zone (hereafter referred to as **Site A**) which consists of three office block buildings, public road widening, and road realignment works along the existing R157 Regional Road and L2214-3 Local Road, the delivery of approximately 365m of new public access road under the Maynooth Outer Orbital Road (MOOR) scheme, internal access road and associated car parking;
- Healthcare Facilities (hereafter referred to as **Site B**) which includes a nursing home and primary care centre as well public road widening and road realignment works along the existing R157 Regional Road, internal access road and associated car parking, and all associated infrastructure;
- The Strategic Housing Development (hereafter referred to as **Site C**) will consist of 360 no. residential homes, a creche facility, scout den, public park, internal access roads, approximately 500m of distributor road, approximately 670m of pedestrian and cycle improvements, two pedestrian and cycle bridges over the Blackhall Little and, shared communal and private open space and all associated site development works.
- The Maynooth Outer Orbital Road (hereafter referred to as **the MOOR**) which consists of approximately 1.7km of distributor road, a single span bridge over the River Rive Water and a single span bridge over the Blackhall Little Stream, pedestrian and cycle improvement measures, a pedestrian and cycle bridge adjacent to the Kildare bridge, upgrade works to an existing road and all associated utilities.
- The Kildare Bridge works (hereafter referred to as **Kildare Bridge**) planning application includes road upgrade works to the existing R157 Regional Road, a proposed pedestrian / cycle bridge adjacent to the existing Kildare Bridge, as well as a proposed wastewater connection to the Maynooth Municipal Wastewater Pumping Station to the southeast of the Proposed Development in County Kildare.
- The Moyglare Bridge (hereafter referred to as **Moyglare Bridge**) planning application includes for the provision of an integral single span bridge over the River Rye Water with associated flood plain works and embankments, as well as services and utilities connections.

For the purposes of this EIAR, where the 'Proposed Development' is referred to, this relates to all the project components described in detail in Chapter 4 of this EIAR (and listed above).

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To provide a rigorous and robust assessment of the Proposed Development, each component of the six planning applications (listed above - Site A; Site B; Site C; MOOR; Kildare Bridge; Moyglare Bridge) are assessed independently. The landscape and visual assessments will then assess the cumulative impact of the Proposed Development in its entirety in consideration of the proximity, connectivity, shared utilities and infrastructure of the various development components.

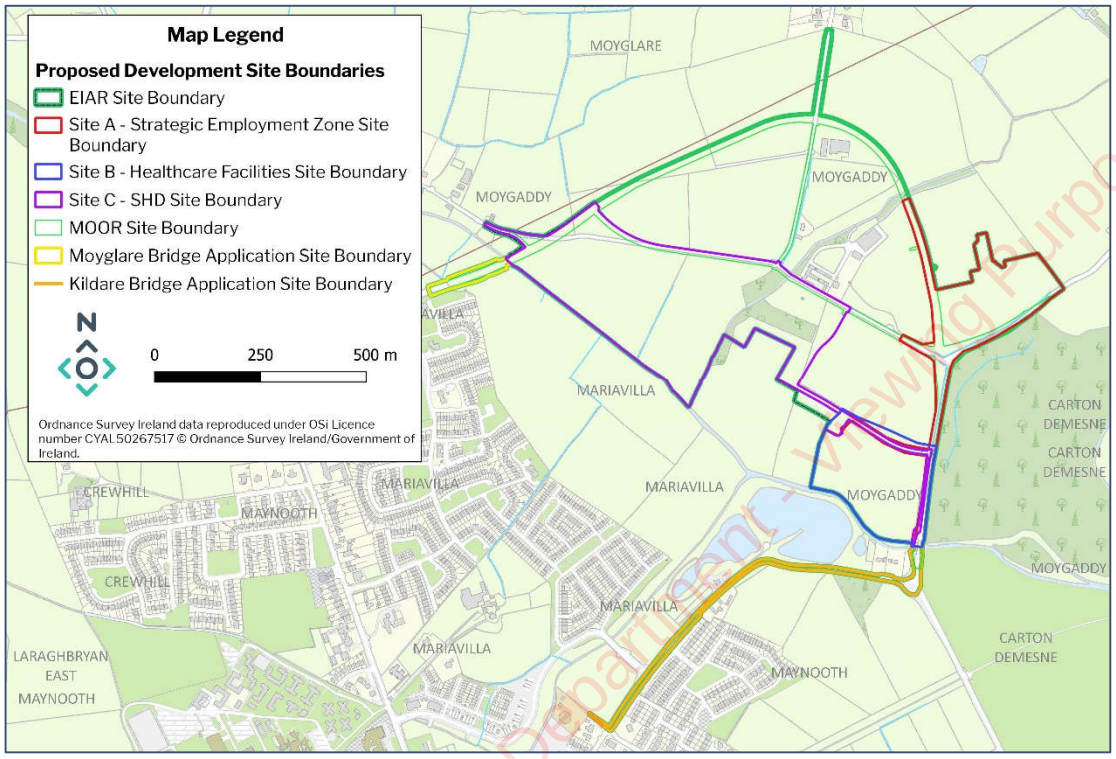

Figure 11-1 Site Boundaries of the Proposed Development

Where applicable and appropriate, this Chapter will also consider the landscape and visual impact of the Proposed Development in combination with other permitted or planned developments in the vicinity, including all those listed in Chapter 2 of this EIAR. Relevant permitted and planned developments assessed are identified in Section 11.5 – *Cumulative Baseline.*

During the conduct of an LVIA it is important to focus on *"the essential aspects of the scheme that will potentially give rise to its effects on the landscape and visual amenity"* (GLVIA3, 2013). The following Proposed Development descriptions (with the aid of visuals) for Site A, Site B, Site C, the MOOR, Kildare Bridge, and Moyglare Bridge focus on the essential elements from a landscape and visual perspective.

Site A: Proposed Development Description (Essential Elements from an LVIA Perspective)

The proposed Site A - Strategic Employment Zone includes the construction of:

- Three no. office buildings; Block A (5 storey), Block B (3 Storey) & Block C (3 Storey);
- Provision of internal access roads and associate car parking spaces, and delivery of a c.365m section of the proposed Maynooth Outer Orbital Route (MOOR) and associated road widening, and realignment works along the existing L22143 Local Road and R157 Regional Road.
- Provision of roof mounted solar PV panels on Office Blocks A, B & C.

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Figure 11-2 Excerpt from the Landscape Plan of Site A (Source RMDA)

As illustrated by the images in Figure 11-3 and Figure 11-4 (below) the three blocks of office buildings are the largest and most visually prominent features of the Proposed Development at Site A. Features such as the MOOR, car parking facilities and other pathways will cover a relatively large spatial extent of Site A, however, by their nature as surface features, they are unlikely to be visually prominent features of the landscape.

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Figure 11-3 A CGI render of the Proposed Development Site A – Strategic Employment Zone within an axonometric view from the south-west (David Smith Architecture)

Figure 11-4 A CGI render of the Proposed Development Site A – Strategic Employment Zone within an axonometric view from the west

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Site B: Proposed Development Description (Essential Elements from an LVIA Perspective)

The proposed Site B - Healthcare Facilities includes the construction of:

- A two-storey Nursing Home containing 156 no. bedrooms;
- A three-storey Primary Care Centre (PCC);
- Provision of internal access roads, car parking amenities, and road widening works along the R157 Regional Road.
- Provision of communal (semi-private) and public open space.

Figure 11-5 Excerpt from the Landscape Plan of Site B – (Source RMDA)

As indicated by Figure 11-6 and Figure 11-5, the two storey Nursing Home (west of Site B) and three storey Primary Care Centre (east of Site B) are the largest and most visually prominent features of the Proposed Development within Site B - Healthcare / Community Infrastructure.

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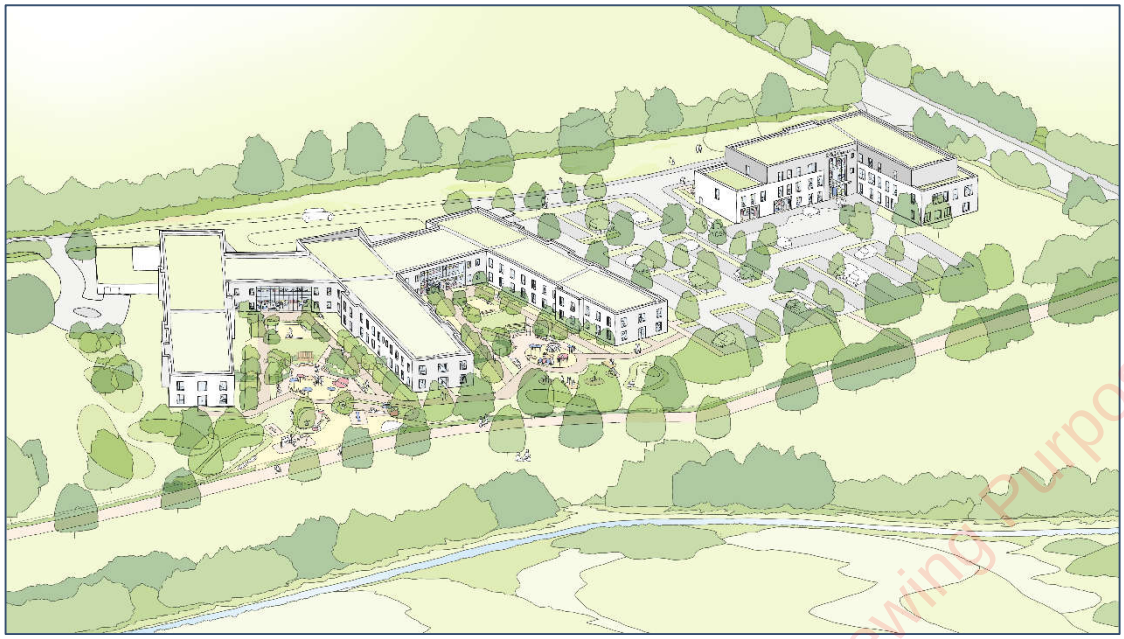

Figure 11-6 An artistic impression of Site B – Healthcare Zone within an axonometric view from the south-west

Site C: Proposed Development Description (Essential Elements from an LVIA Perspective)

The proposed Site C - Strategic Housing Development includes the construction of:

- 360 no. residential homes comprising: 196 no houses; 102 no. duplexes; 62 no. apartments
- A two-storey creche facility (514 sqm), outdoor play area and associated parking.
- A single storey Scout Den facility, including a hall, kitchen, meeting room and ancillary facilities (220sqm) and parking.
- 4 no. bridge structures, comprising:
  - A single span bridge at Moyglare Hall over the River Rye Water to connect with existing road infrastructure in County Kildare and associated floodplain works and embankments;
  - A new pedestrian and cyclist bridge at Kildare Bridge which will link the proposed site with the existing road network in County Kildare;
  - A new pedestrian and cycle bridge across the Blackhall Little Stream on the L2214-3
  - A new pedestrian and cycle bridge over the Blackhall Little Stream linking the proposed residential site with the proposed Childcare Facility, Scout Den and Moygaddy Castle Public Park.
- Provision of pedestrian and cycle improvement measures along local road networks (L6219, L2214-3 & R157);
- Shared communal open space including pedestrian and cyclist links along the River Rye, car and bicycle parking, site landscaping, playground, public lighting, bin stores, site services and all associated site development works.

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Figure 11-7 Excerpt from the Landscape Plan of Site B – (Source RMDA)

Figure 11-8 A CGI render of the Proposed Development Site C - A Four Storey Apartment Block, road network and dedicated cycle lanes.

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Figure 11-9 A CGI render of the Proposed Development Site C - A Four Storey Apartment Block, road network and cycle lane upgrades.

The above ground elements (360 Residential homes; creche facility; Scout Den facility) will be the most visually prominent features of Site C. Most of the Proposed Development footprint comprises two storey residential houses which will be of lesser prominence in the landscape than the proposed duplexes and apartment blocks.

Two No. four storey apartment blocks (pictured in Figure 11-8 above) are the tallest form of proposed building in Site C. One is located at the north-westerly corner of site C and the other at the north-easterly corner.

Maynooth Outer Orbital Route – MOOR: Proposed Development Description (Essential Elements from an LVIA Perspective)

The proposed MOOR - Maynooth Outer Orbital Route includes the construction of:

- Construction of approximately 1.7km of new distributor road linking the existing R157 Regional Road, located to the east of Site B, to the proposed Moyglare bridge which will link into the Moyglare Hall road in Mariavilla, located southwest of Site C. The distributor road will comprise of 7.0m carriageway with turning lanes where required, footpaths, cycle tracks and grass verges.
- The MOOR also includes upgrade and re-alignment works to the existing road network, as well as new junctions and bridges.

The MOOR links all elements of the Proposed Development (Site A; Site B; Site C; Moyglare Bridge; Kildare Bridge) and several sections of the route are included as part of the development footprint of the other various sites. As shown in the imagery (extracted from planning drawings) presented in Figure 11-10 below, the MOOR comprises four main development features: Carriageway; Cycle Way; Footway; and, Verge.

From a visual perspective, most of the proposed MOOR comprises surface features and visual impacts are likely to be highly localised to locations in close proximity to the route. In terms of landscape effects, the route will need to be cleared and topographical level adjustments to enable construction of the route.

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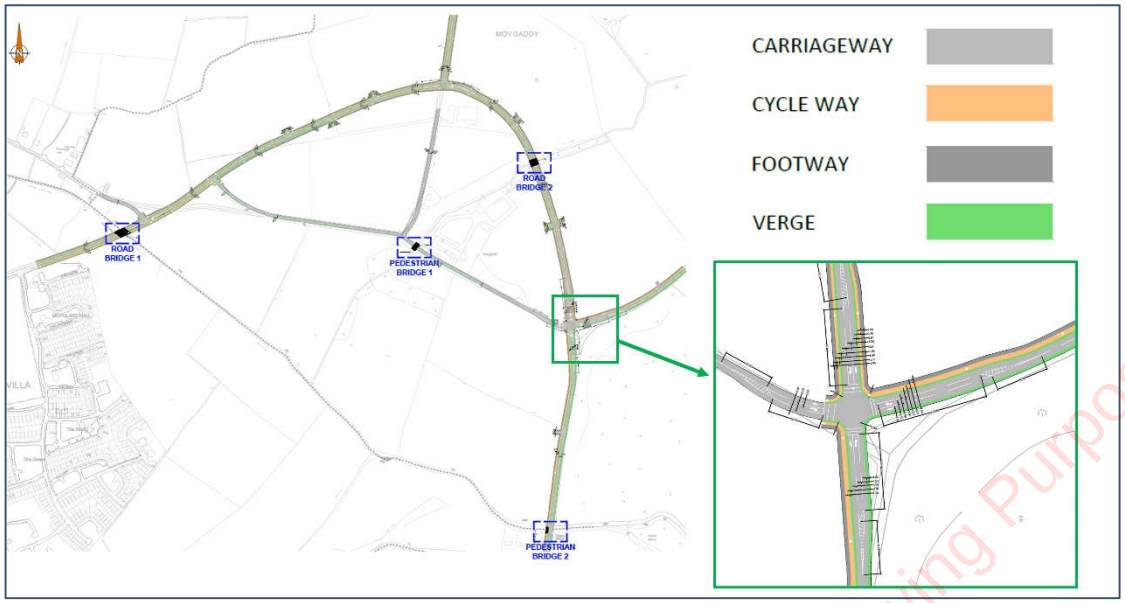

Figure 11-10 Route of the MOOR and an example of new proposed Junction/Crossroad adjacent to Site A – Imagery extracted from Planning Drawings (OCSC, 2022)

The MOOR traverses the Blackhall Little Stream (a small stream as described in Section 11.3 – *Landscape Baseline*) at two points. As illustrated in Figure 11-11 below, the Proposed Development includes the construction of a Pedestrian Bridge (Pedestrian Bridge 1 in Planning Pack) at the site of the existing bridge on the existing L2214-3 Local road (near Moygaddy Castle). It is proposed to construct a multipurpose bridge (Road Bridge 2 in Planning Pack - carriageway, cycle and foot access) along the north-eastern portion of the MOOR.

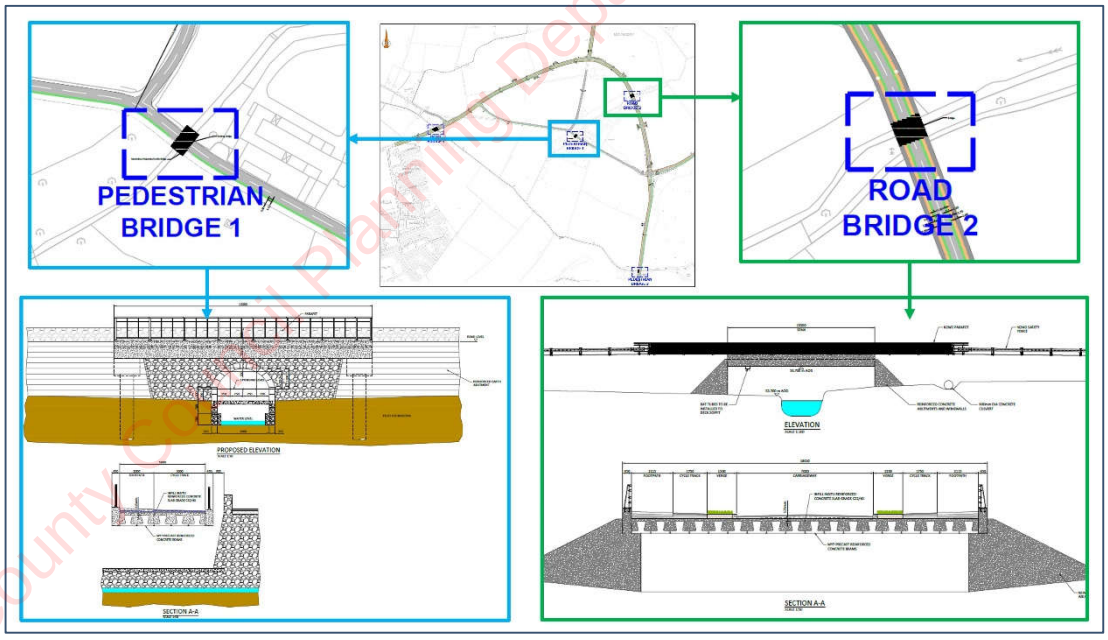

Figure 11-11 Proposed Bridges along the route of the MOOR – Imagery extracted from Planning Drawings (OCSC, 2022)

The MOOR includes upgrade works over Kildare Bridge which cross the Rye Water north of Dunboyne Roundabout. The MOOR includes the proposed construction of a new standalone pedestrian and cycle bridge (Pedestrian Bridge 2 in Planning Pack) to the western side of Kildare Bridge. The proposed Route of the MOOR also crosses the Rye Water to the south-east of Site C via the proposed Moyglare Bridge (Road Bridge 1 in Planning Pack), where it will connect with the existing Road Network at Moyglare Hall Road, adjacent to Maynooth Community College.

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The southern portions of both Kildare Bridge and Moyglare Bridge are located in County Kildare and are the subject of separate, independent planning applications. A description of the two proposed bridges over the Rye Water are included in the following sections.

Kildare Bridge: Proposed Development Description (Essential Elements from an LVIA Perspective)

The proposed Kildare Bridge (Pedestrian Bridge 2 in Planning Pack) includes the following:

- Construction of a new standalone bridge comprising a footpath and dual lane cycle track.
- Upgrade works to the R157 Regional Road
- Potable water and utility connections
- Wastewater connection to the Maynooth Municipal Wastewater Pumping Station which is located to the southeast of the Proposed Development

The proposed bridge is a new standalone structure to the western side of the existing Kildare Bridge which crosses the Rye Water on the R157 Regional Road north of the Dunboyne Roundabout. Figure 11-12 below shows the plans for the proposed bridge.

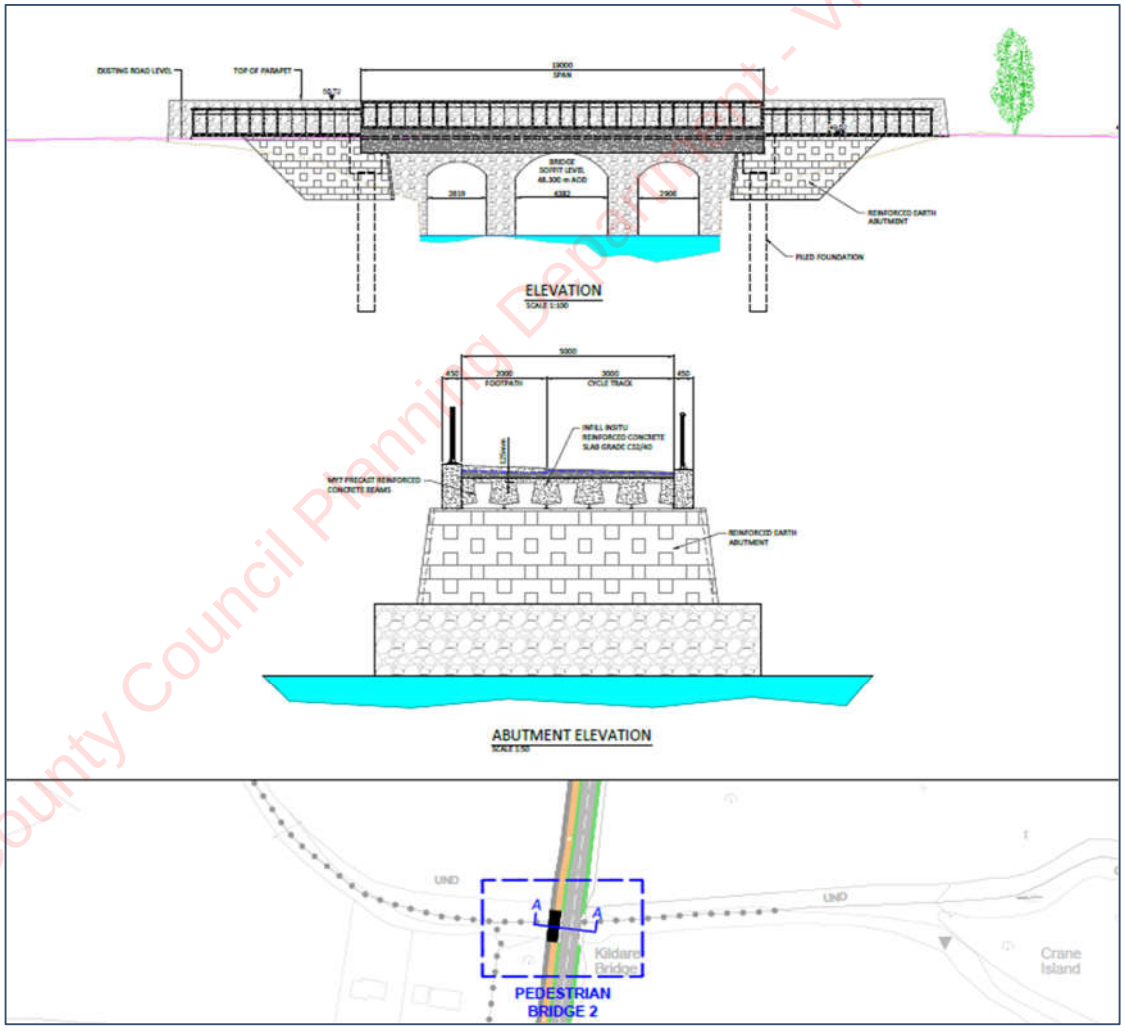

Figure 11-12 Proposed Kildare Bridge (Pedestrian Bridge 2) – Imagery extracted from Planning Drawings (OCSC, 2022)

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Moyglare Bridge: Proposed Development Description (Essential Elements from an LVIA Perspective)

The proposed Moyglare Bridge (Road Bridge 1 in Planning Pack) includes the construction of:

- A bridge comprising a road carriageway (The MOOR), 2No. grass Verges; 2No. footpaths 2 No. cycle tracks.
- Potable water and utility connections
- The proposed bridge development includes embankments, culverts and concrete abutments surrounding the Rye Water river.

The proposed bridge crosses the Rye Water to the south-west of Site C, linking the proposed MOOR with the existing Road Network at Moyglare Hall Road, adjacent to Maynooth Community College. Figure 11-13 below shows the plans for the proposed bridge.

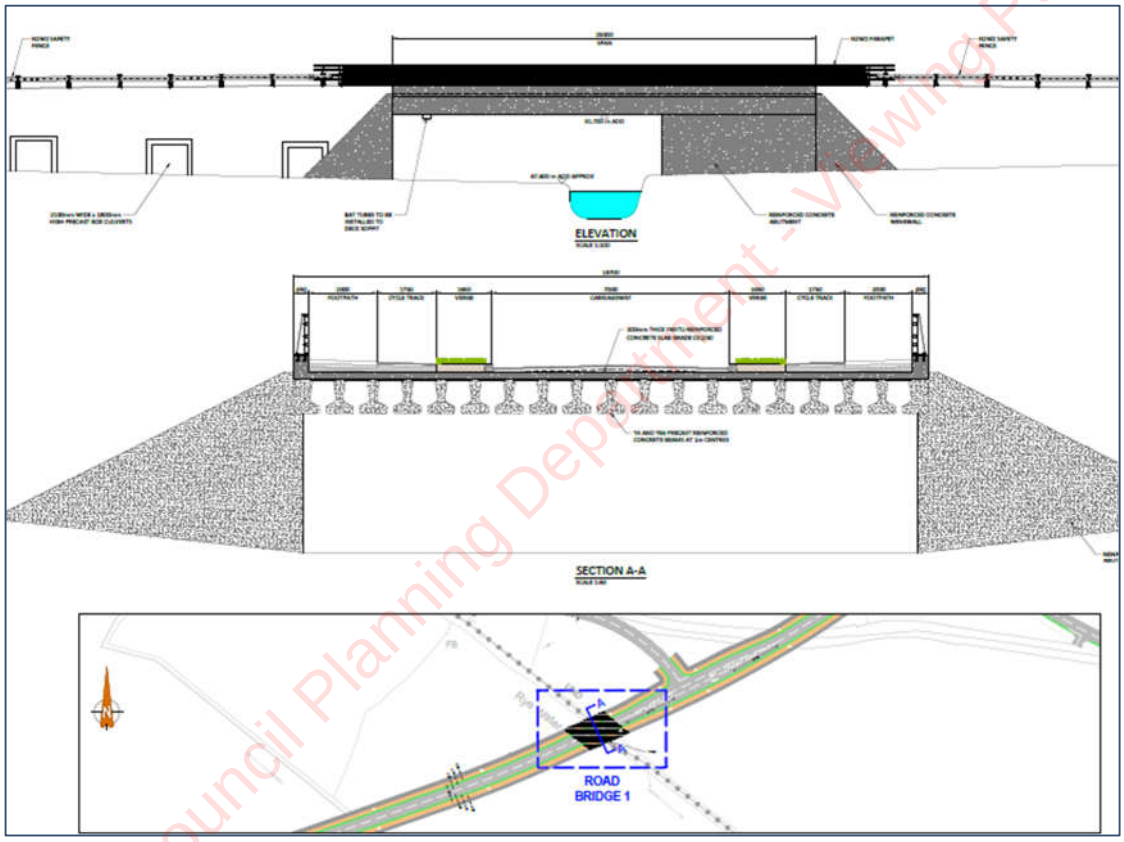

Figure 11-13 Proposed Moyglare Bridge (Road Bridge 1) – Imagery extracted from Planning Drawings (OCSC, 2022)

The Moygaddy Master Plan Site & Proposed Landscape Plan

A Landscape Master Plan has been created for all lands within the Maynooth Environs which form the wider Moygaddy Master Plan Site. As shown in the project plans and landscape plans of the various Proposed Development elements (see Volumes 3a, 3b 3c in Appendix 4-2, Volumes 3d. 3e, 3f in Appendix 4-1 and Volumes 3a, 3b, 3c in Appendix 4-7, Volumes 3d in Appendix 4-5) there is an objective to retain (where possible) existing field boundaries and mature native woodland, as well as provide additional planting of native species within the individual site boundaries.

The landscape plan aims to increase the recreational capacity of the lands at Moygaddy through the provision of pedestrian/cycle access routes which will link various areas of the wider Master Plan Site, as well as along the MOOR. These safe access pathways will facilitate recreational amenity at various

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features within the Master Plan site, such as local watercourses (Rye Water and Blackhall Little) and Moygaddy Castle ruins.

The baseline landscape and visual investigations in this chapter consider and describe the landscape of wider Proposed Development site as a whole, as well as the individual landscapes of Site A, Site B, Site C, the MOOR, Kildare Bridge, and Moyglare Bridge.

11.1.4 Proposed Development Location & Terminology

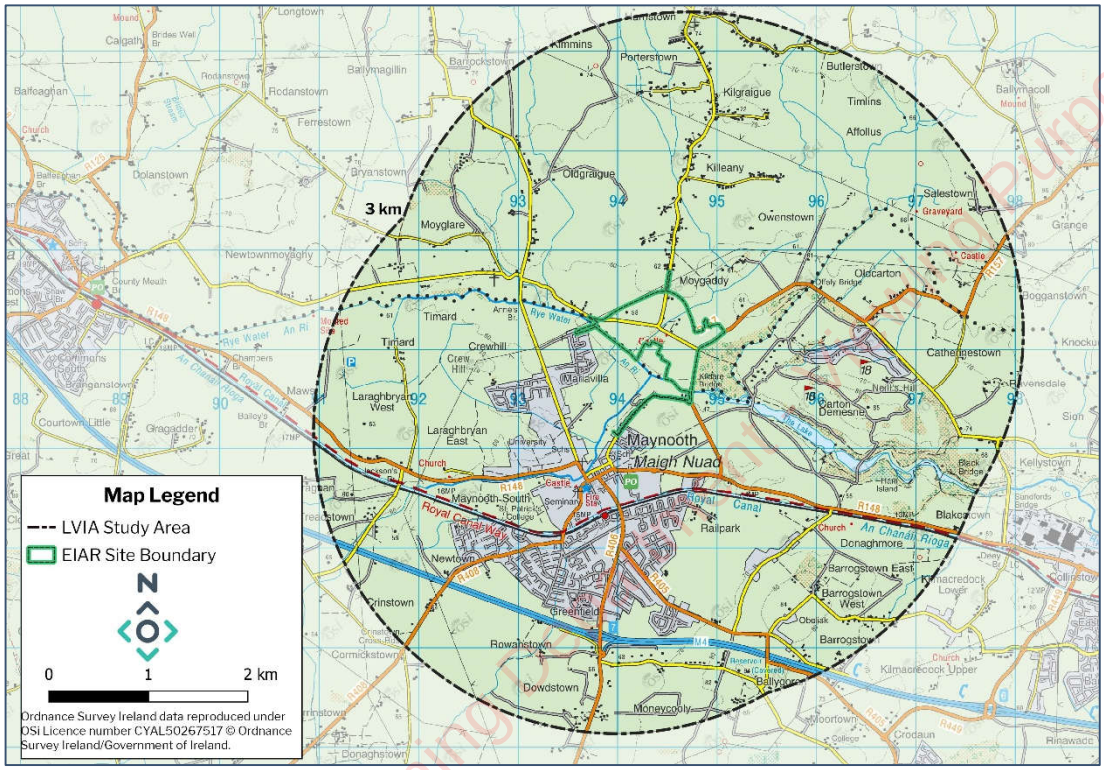

Figure 11-14 Location of the Proposed Development and LVIA Study Area.

The Proposed Development is located in an area defined as the Maynooth Environs which is within the townland of Moygaddy, north of Maynooth town. A majority of the Proposed Development is located in the functional area of County Meath and several components of the Proposed Development (Kildare Bridge; Moyglare Bridge and utility infrastructure) are located in County Kildare. Baseline investigations have included all lands (including both Counties Meath and Kildare) within 3 km of the proposed EIAR Site boundary – The LVIA Study Area (See Figure 11-14 above). Figure 11-1 (See previously) shows the Proposed Development and various elements referred to in this report, which are referred to with the following terminology:

- When stating the 'Proposed Development', this refers to all components (Site A, Site B; Site C; MOOR; Kildare Bridge; Moyglare Bridge) included in the EIAR Study Area.
- When stating the 'Proposed Development Site' or 'the site', this relates to the primary study area for the Proposed Development. This area is labelled as the 'EIAR Site Boundary' illustrated by a dark green line in mapping figures in this Chapter (e.g. Figure 11-14 above);
- When stating the 'LVIA Study Area', this relates to all lands within 3 km of the EIAR Site Boundary and comprises the wider landscape area investigated and assessed in this chapter (See Figure 11-14 above); – Rationale for determination of this study area are included in the following Section – *Methodology and Assessment Criteria.*

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- When stating 'Site A', this refers to the Strategic Employment Zone delineated by a red line in mapping figures in this Chapter (e.g. Figure 11-14Figure 11-1 previously);
- When stating 'Site B', this refers to the Healthcare Facilities delineated by a blue line in mapping figures in this Chapter (e.g. Figure 11-14Figure 11-1 previously);
- When stating 'Site C', this refers to the Strategic Housing Development delineated by a purple line in mapping figures in this Chapter (e.g. Figure 11-14Figure 11-1 previously);
- When stating 'the MOOR', this refers to the route of the MOOR as delineated by a a thin green line in mapping figures in this Chapter (e.g. Figure 11-14Figure 11-1 previously);
- When stating 'Kildare Bridge', this refers to the proposed pedestrian/cycle bridge and utility connection works at Kildare Bridge as delineated by an orange line in mapping figures in this Chapter (e.g. Figure 11-14Figure 11-1 previously);
- When stating 'Moyglare Bridge', this refers to the proposed Moyglare Bridge and utility connection works at the proposed Moyglare bridge as delineated by a yellow line in mapping figures in this Chapter (e.g. Figure 11-14Figure 11-1 previously).

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11.2 Methodology and Assessment Criteria

This section broadly outlines the methodology used to undertake the landscape and visual impact assessment of the Proposed Development, including a description of the following:

- Guidance and Reference material used to conduct the LVIA.
- Study Area chosen for the conduct of Baseline Landscape and Visual Investigations
- Methods for Assessing Landscape Effects
- Methods for Assessing Visual Effects

11.2.1 Guidance/Reference Documents

In 2000, the Department of the Environment and Local Government (DoEHLG) published 'Landscape and Landscape Assessment: Consultation Draft of Guidelines for Planning Authorities', which recommended that all local authorities adopt a standardised approach to landscape assessment for incorporation into development plans and consideration as part of the planning process. This document remains in Draft.

In 2002, Ireland signed and ratified the European Landscape Convention (ELC). This introduced a pan-European concept that centres on the quality of landscape protection, management and planning. The Department of Arts, Heritage and the Gaeltacht published a National Landscape Strategy for Ireland in 2015. The strategy aims to ensure compliance with the ELC and contains six main objectives, including undertaking a National Landscape Character Assessment and developing landscape policies.

Although the DoEHLG 2000 guidance remains in draft form, this section of the LVIA has been informed by the landscape assessment guidelines presented in the DoEHLG document as well as a range of other guidelines, which include:

- Guidelines for Landscape and Visual Impact Assessment Third Edition (GLVIA3) (The Landscape Institute/Institute of Environmental Management and Assessment, UK, 2013) - also referred to as GLVIA3 (LI & IEMA, 2013).
- Photography and Photomontage in Landscape and Visual Assessment'; Landscape Institute Advice Note 01/2011 (2011);
- County Development Plan of County Meath and County Kildare as well as Local Area Plans pertaining to Maynooth Town and surrounding lands.
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA 2022).

11.2.2 Scope and Definition of the LVIA Study Area for Baseline Landscape and Visual Investigations

The GLVIA3 (LI & IEMA, 2013) guidance refers to the identification of the area of landscape that is to be covered while assessing landscape and visual effects. The guidelines state:

> *"The study areas should include the site itself and the full extent of the wider landscape around it which the proposed development may influence in a significant manner."*

For the purposes of this LVIA, where the 'Proposed Development Site' or 'the site' is referred to in this chapter, this relates to the primary study area for the Proposed Development, as delineated in Green as the 'EIAR Site Boundary' within mapping figures in this report and EIAR. This total area measures approximately 60.8 hectares. However, the landscape and visual baseline mapping and viewpoint selection are based on a wider study area. In this case, the wider study area constitutes all the area within 3 kilometres from the EIAR Site Boundary. This area is referred to as the Landscape and Visual

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Impact Assessment (LVIA) Study Area or 'LVIA Study Area' (See Figure 11-14 previously). Considering the scope and scale of the Proposed Development and its existing landscape setting, it is considered that landscape and visual effects will not be significant beyond the 3km LVIA Study Area, therefore assessment of landscape and visual effects from locations beyond 3km are scoped out of this assessment.

Initial baseline investigations of the LVIA Study Area were conducted through desk studies, constraints mapping and site visits. The Landscape Baseline exercise (Section 11.3) identifies landscape policy pertinent to the site and LVIA Study Area such as landscape designations contained in the Meath and Kildare County Development Plans and relevant local area plans. This includes policies on landscape and landscape character, designated landscapes, and protected views. The site is described in terms of landscape character types as identified in 'Landscape and Landscape Assessment: Consultation Draft of Guidelines for Planning Authorities' (DoEHLG, 2000) as well as the surrounding landscapes within the LVIA Study Area. The landscape baseline exercise identifies key landscape values and sensitivities within the site and wider landscape setting.

The Visual Baseline exercise (Section 11.4) includes an appraisal of the likely visibility of the Proposed Development from key visual receptors within the surrounding landscape and within the immediate setting of the site itself. This includes a description of views towards the Proposed Development from a variety of perspectives which informs the selection of photomontage viewpoints.

11.2.3 Assessing Landscape Effects

The methodology uses qualitative methods in order to arrive at an assessment, which is based on the Landscape and Landscape Assessment (DoEHLG, 2000) Guidelines as well as the GLVIA3 (LI and IEMA, 2013).

Landscape effects can be described as changes which affect the landscape as a resource. This includes how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects and its landscape character. Landscape effects also relate to changes in the structure of the landscape. Under the GLVIA3 (2013) guidance, the assessment of likely significant effects on landscape receptors includes a judgement on both the sensitivity of the receptor as well as magnitude of the change.

11.2.3.1 Assessing Landscape Sensitivity

Landscape Sensitivity, which is described in the GLVIA3 (2013) as a combination of the landscape's susceptibility to change as well as the value attached to the landscape.

Susceptibility to change can be described as the ability of the landscape receptor (either the overall character, quality of the landscape or a particular landscape feature) to accommodate the Proposed Development without undue consequences for the maintenance of the baseline (existing) landscape and/or the aims of landscape planning policies and strategies.

Landscape value is the importance attributed to a specific landscape receptor or feature. Landscape value is determined through baseline assessments considering a combination of criteria such as designations and local characteristics.

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For the purposes of this LVIA and the assessment of landscape sensitivity, the following landscape sensitivity ratings are assigned to receptors on site and in the LVIA study area based on designations in the Kildare and Meath County Development Plans and findings from on-site appraisals during site investigations:

- Very High
- High
- Medium
- Low

11.2.3.2 Assessing Magnitude of Change in the Landscape

The magnitude of change occurring within a landscape is a combination of the visual presence - size and scale - of the change, the extent of the area to be affected, and the duration and reversibility of the effect. The magnitude of change for differing landscape receptors was assessed using the definitions outlined in Table 11-1 below.

Table 11-1 Magnitude of Landscape Change Assessment Criteria

Magnitude of Change	Description
Substantial	Where a landscape will experience the loss of key landscape features or the introduction of uncharacteristic additions over a large area. The changes to the landscape are prominent and large in scale. The level of change has an effect on the overall landscape character. The effects are likely long term and may be irreversible.
Moderate	A more limited loss of or change to landscape features over a medium extent which will result in some change to landscape features and aesthetics. Could include the addition of some new uncharacteristic features or elements that would lead to the potential for change in landscape character in a localised area or part of a landscape character area. Would include moderate effects on the overall landscape character that do not affect key characteristics. The effects could be long to medium term and/or partially reversible.
Slight	The loss of or change to landscape features of limited extent, or changes to landscape character in smaller areas. Changes would not affect key characteristics. The addition of any new features or elements to the landscape would only result in low-level changes to the overall aesthetics of the landscapes. Changes to the landscape are more evident at a local level and not over a wide geographical area. The effects could potentially be medium to short term and/or reversible.
Negligible	A change affecting smaller areas of landscape character including the loss of some landscape elements or the addition of features or elements which are either of low value or hardly noticeable. The effects could be short term and/or reversible.

11.2.3.3 Landscape Effects Assessment Matrix

The significance of landscape effect was arrived at by combining the magnitude and sensitivity classifications, using the assessment matrix in Table 11-2 below, where landscape sensitivity is shown in the left-hand first column and magnitude of change is shown in the first row at the top of the table.

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Table 11-2 Landscape effects significance assessment matrix

	Substantial	Moderate	Slight	Negligible
Very High	Major	Major/Moderate	Moderate	Moderate/Minor
High	Major/Moderate	Moderate	Moderate/Minor	Minor
Medium	Moderate	Moderate/Minor	Minor	Minor/Negligible
Low	Moderate/Minor	Minor	Minor/Negligible	Negligible

The determination of significance uses a seven-point scale, ranging from Major to Negligible. This seven-point scale is translated to the EPA (2022) impact assessment classifications of significance, as outlined in Table 11-6 below in Section 11.2.4.5.

11.2.4 Assessing Visual Effects

Visual effects relate to changes in views and visual amenity of the surroundings of individuals or groups of people – termed 'visual receptors'. These may result from changes in content and character of views as a result in changes to the landscape. The assessment of visual effects is based on views shown in photomontages as well as actual visibility on the ground.

It should be noted that in assessing visual effects, there are different types of visual effects:

- Visual obstruction: This occurs when there is an impact on a view which blocks the view
- Visual intrusion: This occurs when there is an impact on a view but which does not block the view.

The significance of the effect on visual amenity is a combination of the sensitivity of the receptor balanced with the magnitude of the change occurring within a view. The likely significant effects of the Proposed Development in terms of visual and landscape effects are informed by on site visibility appraisals and photomontages.

11.2.4.1 Photomontage Viewpoint Selection

A step-by-step process is followed when selecting appropriate photomontage locations. The first step is to select a number of representative locations following a detailed desk top study of mapping. These locations are based on the following criteria:

- Potential visibility of the development site;
- Critical landscape designations e.g. views and prospects, scenic routes, areas classed as sensitive;
- Proximity to receptors such as settlements, groups of residential dwellings or recreational routes or amenity areas;
- Within publicly accessible areas or on public roads, particularly more trafficked routes;
- Views that cover a wide area in terms of geographical location, elevation and varying distance from the site.

Finally, following a site visit, to assess visibility on the ground (see Section 11.4 – *Visual Baseline*), locations were identified as suitable viewpoints for photomontage production. The selected locations provide a representative range of local views towards the Proposed Development. A total of 17 No.

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photomontages were produced from 15 No. Viewpoints (some Viewpoint locations show two differing fields of view e.g. VP 4A & 4B; VP 9A & 9B).

11.2.4.2 Photomontage Production

Photomontages are photorealistic visualisations that superimpose an image of the Proposed Development upon a photograph or series of photographs. They are intended as graphical representations of how a Proposed Development will appear in the existing landscape and are used as a tool to inform the LVIA process.

Verified photomontage imagery has been produced by integrating a 3D architectural model of the Proposed Development within a GPS validated model of the landscape from a high-resolution topographical survey. Images were captured from a height of approximately 1.7 metres and a rendering applied to the imagery that best represents the proposed materials from which the Proposed Development will comprise in the light conditions when the photomontage was captured. A more detailed description of the methodology used to capture and produce the photomontages is included at the start of the Volume 2 Photomontage Booklet titled '*Methodology for Verified Views*'.

Photomontage visualisations can never show exactly what the Proposed Development will look like in reality due to factors such as; atmospheric lighting and weather conditions which vary through time and season. Where possible, photomontage viewpoints are chosen to show open views of the Proposed Development, however, in reality they are representative of viewing conditions encountered; in many instances, some or all of the Proposed Development is screened from view by intervening vegetation, topography or built form existent within the baseline landscape.

Photomontages give a reasonable impression of the scale of the development and the distance to the development, however, there are likely to be minor inaccuracies. It is recommended that decision-makers and any interested parties or members of the public should ideally visit the viewpoints on site, where visualisations (photomontages) can be compared to the 'real life' view, and the full impact of the Proposed Development can be understood.

The following images are shown in the Photomontage Booklet for each viewpoint location:

- **Baseline:** Shows the baseline landscape/streetscape conditions as it currently exists in a do-nothing scenario.
- **Proposed;** Shows a scaled render of the Proposed Development within the current landscape/streetscape.
- **Proposed VVM & Cumulative Wirelines:** Shows the photomontage as presented in the 'Proposed VVM' view; as well as wirelines indicating the relative physical position and scale of the Proposed Development irrespective of screening. The wirelines of the various above ground development elements are colour coded with the following:
    - **Red Wireline = Site A** - Proposed Strategic Employment Zone
    - **Blue Wireline = Site B** – Proposed Healthcare Facilities
    - **Purple Wireline = Site C** - Proposed Strategic Housing Development

Less visually prominent elements of the Proposed Development such as the MOOR, Kildare Bridge and Moyglare Bridge are included in the photomontages. In order to ensure the photomontage booklet is clean and coherent, no wirelines have been added around these surface features within the 'Proposed VVM & Cumulative Wirelines', as this would have resulted a relatively confusing visual output. Where they will be seen, the MOOR, the Kildare Bridge works and the Moyglare Bridge are included in the photomontages and are assessed within the assessment narrative in the photomontage assessment tables included in Appendix 11-1.

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Photomontages are displayed in the photomontage booklet which forms Volume 2 of this EIAR. A comprehensive assessment of the visual effects of the Proposed Development from each of the 17 No. photomontages is included in Appendix 11-1 and a summary of visual effects is included in Table 11-10 in Section 11.6.3.2.11

11.2.4.3 Visual Receptor Sensitivity

Visual sensitivity balances the sensitivity and susceptibility of the receptor (people or groups of people) as well as the amenity value of the view on offer at a particular location. Visual receptor sensitivity depends on the occupation or activity of the people, as well the extent to which the attention is focused on views and visual amenity, according to the GLVIA Guidelines (2013). Visual receptor sensitivity is assessed as either being Very High, High, Medium or Low, based on the definition of descriptions and examples set out in Table 11-3 below.

Table 11-3 Visual Receptor Sensitivity Assessment Criteria

Sensitivity of Visual Receptor(s)	Description
Very High	Included in this category are viewers that are primarily focused on views from this particular location, such as visitors to popular destinations identified for their outstanding views. Residents in close proximity who have primary views of a scenic quality in the direction of the Proposed Development.
High	Includes viewers at designated views or landscapes. Viewers such as residents in close proximity to the viewpoint who have primary views that will be in the direction of the development that may not necessarily be of a particularly scenic quality; viewers at well-known heritage or popular tourist or recreational areas, viewers along scenic or tourist routes.
Medium	Includes viewers who may have some susceptibility to a change in view. Viewers such as residents in medium proximity but who do not have views focused in the direction of the Proposed Development or whose views are not of a particularly scenic quality; those from views which are not designated but may have local recreational uses or those travelling along routes or at view which are considered moderately scenic.
Low	Includes viewers engaged in activities where the focus is not on the landscape or view. These including those travelling along a busy route, viewers at work or engaged in sport not related to views or experience of the landscape.

Photomontage viewpoints are specific locations which are representative of key visual receptors. The viewpoint assessment tables in Appendix 11-1 consider all receptors represented in the determination of the visual receptor sensitivity rating for each viewpoint. This determination takes a balanced approach considering the types, sensitivities, and quantities of visual receptors represented. The sensitivity rating given to each photomontage viewpoint in Appendix 11-1 considers both the susceptibility of the visual receptors represented as well as the value attached to the available views at that particular location.

11.2.4.4 Magnitude of Visual Change

The magnitude of the visual change resulting at each viewpoint is a combination of scale of the change, the extent of the area to be affected and the duration and reversibility of the effect, determined by

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reviewing the photomontage images for each viewpoint. The magnitude of change is determined in accordance with the definitions and descriptions included in Table 11-4 below.

Table 11-4 Magnitude of Visual Change Assessment Criteria

Magnitude of Change	Description
Substantial	Substantial change, where the proposals would result in large-scale, prominent or very prominent change, leading to substantial obstruction of existing view or complete change in character and composition of the baseline though removal of key elements or addition of uncharacteristic elements which may or may not be visually discordant. This includes viewpoints where the Proposed Development is fully or almost fully visible over a wide extent, at close proximity to the viewer. This change could be long term or of a long duration.
Moderate	The change in the view may involve partial obstruction of existing view or partial change in character and composition of the baseline through the introduction of new elements or removal of existing elements. Likely to occur at locations where the development is partially visible over a moderate or medium extent, and which are not in close proximity to the development. Change may be readily noticeable but not substantially different in scale and character from the surroundings and wider setting.
Slight	The proposals would be partially visible or visible at sufficient distance to be perceptible and result in a low level of change in the view and its composition and a low degree of contrast. The character of the view may be altered but will remain similar to the baseline existing situation. This change could be short term or of a short duration.
Negligible	Any change would only be barely distinguishable from the status quo "do-nothing scenario" in the surroundings. The composition and character of the view would be substantially unaltered, approximating to little or no change.

11.2.4.5 Visual Effects Assessment Matrix

Table 11-5 below shows the significance of visual effects, arrived at by combining the visual receptor sensitivity and the magnitude of change classifications. Visual receptor sensitivity is shown in the left-hand first column and magnitude of visual change is shown in the first row at the top of the table. This table is used as an indicative tool to assist in determining the significance of visual effects. In different circumstances differing levels of mitigating factors may ultimately result in a different determination of the level of significance (see below). The significance of a visual effect is based on a balance between the sensitivity of the receptor and the magnitude of effect. The significance of visual effect is arrived at using a combination of the matrix shown in Table 11-5 as well as Figure 11-15 shown in section 11.2.5 - *Determination of Residual Landscape and Visual Effects,* seen below.

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Table 11-5 Visual effects significance assessment matrix

	Substantial	Moderate	Slight	Negligible
Very High	Major	Major/Moderate	Moderate	Moderate/Minor
High	Major/Moderate	Moderate	Moderate/Minor	Minor
Medium	Moderate	Moderate/Minor	Minor	Minor/Negligible
Low	Moderate/Minor	Minor	Minor/Negligible	Negligible

The determination of significance uses a seven-point scale, ranging from Major to Negligible. This seven-point scale is translated to the EPA impact assessment classifications of significance, as outlined Table 11-6 below.

Table 11-6 EPA Impact Assessment Significance Classification for Landscape and Visual Effects

Matrix Classification Significance	EPA Significance Classification	EPA (2022) Definition of Significance
Major	Profound	An effect which obliterates sensitive characteristics
Major/Moderate	Very significant	An effect, which by its character, magnitude, duration or intensity alters most of a sensitive aspect of the environment
Moderate	Significant	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Moderate/Minor	Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends
Minor	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Minor/Negligible	Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Negligible	Imperceptible	An effect capable of measurement but without significant consequences

11.2.4.6 Residual Visual Effect

After determining the significance of the visual effect using the above visual effects assessment matrix, mitigating factors are taken into consideration to arrive at the final residual effect.

11.2.5 Determination of Residual Landscape and Visual Effects

The matrices and tables above are excellent tools to aid professional judgement in the determination of the significance of an effect. They are useful in that they provide a transparent, objective structure to the

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process of balancing sensitivity and magnitude of change. In the context of the determination of visual effects, the formulaic process created by the use of the matrices above provides an indicative initial assessment, which is clearly demonstrated in the photomontage assessment tables in Appendix 11-1.

However, over-reliance on the formulaic process, which is heavily influenced by the definitions of sensitivity and magnitude of change (e.g. Table 11-4 and Table 11-5 above), can lead to a failure to properly account for the full range of circumstances and factors at play in the determination of the significance of a visual effect (see section 3.35, GLVIA3, 2013). A wide range of factors, mitigating or otherwise, can factor into such a determination, and it is not possible to capture the complexity involved in balancing all considerations within the necessarily limited definitions contained in these tables. This then naturally results in circumstances whereby the process of the determination of significance using the mechanistic method involved with the matrix shown in Table 11-5 can result in misrepresentations of the significance of visual effects. It is only with professional judgement, and narrative descriptions of effect, that such complexity can be integrated into the determination of significance. Therefore, the formulaic methods based upon the matrix presented above is combined with professional judgement in the determination of significance. This is illustrated in Figure 11-15 below where the professional judgment of the competent expert is used to properly determine the significance of an effect taking all considerations into account.

A focus is placed upon the narrative description of effects (see section 3.36, GLVIA3, 2013) given the naturally subjective nature of the significance determination process, particularly in relation to visual effects, ensuring that the rationale for the overall judgement is clear (see sections 3.28-3.29, GLVIA3, 2013). The comprehensive assessment of photomontages included in Appendix 11-1 aims to provide a transparent and robust determination of residual visual effects utilising the graph in Figure 11-15 below in combination with a clear and logical narrative.

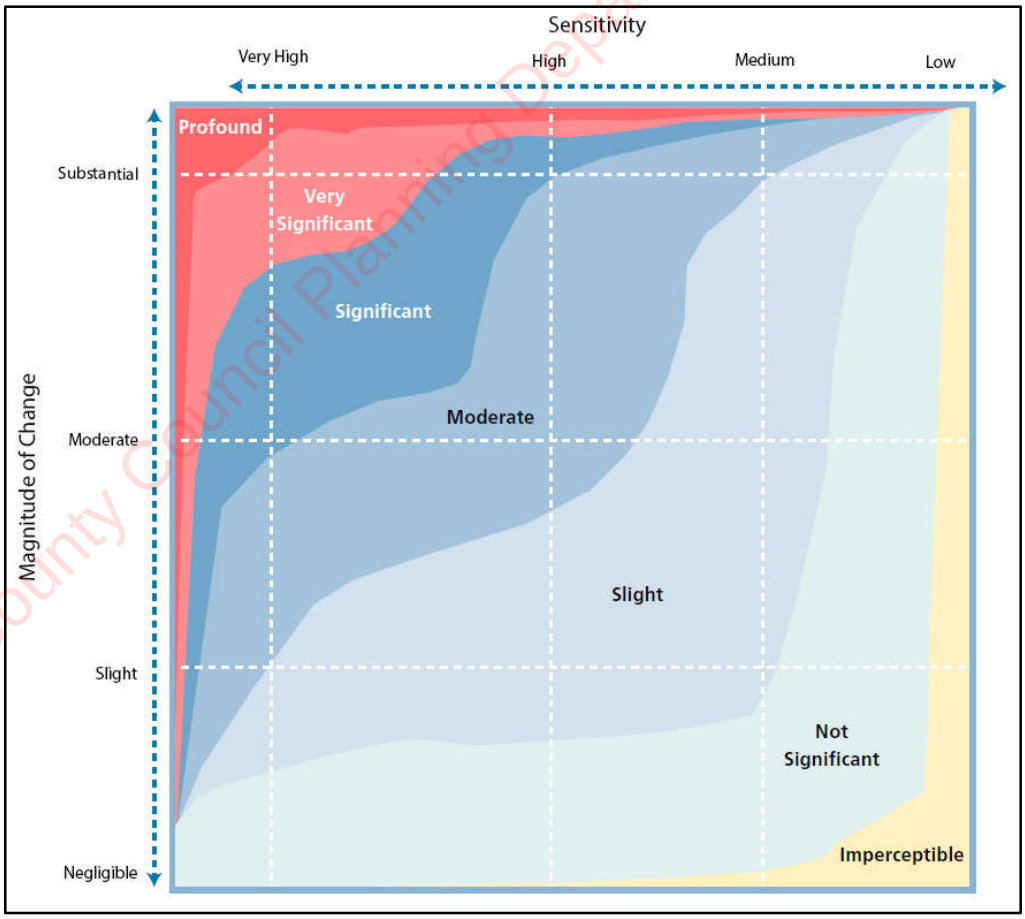

Figure 11-15 Visual Effect Significance Graph (adapted from EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, 2022)

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11.3 Landscape Baseline

This section of the report identifies and describes landscape policy designations and sensitive landscape receptors located in the LVIA Study Area (within 3 km from the Proposed Development site boundary). The receiving landscape of the development site and surrounding areas are also described in terms of their landscape character and landscape value.

11.3.1 Landscape Policy Context

A majority of the Proposed Development is situated in the townland of Moygaddy (Maigh Gadaí), County Meath. Therefore, the Meath County Development Plan 2021-2027 has been consulted to identify relevant landscape policy designations in the LVIA Study Area. The southern perimeter of the Proposed Development Site (South of Site B and Site C) tracks along the banks of the Rye Water River which demarks the boundary between County Meath to the north and County Kildare to the south. The proposed Kildare Bridge and Moyglare Bridge traverse the county boundary and therefore these elements of the Proposed Development are also sited in County Kildare, therefore, The Kildare County Development Plan 2017-2023 was also consulted.

The Proposed Development is located in a predominantly greenfield site to the north of Maynooth Town. Both the Meath and Kildare County Development Plans contain Local Area Plans (LAPs) specifically focussed upon the town of Maynooth and its surrounding environment. Therefore, landscape policy and designations in these LAPs are considered most pertinent with regards to the likely landscape and visual impacts of the Proposed Development.

11.3.1.1 Meath County Development Plan 2021-2027 (MCDP)

The Meath County Development Plan (MCDP) 2021-2027 was brought into effect on the 3rd of November 2021.

11.3.1.1.1 *General Landscape Policy – County Meath*

Chapter 8 of the MCDP contains a strategy for Culture and Natural Heritage, *Section 8.17* of *Chapter 8* comprises general policy and objectives pertaining to landscape. General landscape policies and objectives relevant to the Proposed Development site its surrounding landscape are reported below:

> *"**HER POL 52** - To protect and enhance the quality, character, and distinctiveness of the landscapes of the County in accordance with national policy and guidelines and the recommendations of the Meath Landscape Character Assessment (2007) in Appendix 5, to ensure that new development meets high standards of siting and design."*
>
> *"**HER POL 53** To discourage proposals necessitating the removal of extensive amount of trees, hedgerows and historic walls or other distinctive boundary treatments."*
>
> *"**Objective HER 49** - To ensure that the management of development will have regard to the value of the landscape, its character, importance, sensitivity and capacity to absorb change as outlined in Appendix 5 Meath Landscape Character Assessment and its recommendations."*
>
> *"**Objective HER 50** - To require landscape and visual impact assessments prepared by suitably qualified professionals be submitted with planning applications for development which may have significant impact on landscape character areas of medium or high sensitivity."*

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This LVIA addresses the likely impacts of the Proposed Development on landscape character in the context of the Meath Landscape Character Assessment (2007) that forms *Appendix 5* of the MCDP. A detailed landscape master plan is proposed for the Proposed Development. In mind of objective HER POL 53, where possible, the landscape plan includes the retention of treelines, hedgerows and historic walls that form boundaries within the Moygaddy Master Plan Site.

Section 8.7.4 of the MCDP affords special protection to the high sensitivity landscapes of Tara/Skryne, as well as Loughcrew and Slieve Na Calliagh Hills under policy HER POL 54, designating them as Landscape Conservation Areas:

> ***"HER POL 54****: To protect the archaeological heritage, rural character, setting and amenity of the Tara landscape and Loughcrew and Slieve na Calliagh Hills"*

The Proposed Development is located a substantial distance from these landscapes (>51 km south-east of Slieve na Calliagh and >20 km south of the Hill of Tara) and will therefore have no material impact on any County Meath Landscape Conservation Areas.

11.3.1.1.2 Landscape Character Assessment – County Meath

A Landscape Character Assessment is contained in *Appendix 5* of the MCDP. This Landscape Character Assessment divides the county into 4 landscape character types (LCTs) and subdivides these into 20 landscape character areas (LCAs). *Section 8.17.5* of the MCDP defines the sensitivity of LCAs as:

> *"its overall resilience to sustain its character in the face of change and its ability to recover from loss or damage to its components."*

The MCDP and the Landscape Character Assessment contained in *Appendix 5* categorise the sensitivity of different LCAs as Low, Medium, or High. The MCDP states that:

> *"highly sensitive landscape is likely to be vulnerable, fragile and susceptible to change whereas a landscape with low sensitivity is likely to be more robust and/ or tolerant of change."*

Section 8.17.6 of the MCDP defines landscape capacity of LCAs as:

> *"The potential capacity of each LCA is based on indicative types of development that are likely to occur within the study area. Capacity is the ability that the landscape has to absorb specific types of development. It is only possible to define actual capacity on a case-by-case basis because it will vary according to the type and form of development, its location in relation to the landscape character area in question, and its visibility from it"*

Figure 11-16 below shows that the Proposed Development is entirely located within Meath *LCA 11 – South East Lowlands* which is designated as an LCA of 'medium' landscape sensitivity. Meath *LCA 14 – Royal Canal* is located within the LVIA Study Area (within 3 km). LCA 14 is located approximately 1.8 km west of the Master Plan Site Boundary at its closest point and it is designated as an LCA of 'medium' sensitivity. A description summary of these LCAs as reported in *Appendix 5* of the MCDP are outlined below:

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Meath LCA 11 - South East Lowlands

Meath LCA 14 - Royal Canal

Kildare LCA - Northern Lowlands

RC1 RC4 RC5 RC6 RC7 RC8 RW1 RW2 RW3 RW4

Carton Avenue

College Gates, Castle and College Spire from Main Street

Harbour along Leinster Street

Bond Bridge

Pike Bridge

Map Legend

- LVIA Study Area - 3km Search Area
- EIAR Site Boundary

Landscape Policy Designations

- Meath and Kildare Landscape Character Areas (LCAs)
- County Kildare Designated Scenic Route
- County Kildare Designated Scenic Views
- Protected Views and Prospects from the Maynooth Local Area Plan

Other Landscape and Visual Receptors

- Carton House Demesne
- Stud Farms
- Royal Canal Way Marked Trail and Greenway

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Drawing No.

Figure 11-16

Drawing Title

Landscape Policy Context

Project Title

Moygaddy Mixed-Use Development

Scale	Project No.	Date	Drawn By	Checked By
1:26,000	210414	25.08.2022	JW	MW

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LCA 11 - South East Lowlands

This LCA encompasses the area between the Hill of Tara to the southern border and the Dunboyne environs. It is predominantly rolling lowland with large areas dominated by attractive estate landscapes with associated parkland. This parkland has a mix of smaller estates and stud farms that create a distinctive character. The land is extensively used for pasture in the north, with arable land more prominent further south. The landscape condition gradually deteriorates where development pressure from the Dublin metropolitan area becomes more evident. The landscape is relatively enclosed due to the topography and wooded hedgerows with longer views at the top of many drumlins. Many of the views in the lowlands are restricted to those along road corridors and the immediate hinterland.

County Meath LCA 11 is designated as having a 'Very High' landscape value, a 'Medium' landscape sensitivity and is a landscape of 'Regional' importance. The MCDP provides the following relevant recommendations in relation to this LCA:

> *"Recognise the importance of stud farming to the upkeep of the landscape in the centre of the Dunboyne farmland and maintain the viability of this industry by sensitive siting of development that may adversely affect it."*

Landscape and visual impacts of the Proposed Development on stud farms in the wider landscape surrounding the site are considered in this LVIA. In terms of capacity for development in this LCA, the MCDP states that there is:

> *"Low potential capacity to accommodate multi-house developments due to the significant growth of this type of development in recent years. Such development should be limited to the existing urban areas, which have been designated to accommodate such growth, and in these locations they should be very carefully planned in terms of location, scale and design to mitigate against potential adverse impacts, particularly cumulative impacts."*

The Proposed Development is located within the Maynooth Town Environs and within a designated area where land is zoned to accommodate growth such as that of the Proposed Development (see Section 11.3.1.1.4).

LCA 14 – Royal Canal

The Proposed Development is located approximately 1.8 kilometres east of the eastern boundary of this LCA. This LCA encompasses the rolling lowland adjacent to the Royal Canal, which is more open due to larger arable field patterns and in general this area is less densely vegetated. The landscape is attractive although adjacent to the canal much of the landscape is in poor condition with scrappy farmland and a clear loss of hedgerows. The Meath CDP states that:

> *"The landscape adjacent to the Royal Canal is very flat, but overgrown scrappy hedgerows and farmland restrict views. Views along the Royal Canal are available at the various stone bridges crossing the canal into Kildare, these provide good vantage points and views across the lowland."*

LCA 14 contains part of the Kilcock Environs, which is located approximately 4.5 kilometres west of the Proposed Development. Kilcock is a medium sized settlement area with a diverse mix of retail, commercial and residential development.

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11.3.1.1.3 Views and Prospects - County Meath

County Meath affords protection to designated scenic views and prospects that are of amenity and tourism value. The following policy objective relates to the protection of designated views and prospects in County Meath.

> ***"Objective HER 56*** *- To preserve the views and prospects listed in Appendix 10, in Volume 2 and on Map 8.6 and to protect these views from inappropriate development which would interfere unduly with the character and visual amenity of the landscape."*

Appendix 10 of the MCDP lists and describes 94 No. designated Views and Prospects, the locations of which are shown in *Map 8.6*. There are no County Meath designated views and prospects within the immediate vicinity of the Proposed Development or within the LVIA Study Area (within 3km of the Proposed Development site). The closest County Meath protected view is Coole Hill (County Meath Designated View No. 84), which is located approximately 11 kilometres from the Proposed Development site. The direction of this view is to the west, away from the Proposed Development. It is anticipated that there will be no impact on any protected views or prospects designated within the MCDP, and they are not considered further in this LVIA.

11.3.1.1.4 Maynooth Environs Written Statement (2021-2027 MCDP)

Volume 2 of the MCDP contains a Written Statement for the Maynooth Environs comprising a development strategy for the northern environs of Maynooth Town within the administrative area of Meath County Council. Maynooth Environs in County Meath includes the following lands:

> *"Maynooth Environs in County Meath is located on the northern periphery of the dynamic university town of Maynooth. The lands within Maynooth Environs are largely undeveloped at present and comprise approximately 139 hectares of land approximately 1.5km to the north east of the town centre. It is bisected by the R157 road which links Maynooth to Dunboyne. For the purposes of this plan the Moygaddy lands are taken to contain all lands within the boundary of the Environs Plan excluding the lands in Co. Meath which are part of the Carton Estate."*

The written statement describes the Maynooth environs as two distinct elements, the Moygaddy Stud and The Carton Demense.

> *"The lands are composed of two distinct elements; Moygaddy stud, on lands to the west of the R157, and the Carton Demesne lands located to the east of the R157. The lands to the west of the R157, of some 98 hectares, are currently in use as a stud farm. The existing buildings on these lands reflect this use and consist of a purpose built stud dating from the 1830's..."*

The Proposed Development is located within the Moygaddy Stud area of the Maynooth Environs, west of the R157, which are lands zoned for strategic development. The strategic vision for the Moygaddy stud area of the Maynooth Environs as stated in *Section 3* of the Written Statement is reported below:

> *"Maynooth Environs shall develop in partnership with the existing town in County Kildare as a dynamic developing area, which will integrate with the town's existing urban area. It is envisaged that the Environs will be a focal point for science and technology employment, with high quality knowledge based jobs utilising the synergy with NUI Maynooth as a centre of excellence for research and innovation. The intention is to create a unique employment hub centred on a high tech/bio tech campus within the lands, supported by a 'live work' community with a mixture of residential, employment, community and tourism zoning'"*

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To facilitate this vision, the Written Statement identifies a master plan for the Maynooth Environs which includes very specific land use zoning for the landscape of the Moygaddy area and site of the Proposed Development. The policy and direction of this master plan is comprehensively addressed in Chapter 2 of this EIAR. As detailed in Chapter 2, the Proposed Development is a plan lead design, adhering to the land use zoning and objectives included in the master plan and Maynooth Environs Written Statement.

Map 26(a) of the Written Statement shows the proposed land use zoning for the Maynooth Environs. Figure 11-17 below shows the location of the various proposals comprising the Proposed Development (Site A; Site B; Site C; the MOOR; Kildare Bridge; Moyglare Bridge) within the EIAR Site Boundary in the context of land zoning in *Map 26(a).*

The infrastructure footprint of the Site A proposed Strategic Employment Zone are located within Zoning 'E1 – Strategic Employment Zones'. The infrastructure footprint of the Site B proposed Healthcare Facilities is located within Zoning 'G1 – Community Infrastructure'. The infrastructure footprint of the Site C proposed Strategic Housing Development' is located within Zoning 'A2 – New Residential'. The proposed MOOR follows the 'Transport - Indicative Road Route' within the zoning map. Considering the alignment and compliance of the Proposed Development with these land use zoning in local planning policy (Maynooth Environs Master Plan) the landscape of the subject lands are deemed to have a low susceptibility to change.

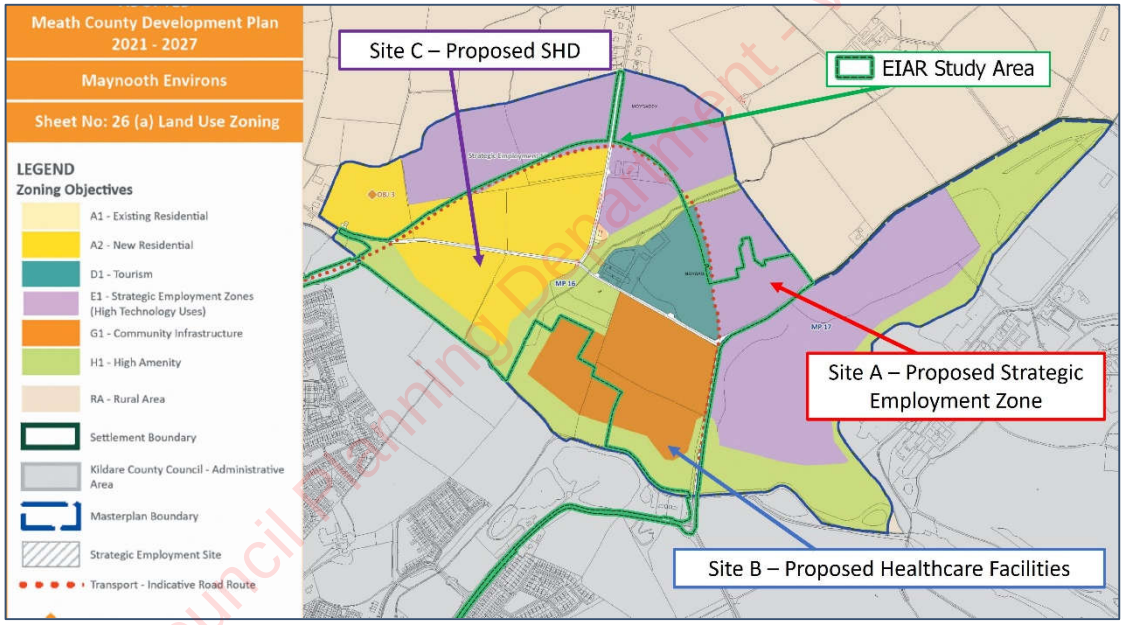

Figure 11-17 Land Zoning maps extracted from the MCDP 2021-2027 and the location of The Proposed Development and EIAR Site Boundary bounded by a green line.

As shown in Figure 11-17, the EIAR Study Area includes lands zoned as 'H1- High Amenity Area'. As shown in the zoning of the master plan (seen above in Figure 11-17), H1 High Amenity Area zoning primarily comprises buffer zones around watercourses such as the Rye Water and its tributary the Blackhall Little, as well as woodland and monuments surrounding Moygaddy Castle ruins. H1 areas within the EIAR Study Area includes land at the margins of the Rye Water, as well as two crossing points, Kildare Bridge and Moyglare Bridge. It is an objective of Meath County Council to protect and improve lands zoned as H1. Permitted uses/development in these lands zoned as high amenity include *"Cycleways / Greenways / Trail Development, Land & Water Based Recreational Activities Open Space, Cultural Activities".* In accordance with the H1 zoning of lands, the Landscape Master Plan for the Proposed Development includes cycleways, pedestrian walkways, recreational green space and various amenities to facilitate cultural and recreational activities (e.g. Scout Den)

It is noted that that the proposed infrastructure footprint of the Healthcare Facilities at Site A, Site B and SHD at Site C do not comprise the Area of H1 High Amenity zoning (green).

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As shown above in Figure 11-17, multiple other land use zones exist within the wider master plan for the Maynooth Environs. The Written Statement contains the following general policies relating to the proposed master plan, its landscape and the visual aesthetic of development proposed for the area:

> ***"MAY POL2:*** *To ensure that the development of the Maynooth Environs is accommodated in an environmentally sensitive manner that will:*
>
> 1. *Create a centre of excellence for innovation and employment;*
> 2. *Protect the existing natural environment and built heritage and utilise it to frame new development, and*
> 3. *Build a distinctive and attractive mixed-use place to work and live.*
>
> ***"MAY OBJ10:*** *To require that any development in the Maynooth Environs respects the built and natural heritage of the area, its landscape quality, protected structures, historic demesne, archaeological heritage, natural heritage and general landscape character."*
>
> ***"MAY OBJ11:*** *To ensure all development in the area has no negative impact on the Rye Water Valley/Carton SAC site or on the environmental characteristics of the area including woodland, rivers and tributaries"*
>
> ***"MAY OBJ12:*** *To encourage the sympathetic re-use or rehabilitation of Moygaddy House and outbuildings and encourage their sensitive conversion to residential or tourist accommodation or other appropriate use in accordance with the land use objective applicable to the said lands."*
>
> ***"MAY OBJ13:*** *To facilitate the provision of community facilities including a hospital and/or associated educational/research and residential facilities.*
>
> ***"MAY OBJ14:*** *To promote a high standard of architectural design, and quality of materials utilised throughout the Development Framework area, that is appropriate in scale, and form to its location.*

This LVIA addresses the likely impact of the Proposed Development upon the landscape character of the site and its qualities in consideration of built heritage features and natural landscape receptors such as woodland, hedgerows and the Rye Water Valley that exist within the landscape of the site.

Under the objective *MAY OBJ 2 (Master Plan 17*), the Written Statement emphasises the importance of Carton House and its Demesne landscape located to the east and south-east of the Proposed Development and provides many measures to preserve and protect its unique landscape setting. *Item 1* of *MAY OBJ 2* refers to Proposed Developments within Carton Demesne:

> *"An assessment prepared by a suitably qualified conservation architect which demonstrates and concludes that the Proposed Development is sited and scaled such that it ensures that the character and integrity of this sensitive designed landscape and setting of Carton House within this landscape is respected and not adversely impacted upon. The assessment shall include reference to the significance of the designed landscape within the Development Framework lands to the overall evolution of the demesne."*

The Proposed Development is not located within Carton Demesne. There are no protected views listed in the MCDP or the Maynooth Environs written statement. However, County Kildare is located immediately south and south-east of the Proposed Development site and the Kildare County Development Plan 2017-2023 identifies protected views to and from Carton House and the lake and woodland areas comprising the Carton Demesne landscape. These scenic views are reported in the following section. Visibility of the Proposed Development from Carton Demesne is assessed in Section 11.4 - *Visual Baseline*.

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11.3.1.2 Kildare County Development Plan 2017 – 2023 (KCDP)

The Kildare County Development Plan 2017-2023 (KCDP) contains policies and objectives relating to landscape, recreation, and amenity which are referred to in the following sections.

11.3.1.2.1 *General Landscape Policy – County Kildare*

The KCDP contains the following designations relating to areas and landscapes which are of value:

- Designated Views
- Scenic Routes
- Areas of High Amenity

General landscape policies and objectives contained in *Section 14.8.1* of the KCDP are reported below:

"It is the policy of the Council to:

LA 1: *Ensure that consideration of landscape sensitivity is an important factor in determining development uses. In areas of high landscape sensitivity, the design, type and the choice of location of Proposed Development in the landscape will also be critical considerations.*

LA 2: *Protect and enhance the county's landscape, by ensuring that development retains, protects and, where necessary, enhances the appearance and character of the existing local landscape.*

LA 3: *To require a Landscape/Visual Impact Assessment to accompany significant proposals, that are likely to significantly affect:*

- *Landscape Sensitivity Factors*
- *A Class 4 or 5 Sensitivity Landscape (i.e. within 500m of the boundary)*
- *A route or view identified in maps 14.2 and 14.3 (i.e. within 500m of the boundary)*

LA 4: *Seek to ensure that local landscape features, including historic features and buildings, hedgerows, shelter belts and stone walls are retained, protected and enhanced where appropriate, so as to preserve the local landscape and character of an area, whilst providing for future development."*

LA 7: *Be informed by consideration of the County Landscape Character Appraisal."*

This LVIA addresses the impacts upon designated landscape receptors of high sensitivity within the LVIA Study Area (3km from the proposed Development) such as those noted in policies LA3 and LA4 above. The LVIA will be informed by the Landscape Character Appraisal referred to in policy LA7 (See following section 11.3.1.2.2 below).

"It is an objective of the Council to:

LO 1: *Have regard to the Landscape Sensitivity Factors in the vicinity of sites in the consideration of any significant development proposals.*

LO 2: *Ensure landscape assessment will be an important factor in all land-use proposals.*

LO 4: *Protect the visual and scenic amenities of County Kildare's built and natural environment.*

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LO 5: *Preserve the character of all important views and prospects, particularly upland, river, canal views, views across the Curragh, views of historical or cultural significance (including buildings and townscapes) and views of natural beauty.*

LO 6: *Preserve and protect the character of those views and prospects obtainable from scenic routes identified in this Plan, listed in Table 14.5 and identified on Map 14.3."*

The LVIA conducted in this chapter assesses the impact of the Proposed Development on scenic amenity in the LVIA Study Area (3km) such as those noted in policy LO5 and the designated views and prospects listed in *Table 14.5* and on *Map 14.3* of the KCDP.

11.3.1.2.2 Landscape Character Assessment – County Kildare

The KCDP refers to Volume II of the Kildare County Development Plan 2005-2011 which comprises a Landscape Character Assessment carried out in 2004. This Assessment identifies 14 Landscape Character Areas (LCAs) and also categorises these into four types of landscape, based on similarities within these areas. As shown in Figure 11-16 (above), the Kildare LCA *Northern Lowlands* is located immediately south of the River Rye, comprising all areas of County Kildare located in the LVIA Study Area.

Northern Lowlands LCA

This LCA encompasses the lowland area to the north-east of Kildare. This area is characterised by generally flat terrain and open lands with regular (medium sized) field patterns. Hedgerows are generally well maintained and low, with scattered trees along the field boundaries that partially screen the lowest lying areas. Nevertheless, the generally low-lying vegetation of the area allows long-distance and extensive visibility. The predominant landuse in this area is pasture, with large areas of non-irrigated arable lands (mainly tillage). Coniferous plantations and deciduous woodlands can also be found, as well as large patches of bogland and peat extraction sites. This area has a high population density, with a number of large towns including Maynooth.

The Landscape Character Assessment states that the following Critical Landscape Factors for this LCA are:

*"**Smooth Terrain** - Smooth terrain and the generally flat topography and landform that characterise this landscape character unit, allow vistas over long distances without disruption. As a result development can have a disproportionate visual impact, due to an inherent inability to be visually absorbed.*

***Undulating topography** - Gently undulating topography is presented at certain areas of this character unit, providing the potential for local visual enclosure thereby absorbing development where it does not break the skyline (i.e. it renders visually unobtrusive of the overall landscape scale). St. Patrick's Hill, Ardrass, Celbridge represents an important topographical feature within the Northern Lowlands area.*

***Low Vegetation** - The grassland, tillage fields and generally low hedgerows of this area provide similar characteristics to smooth terrain in landscape terms, and the two are often interrelated due to soil attributes. Grassland vegetation and agricultural crops are usually uniform in appearance, failing to break up vistas, and allowing long distance visibility. Existing low hedgerows partially screen the lowest land parcels, nevertheless the common low vegetation proves unable to visually absorb new development.*

***Shelter Vegetation** - Shelter vegetation is represented at some stretches of this unit by coniferous plantations, deciduous woodlands and the presence of trees that grow on field hedgerows. In a similar manner to undulating topography, shelter vegetation has a shielding*

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and absorbing quality in landscape terms. It can provide a natural visual barrier and also adds to the complexity of a vista, breaking it up to provide scale and containment for built forms.

Localised River and Canal Views *- River valleys and canal corridors are generally visually enclosed and highly localised areas of very distinctive character with a high degree of visual consistency. This character unit includes sections of the River Liffey and the Grand and Royal Canals. Due to the low lying nature of this area, many views of the river valley and the canal corridors are available from the local roads and from the viewing points located on bridges."*

This LCA is designated as Class 1 – Low Sensitivity in the KCDP, as it is an area *"with the capacity to generally accommodate a wide range of uses without significant adverse effects on the appearance or character of the area."*

11.3.1.2.3 Areas of High Amenity - County Kildare

In addition to the LCAs and the sensitivity rating of these areas, the KCDP recognises special landscape receptors within the county. These areas are designated as Areas of High Amenity *"because of their outstanding natural beauty and/or unique interest value and are generally sensitive to the impacts of development."*

The KCDP lists 5 areas designated as Areas of High Amenity. The Grand and Royal Canal Corridor is a designated Area of High Amenity in the KCDP. The Royal Canal flows in an east to west direction along the northern boundary of the county through Maynooth and at its closest point it is located approximately 680 metres south of the EIAR Site Boundary (underground utilities that are part of the Proposed Development). The KCDP states the following in relation to the Canal Corridor High Amenity Area:

"The canal corridors and their adjacent lands have been landscaped and enhanced along the sections where the canals flow through urban areas. Canal locks are distinctive features of these water corridors.

The smooth terrain, generally gentle landform and low canal bank grassland that characterise the canal corridors allow vistas over long distances without disruption, where the canal flows in a straight-line direction. Consequently, development can have a disproportionate visual impact along the water corridor and it can prove difficult for the existing topography to visually absorb development. The occurrence of natural vegetation, coniferous and mixed plantations adjacent to the water corridors can have shielding and absorbing qualities in landscape terms, by providing natural visual barriers.

Canal corridors are potentially vulnerable linear landscape features, as they are often highly distinctive in the context of the general landscape. In some cases landscape sensitivities may be localised or site-specific."

The Kildare CDP contains the following policies in relation to Water Corridors (Areas of High Amenity), including the Royal Canal Corridor:

"It is the policy of the Council to:

WC 1 *Seek to locate new development in the water corridor landscape character areas towards existing structures and mature vegetation.*

WC 2 *Facilitate appropriate development that can utilise existing structures, settlement areas and infrastructure, whilst taking account of the visual absorption opportunities provided by existing topography and vegetation.*

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WC 3 *Control development that will adversely affect the visual integrity of distinctive linear sections of water corridors and river valleys and open floodplains."*

As shown in Figure 11-16 (previously), the route of the Royal Canal generally runs in a linear path, east to west across the LVIA Study Area. Above ground elements of the Proposed Development are located approximately 1 km north of the canal at its closest point (underground utility infrastructure is located in closer proximity, but will not be visible after the construction phase), therefore, long-ranging vistas along the canal corridor are oriented in a direction perpendicular to the Proposed Development. Consequently, landscape features lining the canal (vegetation and built form) are likely to screen the Proposed Development from view, protecting the visual integrity of linear views along the canal.

Table 14.10 of the KCDP designates 11 No. protected views to and from bridges which cross the Royal Canal. Four of these designated views (RC-5, RC-6; RC-7; RC-8) are located in the LVIA Study Area and are described in Table 11-7 of the following Section.

11.3.1.2.4 Scenic Routes and Protected Views - Kildare

*Section 14.*6 of the KCDP identifies designated Scenic Routes and Protected Views within County Kildare. The KCDP describes them as *"important and valued views and prospects within the county"* and notes that protected views *"are located particularly along water corridors and to and from the hills in the countryside."* The KCDP states:

"The Council recognises the need to protect the character of the county by protecting views and scenic routes. However, it is acknowledged that in certain circumstances, some development may be necessary. In this regard, appropriate location, siting and design criteria should strictly apply. All proposals will be assessed taking into account the overall character of the scenic route and the character of the landscapes through which the route passes, in accordance with the criteria outlined in section 14.4.2."

The following policies from the KCDP apply to Scenic Routes and Watercourse and Canal Corridor Views:

"It is the policy of the Council to:

SR 1 *Protect views from designated scenic routes by avoiding any development that could disrupt the vistas or disproportionately impact on the landscape character of the area, thereby affecting the scenic and amenity value of the views.*

WV 1 *Curtail any further development along the canal and river banks that could cumulatively affect the quality of a designated view.*

WV 2 *Preserve and enhance the scenic amenity of the river valleys and canal corridors and the quality of the vistas available from designated views.*

WV 3 *Prevent inappropriate development along canal and river banks and to preserve these areas in the interests of biodiversity, built and natural heritage and amenity by creating or maintaining buffer zones, where development should be avoided."*

Designated Scenic Routes and Protected Views identified within the LVIA study area (3km of the Proposed Development), are illustrated in Figure 11-16 and described in Table 11-7 below.

*Please note the following prefixes in Table 11-7:

- SR – Scenic Routes in County Kildare;
- RW – Views of the Rye Water from Bridges;
- RC – Views to and from all bridges on the Royal Canal.

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Table 11-7 Scenic Routes and Views from the Kildare CDP

Scenic View	Description KCDP
SR – 30	Within Carton Demesne walls: Views to and from Carton House, the Lake and Woodland Areas
RW - 1	Black Bridge Kellystown / Blakestown
RW - 2	Carton Bridge Carton Demesne.
RW - 4	Kildare Bridge Carton Demesne
RC - 5	Pike Bridge Railpark/Donaghmore
RC - 6	Mullen Bridge Railpark/Maynooth
RC - 7	Bond Bridge Maynooth
RC - 8	Jackson's Bridge Laraghbryan East

The likely visibility of the Proposed Development was appraised from these designations during a site visit conducted in August 2021, visibility from these receptors is reported in Section 11.4 of this report - *Visual Baseline.*

11.3.1.2.5 *Maynooth Local Area Plan 2013 – 2019*

The Maynooth Local Area Plan 2013-2019 (MLAP) forms part of the current KCDP and incorporates the lands of the Proposed Development at Kildare Bridge and Moyglare Bridge. A majority of the Proposed Development site is located in County Meath immediately adjacent to the northern border of the area covered by the MLAP and does not fall within the jurisdiction of the MLAP. Figure 11-18 (below) is extracted from *Map 5* of the MLAP, the red line indicates the 'Local Area Plan Boundary'.

The Maynooth streetscape, amenity areas to the north and green fringe areas are important landscape receptors contributing to the context, setting and character of the surrounding landscape of the Proposed Development site within the wider LVIA Study Area. As discussed in Section 11.3.1.1.4 the Proposed Development is located within the Maynooth Environs zoned lands as set out in the Maynooth Environs Local Area Plan (2013-2019).

Amenity Grasslands - MLAP

Section 7.10.8 of the MLAP contains the following policies related to amenity grasslands:

> *"It is the policy of the council:*
>
> *GI 1: To require all proposals for major developments to submit, as part of the landscaping plan for the proposal, details of how any green infrastructure proposed as part of the development (e.g. green open spaces, hedgerows, tree lines, etc.) contribute positively to the development and protection of the overall green infrastructure assets of Maynooth as identified in Map 5 and how it protects and enhance linkages to the wider natural landscape features."*

The proposed Moyglare Bridge will cross a small portion of designated amenity grasslands which tracks the course of the Rye Water along the northern boundary of the Maynooth LAP.

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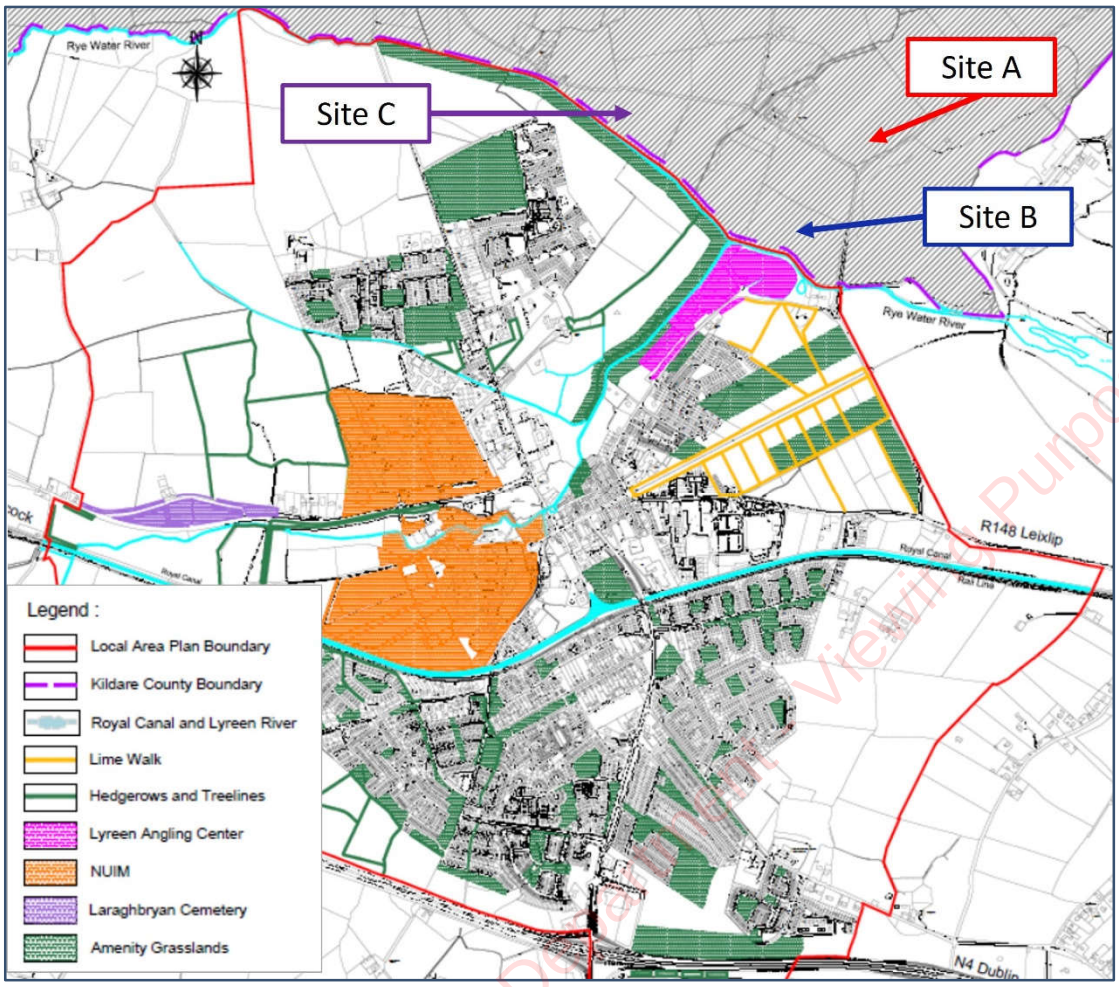

Figure 11-18 Extracted from Map 5 from Maynooth LAP showing the location of the Proposed Development Site A, Site B and Site C.

Views and Prospects

Section 7.11 of the MLAP provides an overview of policies and objectives related to recreation, amenity and open spaces. The following policies relate to views and prospects in the MLAP:

> *"It is the policy of the Council: **AR 10:** To protect the following views and prospects:*
>
> - *Of the College Gates and Castle;*
> - *Of The Royal Canal from all bridges;*
> - *Pike Bridge;*
> - *Bond Bridge;*
> - *Along the Carton Avenue / Main Street Axis;*
> - *Off the Harbour along Leinster Street;*
> - *The College Spire from MainStreet"*

These views and prospects are mapped on *Map 4* and *4(a)* of the MLAP as well as the Landscape Policy Context Map (Figure 11-16). These designated views are either focussed within the internal streetscape of Maynooth itself or are views along the Royal Canal from elevated bridges. The likely visibility of the Proposed Development was appraised from these designations during a site visit conducted in August 2021, visibility from these locations are reported in Section 11.4 of this report - *Visual Baseline.*

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11.3.2 Landscape Character of the Proposed Development Site:

Landcover and Land Use

The Proposed Development is located within a greenfield site which currently comprises a rural agricultural landscape as part of Moygaddy Stud Farm. Predominant landcover is improved grassland of open grazing pasture used for sheep (Plate 11-1) and cattle (Plate 11-7), as well as horses in the northern fields of Moygaddy farm (Plate 11-2). The entirety of the Moygaddy Master Plan Area (as defined in the Maynooth Environs Written Statement) comprises 13 No. fields. Field cells are bounded by stone walls, wooden fencing and well-established vegetation in the form of mature hedgerows, scrub, gorse and mixed woodland.

Mature broadleaf trees (e.g. Oak. Ash, Alder, Beech) are a common feature of the site, particularly along local watercourses, along field boundaries and at the centre of the site where Moygaddy house and the ruins of Moygaddy Castle are enclosed by mature woodland.

A comprehensive description of the trees existent within the EIAR Study Area and their ecological value are detailed in Chapter 6 of this EIAR, as well as a tree survey and protection plan in Appendix 6-3.

Plate 11-1 A typical view within the Proposed Development site: Open parklands of grazing pasture bounded by mature woodland.

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Plate 11-2 View to the south-west towards Moygaddy house from the north-east of the site.

The remnants of Moygaddy castle are pictured below in Plate 11-3. The tower and other elements such as a well and old stone wall boundaries are sensitive cultural heritage features within the site. The area containing these features is parkland surrounded by mature woodland. These lands are designated as H1 High amenity Areas in the Maynooth Environs Written Statement (See Figure 11-17 previously). As shown in the landscape master plans (see Appendix 4-5, valuable landscape receptors such as the mature trees and heritage elements will be retained where possible. Proposals include the addition of recreational walking trails in this area, enabling safe public access to these features, improving their amenity value. The Landscape Plan includes for the surrounds of Moygaddy Castle to be landscaped as a public park with a playground.

For a more comprehensive description and appraisal of the impact of the Proposed Development on heritage features within the Proposed Development Site see Chapter 12 - *Cultural Heritage.*

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Plate 11-3 View to the west of Moygaddy Castle Ruins, A mature oak tree and the L2214-3 Local road are visible in the image.

Plate 11-3 was captured from a small field to the south of the L2214-3 Local road, and east of the Blackhall Little watercourse. Moygaddy House, pictured below in Plate 11-4 is located adjacent to the castle ruins on the northern side of the road. Moygaddy House is also a heritage building and conservation of its landscape setting is also a key aim of the proposed Master Plan. A communication mast is evident in the background of Plate 11-4 as a tall thin lattice structure.

Plate 11-4 View north-east towards Moygaddy House from south of the L2214-3 Local road.

Landform and Drainage

Although the wider landscape of Maynooth and its surrounding farmlands are generally very flat, the Proposed Development site comprises rolling pasture with localised topographical undulations. The River Rye Water flows easterly along the south-western perimeter of the Masterplan area. As shown in

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Figure 11-19 below, a steep embankment exists along the southern margins of the site as the landform rises and extends away from the Rye Water to the north-east (See Plate 11-5 below).

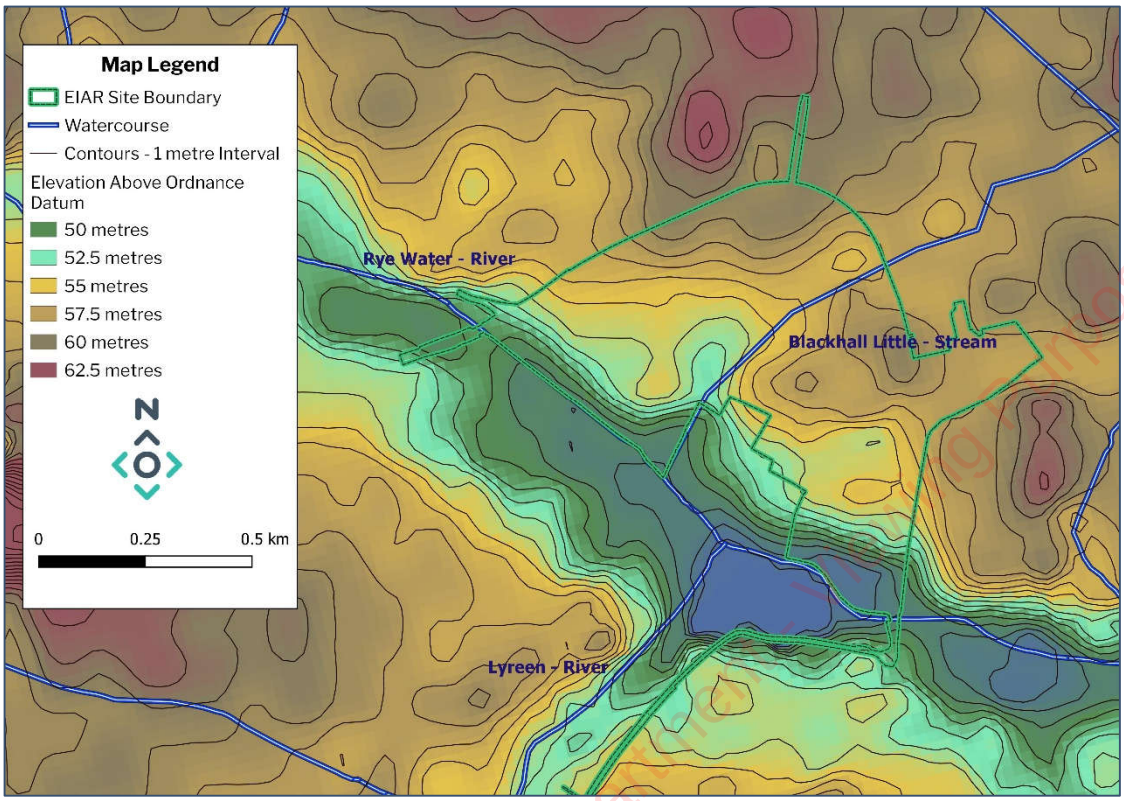

Figure 11-19 Topography and Drainage

Plate 11-5 Steep topography at the southern perimeter of the site (Site B looking south-east) where the landscape drains into the Rye Water.

As shown in Figure 11-19 above, the Proposed Development Site is bisected by a stream called the Blackhall Little (IE_EA_09R010400). The Blackhall Little enters the EIAR Study Area from the north-

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eastern perimeter and flows in a south-westerly direction. The watercourse carves a narrow valley past Moygaddy House and Moygaddy Castle before discharging into the Rye Water at the south-western perimeter of the Proposed Development site. The entirety of the site is drained by the Rye Water, which is joined by its tributary the Lyreen River before heading east where it discharges into the Royal Canal and then the River Liffey in central Dublin.

Plate 11-6 View looking south from along the Blackhall Little from a field south-west of Moygaddy Castle

The open fields to the north of the Rye Water provide an elevated vantage point where there are relatively unobstructed, long-ranging views of Maynooth Town (see Plate 11-7 below).

Plate 11-7 An open view of Maynooth Town from within the site boundary.

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Human Influences

This is a modified and managed working landscape, influenced by the ongoing livestock grazing at the Moygaddy Stud Farm. Other human influences include grid infrastructure such as metal pylons and overhead lines (Plate 11-8 below) which cross the north-eastern extent of the Masterplan area, as well as a communication mast at Moygaddy House (seen previously in Plate 11-4). The Route of the proposed MOOR roughly traces the route of the overhead electricity line through the field shown in Plate 11-8 below.

Plate 11-8 An electricity pylon at the north-east of the site where the MOOR will cross this field, parallel to the overhead line. Residential settlements are seen beyond the northern margin of the site boundary.

The L6219 Local road enters the site boundary from the west and traverses to the east where it passes a junction with the L2214 and then the road becomes the L2214-3 as it passes Moygaddy House. The L2214-3 Local road links with the R157 Regional road which traces the eastern perimeter of the site. As shown in Plate 11-9 and Plate 11-10 below, the roadway is lined on both sides by dense vegetation. During summer months when trees and hedgerows are full of foliage, there is very little visibility into the adjacent fields.

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Plate 11-9 View to the east along the L2214-3 Local Road from Moygaddy House.

Plate 11-10 View to the west along the L6219 local road at the junction with the L2214 & L214-3

A small bridge crosses the Blackhall Little watercourse in the centre of the Proposed Development Site (Plate 11-11) in close proximity to Site C, Moygaddy House and Moygaddy Castle. West of this bridge is a junction where the L2214 Local road extends north from the L2214-3 and L6219.

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Plate 11-11 Bridge over the Blackhall Little on the L2214-3

Plate 11-12 Junction between the L6219, L2214-3 and L2214. At the centre of the Proposed Development site.

11.3.3 Landscape of Site A – Strategic Employment Zone

Site A is located immediately north of the L2214-3 and west of the R157 Regional Road. It is located in a field that connects with Moygaddy House to the west. As shown in Plate 11-13 below, the landscape of Site A is very flat. Like the rest of the Masterplan area, Site A is currently an open field of grazing pasture comprising improved grassland bordered by dense hedgerows and several mature trees adjacent to the roads and junction to the south and east.

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Plate 11-13 Existing landscape of Site - A Strategic Employment Zone and the northerly, greenfield section of the proposed MOOR.

The majority of the proposed infrastructure (e.g., office blocks and car parking) of Site A is located within the existing field cell shown in the image above. However, the proposed crossroad, new sections of the MOOR network and road upgrades to the R157 and L2214-3 will be located at the south-western boundary of the field and upon the existing road network. As shown by the annotations on Plate 11-14 below, localised vegetation clearance will be required in order to facilitate the upgrade to this junction and development of the MOOR road network.

Plate 11-14 View west-north-west along the L2214-3 Local Road from the existing junction with the R157.

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Plate 11-15 View north-north-west where the proposed north-westerly section of the MOOR is located

Plate 11-15 shows an indication of the proposed c.380m section of the MOOR as part of the Site A planning application. This is located within the same field cell as the other infrastructure forming Site A shown in Plate 11-13 previously. Plate 11-15 was captured from a grove of beech trees (amongst other species) that exists at the old driveway entrance to Moygaddy House (seen below in Plate 11-16). The existing driveway and woodland extends north-westerly adjacent to the local road until it reaches Moygaddy House, the woodland and driveway are located approximately 85 metres from the proposed MOOR route at its closest point.

Plate 11-16 Woodland at the driveway entrance to Moygaddy House adjacent to the L2214-3 Local Road.

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11.3.4 Landscape of Site B – Healthcare Facilities

Site B is located within an agricultural grassland field immediately adjacent to the R157 as it exits Maynooth to the north from the Dunboyne Roundabout. The northern field boundary (Plate 11-17) comprises a wooden fence and a line of dense mature deciduous trees. As shown below, overhead lines and telegraph poles run across the site parallel with the northern field boundary.

Plate 11-17 View east along the northern field boundary of Site B.

The northern portion of Site B (shown Plate 11-17) is the flattest area of Site B and is consequently the proposed location of all proposed infrastructure including the proposed primary care centre, proposed nursing home, the proposed pumping station and proposed access roads and associated car parking amenities.

The western (left) and southern (right) boundaries of Site B are shown in the panorama image below (Plate 11-18). The elevation of the landscape tapers down to the south towards the Rye Water which is located beyond the treelines to the right of the image. As shown previously in Plate 11-5 there is a steep embankment at the southern perimeter of Site B, a natural flood plain of the Rye Water. Consequently, minimal infrastructure (only drainage infrastructure – See Chapter 4 of this EIAR) is proposed within the more steeply sloped areas of Site B. This area which tracks along the northern bank of the Rye water is also zoned as H1- High Amenity Area and therefore is not zoned for full development.

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Plate 11-18 Panorama view west(left) and south(right) of Site B.

As shown in Plate 11-19 the suburban fringe (Lyreen/Mariavilla Housing Estate) of Maynooth town is visible beyond the low elevations around the Rye Water to the south-west of Site B. Excepting the proposed road entrance that links with the R157 at the east of the site, all of the proposed infrastructure of Site B is located within the enclosure of the existing field cell. The Proposed Development design includes the retention of the existing field boundaries which typically comprise dense hedges, scrub and deciduous trees (See Plate 11-20 below).

Plate 11-19 View to the south-west towards Maynooth town from within Site B.

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Plate 11-20 Typical existing field boundary conditions of Site B.

11.3.5 Landscape of Site C – Strategic Housing Development

The landscape of Site C includes the lands discussed previously around Moygaddy Castle Ruins (Plate 11-3) and the Blackwater Little (Plate 11-6) which will be developed in line with land zoning as areas of recreational amenity. A majority of the development footprint of the proposed residential houses, apartments and duplexes will be located within the two fields located immediately west of the Blackhall Little and north of the Rye Water. Like the rest of the Proposed Development site, the landscape comprises agricultural grassland bound by dense vegetation.

Plate 11-21 View into an agricultural field at the north-eastern perimeter of Site C SHD.

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The northern perimeter of Site C comprises the L6219 Local Road. As part of the Proposed Development the western portion of this road will be re-aligned in a north-westerly direction where it will link up with the proposed MOOR.

Plate 11-22 View West along the L6219 Local Road, along the northern perimeter of Site C

11.3.6 Landscape of The Proposed MOOR

The route of the proposed MOOR arcs north-east from Site A through fields of grassland and across the Blackhall Little stream (Plate 11-23). The MOOR then intersects with the existing Local Road L1224 north of Moygaddy House (Plate 11-24) before arcing to the south-west towards the north-western perimeter of Site C (Plate 11-25).

Plate 11-23 Route of the MOOR, across the Blackhall Little and through Fields of grassland.

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Plate 11-24 Route of the MOOR at the north of the EIAR Study Area where the proposed route intersects with the L1224.

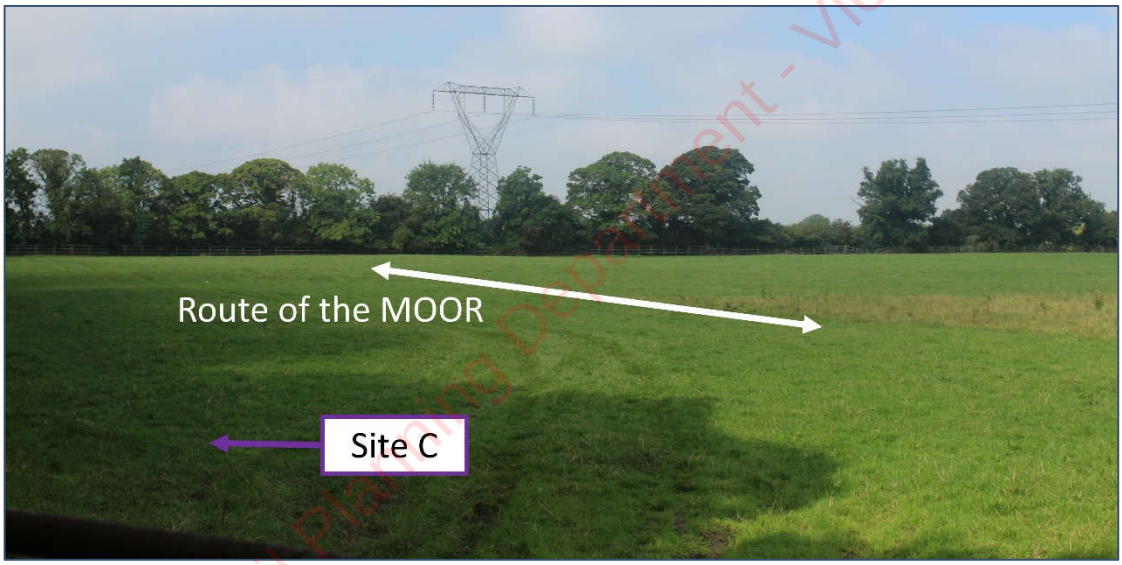

Plate 11-25 Route of the MOOR to the west of the L1224.

11.3.7 Landscape of Kildare Bridge

The proposed Kildare Bridge pedestrian and cycleway bridge known will be a standalone structure located adjacent to and west of the existing Kildare Bridge pictured below in Plate 11-26. The existing bridge carries the R157 Regional road over the Rye water, bridging County Meath and County Kildare. The landscape surrounding the Rye Water river comprises riparian vegetation and a landscape of some ecological value. There is currently no public right of way down to the Rye Water from the bridge and the landscape surrounding the river is relatively inaccessible. As detailed in the following Section (Section 11.4 – *Visual Baseline*), due to the high stone walls, there is limited visibility of the Rye Water from the existing pedestrian access across the existing Kildare Bridge. The proposed 'Kildare Bridge' pedestrian and cycleway will enable visual receptors such as pedestrians and cyclists an opportunity to appreciate and enjoy the environment of the river Rye Water.

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Plate 11-26 Kildare Bridge viewed from the West.

11.3.8 Landscape of Moyglare Bridge

The proposed Moyglare Bridge crosses the Rye Water to the south-west of Site C. The lands of Moyglare Bridge are located within County Kildare and comprise a disused field of wild grassland seen in the foreground of Plate 11-27. These grasslands are designated in the MLAP as amenity grasslands.

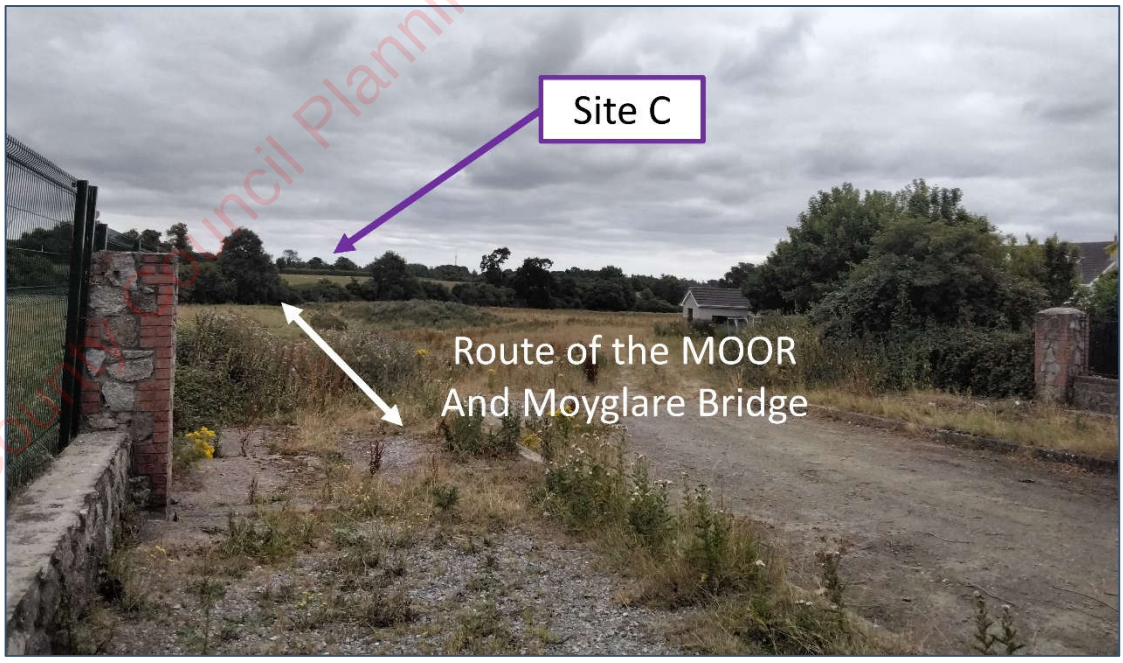

Plate 11-27 View north along the Route of the MOOR and Moyglare Bridge from the south of the Rye Water.

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Plate 11-28 A roundabout on Moyglare Hall Road, where the proposed MOOR and Moyglare Bridge will link the Existing Road Network in County Kildare

The banks of the Rye Water are lined by deciduous woodland and scrub.

Plate 11-29 Landscape around the Rye Water River in proximity to the proposed site of Moyglare Bridge.

11.3.9 Wider Landscape Setting

The Proposed Development site is located approximately 1 km north of the centre of Maynooth Town. Maynooth is a small but vibrant university town with a well-developed streetscape, heritage features and its own protected views (see Section 11.3.1.2.5 previously).

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Plate 11-30 The R148 and streetscape in the centre of Maynooth Town.

The Royal Canal (Plate 11-31 below) bisects Maynooth town and is a central feature of the town, providing visual and recreational amenity. The Lyreen is a small river that also traverses the town, flowing from the south-west to the north-east before discharging into the Rye Water. Several ponds south of the Rye Water and east of the Lyreen river provides amenity for the Lyreen angling centre immediately south of Site B and adjacent to Kildare Bridge.

Plate 11-31 View to the east along the Royal Canal corridor from Mullen Bridge in Maynooth Town

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Plate 11-32 View to the north, towards the Proposed Development from a newly built bridge on Lyreen Avenue. The Lyreen watercourse is visible within the small valley.

Plate 11-33 View towards urban developments (Coláiste Pobail Mhá Nuad – Public College of Maynooth) at the northern margins of Maynooth from the local road west of the Proposed Development Site, north of the Rye Water.

The Rye Water River and the slight valley of its floodplain provides both a physical and visual buffer between the existing urban fringe to the north of Maynooth and the Proposed Development Site. The northern margins of Maynooth comprises high density residential developments as well as school and college buildings shown above in Plate 11-33.

A gently rolling agricultural landscape exists to the north of the site. This rural landscape is very similar to that of the Proposed Development site, comprising fields of pasture delineated by hedgerows and woodland. Sporadic private settlement exists in linear arrangements along the local road networks, as well as the small village of Kilcloon approximately 2.5 km north of the Proposed Development.

The wider areas to the north and north-west of the site is a modified working landscape influenced by working stud farms. Moyglare stud farm is located north of the Rye Water and 1.9 km west from the eastern extent of the EIAR Site Boundary. The townland of Moyglare also contains Moyglare Manor which is a historic, eighteenth-century house with 268 acres of parkland landscape. Owenstown Stud Farm neighbours the site and is located approximately 600 metres north-east of the EIAR Site Boundary at its closest point. Leinster Stud Farm is located approximately 1.5 km east beyond Carton House Demesne. The likely visibility of the Proposed Development from the aforementioned stud farms are reported in Section 11.4 - *Visual Baseline.*

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Carton House Demesne is a managed and protected heritage landscape located to the east and south-east of the site. Walking routes, a golf course and Carton House Hotel gives this landscape a high recreational amenity value. Dense woodland along the north-western margins of the Carton House substantially buffers this landscape from the Proposed Development site and is likely to screen the Proposed Development from view (a detailed assessment of likely visibility from Carton Demesne is detailed in Section 11.4 – *Visual Baseline*).

Plate 11-34 Carlton House and Demesne Landscape.

11.3.10 Landscape Value and Sensitivity

Landscape values were assessed in order to determine the landscape sensitivity of the Proposed Development site and its wider landscape setting. Determination of landscape value considers scenic amenity designations, sensitivity and value designations found in local landscape policy, as well as other indications of landscape value attached to undesignated landscapes. Table 11-8 (below) describes various features and attributes of the landscape that indicate landscape value. These then contribute to the assessment of landscape sensitivity.

Table 11-8 Indications of Landscape Value

Features & Attributes of Landscape Value	Description
Landscape Designations	The Proposed Development site is not a protected landscape within any local landscape policy. Kildare Bridge is the origin of a County Kildare protected view and there are protected views along the Rye Water. Carton Demesne is a protected landscape of high sensitivity to the south-east, contributing value to the wider setting of the landscape at Moygaddy. The lands at Moygaddy are located within County Meath Landscape Character Area 11 – 'South East Lowlands', which is designated as a landscape of Medium sensitivity in County Meath. Descriptions of LCA 11 recognise the value and sensitivity of stud farming in the rural landscape of the Dunboyne Farmlands.
Landscape Elements Quality/Condition	This refers to the physical state of the landscape and the condition of individual elements. The landscape of the Proposed Development site

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Features & Attributes of Landscape Value	Description
	is well maintained agricultural land of relatively high quality and condition.
Aesthetic Qualities	The Proposed Development Site has some rural aesthetic qualities considering the neatly maintained fields, watercourses, woodland and the ruins of Moygaddy Castle. In general, it is a relatively enclosed landscape due to the flat topography and densely vegetated field boundaries. Longer ranging views towards the town of Maynooth exist from fields towards the southern perimeter of the lands at Moygaddy. From Site B and Site C there are relatively uninterrupted views across the Rye Water to the Maynooth townscape. Views within Site A are contained to the field cell in which it is located by densely vegetated field boundaries. The wooded river landscape and riparian zone around the Rye Water are of high aesthetic quality, particularly at the site of Kildare Bridge.
Wildness/naturalness	The landscape within the EIAR Study Area is currently a modified working landscape – fields used as grazing pasture. The rivers and woodland in the area give the landscape setting a natural and rural feel, however, the presence of Maynooth to the south and surrounding road network slightly diminishes any sense of remoteness or wildness.
Rarity/Conservation Interests	Conservation interests include the mature trees and woodland seen throughout the Proposed Development site and the densely vegetated field boundaries which are important biodiversity corridors. The Blackhall Little stream, the Rye Water River and riparian zone to the south of Site B and Site C holds some ecological value. A comprehensive assessment of the biodiversity within the EIAR study Area is contained in Chapter 6 – *Biodiversity*
Cultural Meaning/Associations	Moygaddy Castle, Moygaddy House and stone walls demarking field boundaries are valuable heritage features of the Site. A detailed assessment of cultural heritage features and monuments on the site are contained in Chapter 12 – *Cultural Heritage*
Recreation Value	The site itself is privately owned land and it is not currently used for public recreation. The small loughs across the Rye Water to the south of Site B are used by the Lyreen angling centre although there is limited public access to this area.

In consideration of the indicators detailed in Table 11-8 above, the landscape value of the site is deemed to be Medium to High. Local policy designations within the Maynooth Environs Written Statement pertaining to the lands of the Proposed Development Site align with the proposals which are the subject of this EIAR. The landscape of the site is zoned to accommodate growth such as that of the Proposed Development, therefore the susceptibility of this landscape to the proposed change is deemed to be Low. On balance, the sensitivity of the site is deemed to be **Medium**.

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11.4 Visual Baseline

This section of the LVIA establishes the likely visibility of the Proposed Development from landscape and visual receptors located in the LVIA Study Area (area within 3 km of the Proposed Development - EIAR Site Boundary). This includes a description of views towards the Proposed Development from a variety of perspectives which has informed the selection of photomontage viewpoints. Certain areas were screened out from assessment where it is very unlikely that any visibility will occur due to factors such as screening from vegetation, localised topography and built form.

11.4.1 Visibility of the Proposed Development – Views Towards the site

A site visit was conducted during August 2021. The likely visibility of the Proposed Development and general visibility of the Moygaddy Masterplan area was appraised from sensitive receptors and landscape policy designations identified in the previous section of this chapter - *Landscape Baseline*. Photos are used to show views towards the site from prominent visual receptors in the LVIA Study Area, as well as local and regional roads within and surrounding the site. The location of photos used in the following section are illustrated below in Figure 11-20. Figure 11-20 also shows an 'Indicative Area of Likely Visibility' (IALV), this is a subjective determination of areas where any proposed development within the Moygaddy Masterplan area is likely to be visible from. The IALV was established from appraisals conducted during a site investigation.

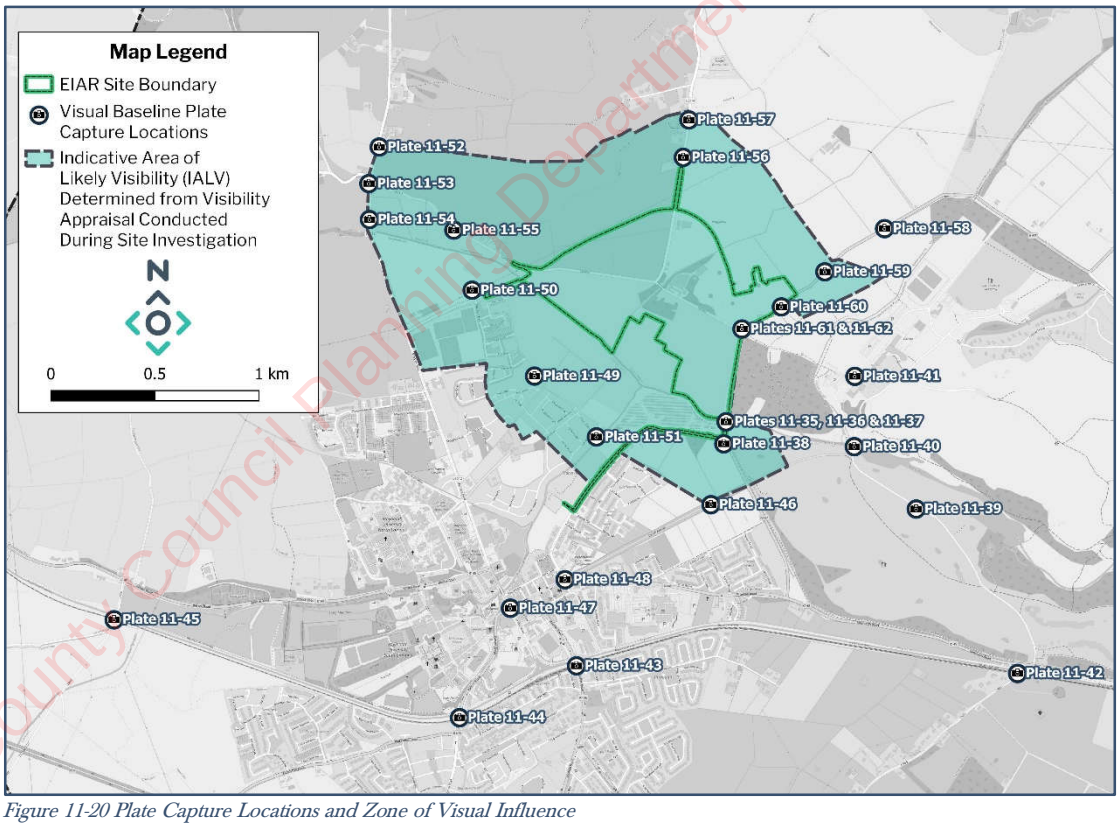

Figure 11-20 Plate Capture Locations and Zone of Visual Influence

11.4.1.1 Visibility from Designated Scenic Views and Prospects

Baseline investigations of the LVIA Study Area identified 8 No. Designated scenic views/prospects from the KCDP and 7 No. protected views from the MLAP.

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County Kildare Scenic View RW-4 is located within the EIAR Study Area on Kildare Bridge. Kildare Bridge and the R157 Regional road crosses the Rye Water to the north of the Dunboyne Roundabout. The protected views are directed east and west towards the Rye Water from Kildare Bridge, as shown in Plate 11-35 and Plate 11-36 below.

Plate 11-35 View of the Rye Water from Kildare Bridge (County Kildare View RW-4), this view is directed west towards the River Lyreen.

Plate 11-36 View of the Rye Water from Kildare Bridge (County Kildare View RW-4), this view is directed east towards Carton Demesne

The images above show the relatively scenic views of the Rye Water River, as well as the woodland and riparian vegetation surrounding the river. During a site investigation, it was noted that the stone walls enclosing either side of the existing Kildare Bridge are quite high, above the eyesight of the

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average pedestrian who might be crossing the bridge. The images above were captured by extending the camera up above the parapet, it is therefore unlikely that many visual receptors such as pedestrians and cyclists can currently appreciate these designated scenic views. The proposed pedestrian and cycleway on the western side of Kildare Bridge included as part of the Proposed Development would enhance the accessibility of the designated scenic views (RW-4) available to the west (Plate 11-35). The Proposed Kildare Bridge (pedestrian and cycle access) will not be seen above the parapet of the existing stone walls of the bridge and it is unlikely to restrict views from the existing Kildare Bridge and R157 (which are currently difficult to access). The likely visual impact of the proposed Kildare Bridge is discussed in Section 11.6.3.2 – *Likely Significant Visual Effects*

The proposed infrastructure of Site B is likely to be visible to the north and north-west from Kildare Bridge, which is the origin of view RW-4 (see Plate 11-37 below). Although dense roadside screening is evident along the R157 Regional Road (right of image below), there will be some relatively open views into the field where the Healthcare Facilities of Site B are sited from immediately south of Kildare Bridge. Therefore, this location was chosen as a photomontage viewpoint (Viewpoint 07). Visual effects arising from this location (Viewpoint 07) are comprehensively assessed in Appendix 11-1 and summarised in Section 11.6.3.2 – *Likely Significant Visual Effects.*

Plate 11-37 View north-east towards the Proposed Development from Kildare Bridge, on the R157 Regional Road.

The Dunboyne roundabout is located approximately 100 metres south of Kildare Bridge (Kildare View RW-4). As shown below in Plate 11-38, tall and dense roadside hedgerows will obscure visibility of the Proposed Development from the Dunboyne Roundabout. Due to other screening elements, very little visibility is anticipated from areas to the south, south-east and west of this capture location.

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Plate 11-38 View towards the Proposed Development from the Dunboyne Roundabout.

Carton Demesne

County Kildare Scenic View RW-2 is directed to the Rye Water from Carton Bridge within Carton Demesne Historic Landscape. County Kildare designated Scenic Route 30 is also located within Carton Demesne comprising protected scenic amenity *"Within Carton Demesne walls: Views to and from Carton House, the Lake and Woodland Areas*". The images below show views towards the Proposed Development from Scenic Route 30 (Plate 11-39) and View RW-2 (Plate 11-40).

Plate 11-39 View towards the Proposed Development from County Kildare Scenic Route 30, within Carton Demesne.

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Plate 11-40 View of the Rye Water from Carton Bridge within Carton Demesne (County Kildare View RW-2), this view is directed west towards the Proposed Development (Site B).

The dense woodland comprising the north-western margins of Carton Demesne is seen in the background of the images above. This woodland will screen the Proposed Development from designated scenic view RW–2 and the entirety of Scenic Route 30. No visibility is likely to occur from the other protected views (RW-1) on the Rye Water east of Carton Bridge. The Proposed Development is not likely to impact any protected scenic amenity within Carton Demesne.

Plate 11-41 View north-north-west in the approximate direction of Site A from the north-western side of Carton House Hotel.

Site A is located to the north-west of Carton House Hotel. As illustrated by Plate 11-41 above and Figure 11-21 below, the dense woodland located between the Proposed Development and Carton House Hotel is a physical landscape buffer separating both developments. Due to the dense screening

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and distance it is highly unlikely that the Proposed Development will be visible from this part of Carton Demense.

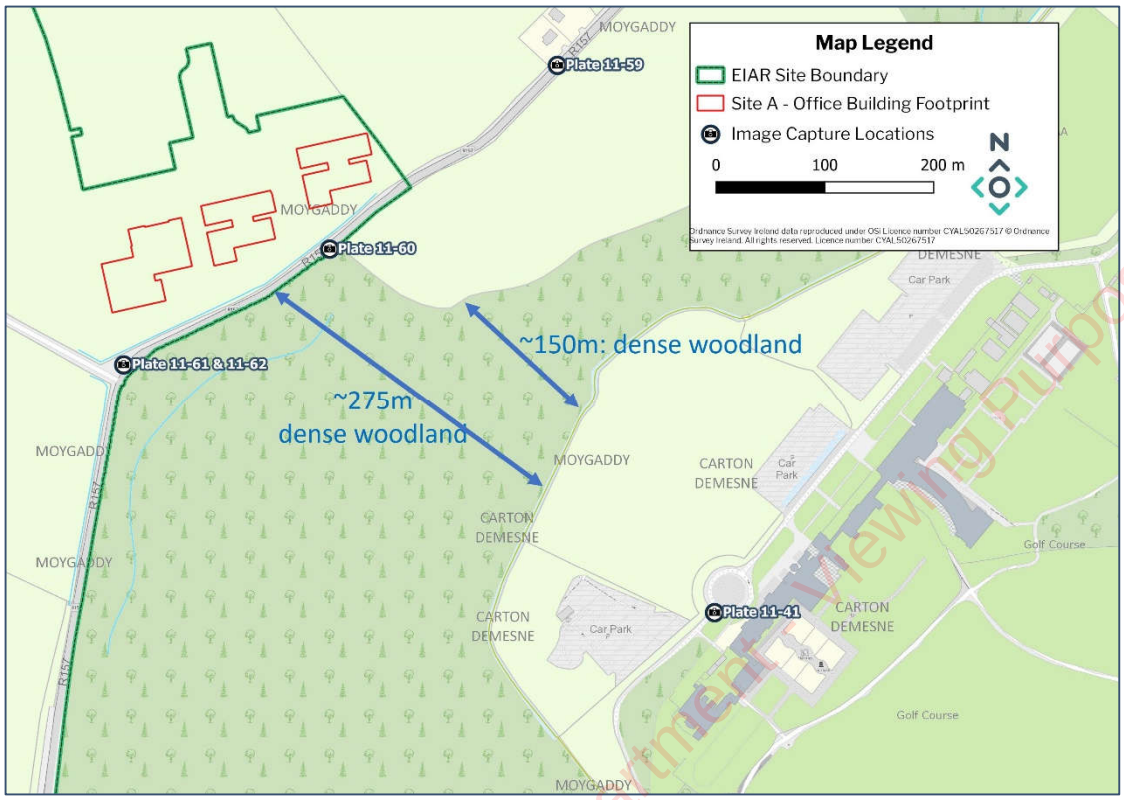

Figure 11-21 Woodland buffer between Site A and Carton House Hotel

Visibility of the Proposed Development (Site B only) may occur from several isolated areas within Carton Demesne during winter months when there is less foliage on intervening trees and hedges. Visibility may occur at the westerly extent of the golf course, south of the Rye water and also where the walking path from Carton Avenue (also known 'Lime Walk') extends north easterly across the golf course into Carton Demesne. Therefore, a location on this walking route within Carton Demesne was chosen as a photomontage viewpoint (Viewpoint 10) and it was captured during winter months to demonstrate the worst-case scenario. Visual effects arising from this location (Viewpoint 10) are comprehensively assessed in Appendix 11-1 and are summarised in Section 11.6.3.2 – *Likely Significant Visual Effects.* It is noted that visibility is only likely to occur momentarily from certain angles as receptors move on along the path or golf course. These are not designated scenic views and any slight visibility of the Proposed Development is not likely to alter the visual aesthetic or character of Carton Demesne or Carton House.

The Royal Canal

During a site visit, likely visibility of the Proposed Development was assessed from the four County Kildare designated scenic views located on bridges over the Royal Canal (RC-5, RC-6, RC-7, RC-8) that were identified in the LVIA Study Area. All of the bridge views are from elevated vantage points, and valuable scenic amenity is directed along the canal corridor. Due to the distance from the Proposed Development (RC-6 in closest proximity at 0.7km to EIAR Site Boundary) and the extent of screening (vegetation and built form) existent in the relatively flat landscape, no visibility of the Proposed Development is likely to occur from any of the designated Royal Canal scenic views.

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Plate 11-42 View to the north-west towards the Proposed Development from County Kildare protected View RC-5 (Pike Bridge Railpark/Donaghmore).

Plate 11-43 View to the north towards the Proposed Development from County Kildare protected View RC-6 (Mullen Bridge Railpark/Maynooth).

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Plate 11-44 View to the north-east towards the Proposed Development from County Kildare protected View RC-7 (Bond Bridge Maynooth).

Plate 11-45 View south-east along the Royal Canal from County Kildare protected View RC-8 (Jackson's Bridge Laraghbryan East)

The Royal Canal Way is a popular way marked walking trail following the route of the Royal Canal. As shown in Plate 11-42 and Plate 11-45, the canal and the recreational walking route is located within a linear corridor contained by tall mature treelines and hedges. The Proposed Development will not be visible from the royal canal corridor and will not impact the landscape of the canal or any of its recreational value or scenic amenity.

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Maynooth Streetscape – Protected views in the MLAP

Likely visibility of the Proposed Development was assessed from protected views within Maynooth town (see list of views identified previously in Section 11.3.1.2.5). As shown previously there is not likely to be any visibility of the Proposed Development from any of the bridges over the Royal Canal. On-site appraisals determined that the Proposed Development would not comprise views *"of the Harbour along Leinster Street"* or views *"of the College Gates and Castle"*.

Plate 11-47 below, shows a view towards the Proposed Development from Main Street in Maynooth. The Proposed Development will not be visible within the protected view *"of the College Spire from Main Street"*. Also, as shown in Plate 11-48, the Proposed Development is unlikely to be visible in the protected view *"along the Carton Avenue / Main Street Axis"*.

Carton Avenue is a popular and direct walking route from Maynooth Town Centre to Carton Demesne. As shown in the image below, the route is lined on either side by mature treelines. It is unlikely that there will be any visibility of the Proposed Development from a majority of the route, there may be some minor glimpses of elevated rooftops from isolated areas towards the eastern end of Carton Avenue during winter months when vegetation has lost its foliage, although as demonstrated by Plate 11-46 (below) this is likely to be very limited.

Plate 11-46 View towards the Proposed Development from a location towards the eastern end of Carton Avenue during winter months.

Due to the enclosed nature of the streetscape and built form (as well as treelines), it is anticipated that there will be no visibility or very limited visibility of the Proposed Development from any of the protected views in the Maynooth Local Area Plan.

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Plate 11-47 View towards the Proposed Development Site from Main Street – The Proposed Development is not likely to be visible from this location

Plate 11-48 View along the Carton Avenue / Main Street Axis – The Proposed Development is not likely to be visible from this location

11.4.1.2 Views from Residential Receptors South of the Rye Water

Several housing estates (Moyglare Hall, Mariavilla and Lyreen) and college buildings (Coláiste Pobail Mhá Nuad – Public College of Maynooth) comprise the northern fringe of urban development in Maynooth. These developments are built upon the elevated embankments south of the Rye Water. Open views towards the Proposed Development are found along these slightly elevated lands, where there are relatively unobstructed views to the north across the Rye Water floodplain.

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Plate 11-49 View north towards the Site C from within the Moyglare Hall Residential Housing Estate.

Plate 11-49 (above) and Plate 11-50 (below) show views towards Site C which from receptors to the south-west of the Rye Water and the Proposed Development Site. Site C, the MOOR and Moyglare Bridge will be clearly visible from residential receptors located at these locations at the northern perimeter of Moyglare Hall housing development, as well as the Public College of Maynooth. Photomontages were captured from these two locations (Viewpoint 12 and Viewpoint 13). Visual effects arising from these viewpoints are comprehensively assessed in Appendix 11-1 and summarised in Section 11.6.3.2 – *Likely Significant Visual Effects.*

The second storey of residences and college buildings are likely to have more visibility of the Proposed Development than is shown in Plate 11-49 and Plate 11-50 and potentially some visibility of the Site A and Site B to the east and north-east. These open views only occur at isolated and localised areas at the northerly and easterly perimeter of these housing developments and college grounds, as the housing and school buildings themselves screen views towards the Proposed Development from areas to the south and west.

Plate 11-50 View north-east towards the Proposed Development (Site C) from the Public College of Maynooth. The communications mast at Moygaddy house is visible in the background (centre-right) of the image.

Plate 11-51 below shows a view across the Lyreen River and then the Rye Water, towards the south-eastern portion of the Proposed Development (Site B). Plate 11-51 was captured from recreational

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greenspace adjacent to Lyreen Close in the Mariavilla Housing development. Infrastructure of the Proposed Development will be visible from residential receptors in this area. Therefore, this location was chosen as a photomontage viewpoint (Viewpoint 08). Visual effects arising from this location (Viewpoint 08) are comprehensively assessed in Appendix 11-1 and summarised in Section 11.6.3.2 – *Likely Significant Visual Effects.*

The permitted Dunboyne Road SHD (See Description in Chapter 2) is located to the right (east) of the view shown in Plate 11-51 below, beyond the angling centre building and woodland. The permitted Dunboyne Road SHD is likely to be partially visible in combination with the Proposed Development from this location. The proposed Moyglare Road Development (ABP 314337) is located to the south of Viewpoint 08 and will likely be visible in the other direction to the south. Assessment of photomontage Viewpoint 08 (Appendix 11-1) considers the potential for cumulative visual impact from this location.

Plate 11-51 view to the north-east towards the Proposed Development site from Lyreen Close in the Mariavilla Housing Development.

11.4.1.3 Views from the rural landscape and local roads surrounding the Proposed Development Site – north of the Rye Water.

In a general sense, the rural landscape surrounding the Proposed Development site to the west, north and east is quite flat. The agricultural field cells in the surrounding lands are bounded by mature woodland and hedgerows. Excepting elevated vantage points, the dense field boundaries obscure long-range views beyond the nearest field in the flat landscape. On-site surveys determined that in most instances, likely visibility of the Proposed Development will be restricted to locations in close proximity to the site (1-2 field cells, approximately 250 metres) and it is only likely that elevated elements of the Proposed Development (e.g., three storey office block buildings) will be visible above screening within the landscape.

Views from the West

Plate 11-52 was captured approximately 850 metres north-west of the Proposed Development on the L1202 Local Road. The communication mast at Moygaddy House is faintly visible in the centre background of the image. Plate 11-52 was found to be one of the only elevated vantage points with long ranging views looking down over the Moygaddy Masterplan Area from the surrounding agricultural landscape north of the Rye Water and was therefore selected as a photomontage viewpoint (Viewpoint 14). Visual effects arising from this location (Viewpoint 14) are comprehensively assessed in Appendix 11-1 and summarised in Section 11.6.3.2 – *Likely Significant Visual Effects.*

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Plate 11-52 View east towards the Moygaddy Masterplan area and Proposed Development from an elevated vantage point on the L-1012 road.

No visibility of the Proposed Development is anticipated from locations north or west of the capture location of Plate 11-52 (Photomontage Viewpoint 14). The roadside screening along the L-1012 road suggests that views such as those seen in the image above will only be seen momentarily from road users passing this location.

Plate 11-53 (seen below) was captured from the intersection between the L-1012 and the L6219, approximately 850 metres west of the Proposed Development. The image shows substantial screening of views towards the Proposed Development, however, there is likely to be better visibility in the winter months when vegetation has lost its foliage.

Plate 11-53 View east towards the Proposed Development from the intersection between the L-1012 and the L6219

Plate 11-54 shows a view towards the Proposed Development (Moyglare Bridge, The MOOR and Site C) from a location immediately north of Anne's Bridge on the L-1012 (Moyglare Road). The treeline seen in the middle-ground of the image will screen most visibility of the Proposed Development within

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this view along the Rye Water. The Moyglare Bridge and MOOR may be just discernible in the very background right of the image.

Plate 11-54 View to the east towards the Proposed Development from the L-1012 (Moyglare) Road immediately north of Anne's Bridge over the Rye Water.

As the L6219 tracks directly east towards the Proposed Development from the junction shown in the image above (Plate 11-53), the road rises to an elevated vantage point approximately 350 metres west of the EIAR Study Boundary (Plate 11-55). From this location there are open views down upon the low-lying lands immediately north of the Rye Water.

Plate 11-55 view to the south-east towards the Proposed Development site from the L6219 Local Road.

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Infrastructure of the Proposed Development such as buildings of Site C and Site B are not likely to be visible within Plate 11-55 as the line of sight is obscured by the trees and vegetation seen to the left of the image. A photomontage was captured from a viewpoint (Viewpoint 15) beyond the dense screening where the first open visibility of Site C will occur from the west on the L6219. Visual effects arising from this location (Viewpoint 15) are comprehensively assessed in Appendix 11-1 and summarised in Section 11.6.3.2 – *Likely Significant Visual Effects.*

Views from the North

Open views of the Proposed Development are very limited from areas to the north. It is unlikely that the Proposed Development will be seen beyond 250 metres from the site boundary where tall mature woodland along field boundaries causes a disproportionate screening effect in the flat landscape.

Plate 11-56 view south towards the Proposed Development site from the L2214 at the north of the site.

Plate 11-56 (above) was captured from a location approximately 250 metres north of the proposed crossroad between the existing road network and the MOOR, 5approximately metres north of the EIAR Site Boundary. As seen in the image there is a row of residential properties in this area. Tall components of the most northerly proposed above ground infrastructure (Site A and Site C) will most likely be either partially or entirely screened from view from these residential receptors by intervening treelines and hedgerows.

Plate 11-57 (below) was also captured from a location on the L2214 road, approximately 230 metres north of the EIAR Study Boundary. The Proposed Development infrastructure elements of Site A are located beyond the treelines in the background of the image. As the capture location of Plate 11-57 is the most open view towards the Proposed Development (Site A) from receptors to the north, it was chosen as a photomontage viewpoint (Viewpoint 05). Visual effects arising from this location (Viewpoint 05) are comprehensively assessed in Appendix 11-1 and summarised in Section 11.6.3.2 – *Likely Significant Visual Effects.*

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Plate 11-57 View south-west towards the Proposed Development site from the L2214 at the north of the site.

Views from the East

The R157 Regional Road approaches the Proposed Development (Site A) from the north-east. With Carton Demesne to the south and south-west, the road passes along the south-eastern boundary of Site A before heading south into Maynooth. The tall hedgerows and trees lining the R157 (Plate 11-58) will obscure most views towards the Proposed Development until the road runs adjacent to the site boundary itself.

Plate 11-58 Dense roadside screening on the R157 Regional road as it approaches Moygaddy from the north-east

An open view towards Site A was found from a residential dwelling approximately 173 metres east of the EIAR Study Boundary (Plate 11-59).

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Plate 11-59 View west-south-west towards the Proposed Development from a residential dwelling on the R157, east of the site

The proposed three storey office block located at the north-eastern extent of the Site A will likely be visible above the treeline in the background of Plate 11-59. Therefore, the capture location of Plate 11-59 was chosen as a photomontage viewpoint (Viewpoint 01). Visual effects arising from this location (Viewpoint 01) are comprehensively assessed in Appendix 11-1 and summarised in Section 11.6.3.2 – *Likely Significant Visual Effects.*

Plate 11-60 shows a gap in the roadside hedgerows from the R157, immediately east of the Proposed Development (Site A) where an old gate (Queen Victoria Gate) enters/exits from Carton Demesne. Other than the location shown above in Plate 11-59, this is one of the only locations where there will be open visibility of the Proposed Development Site from the north-eastern approach of the R157. Therefore, this location was chosen as a photomontage viewpoint (Viewpoint 03). Visual effects arising from this location (Viewpoint 03) are comprehensively assessed in Appendix 11-1 and summarised in Section 11.6.3.2 – *Likely Significant Visual Effects.*

Plate 11-60 View west to the proposed office development from the R157.

The Proposed Development is likely to be visible to both the north (Site A) and the south (Site B) from the junction shown in Plate 11-61 below. Therefore, this location was chosen for the capture of

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photomontages. Photomontage Viewpoint 04A shows a perspective to the north towards Site A, whereas Photomontage Viewpoint 4B shows a view to the south towards Site B.

Although to provide better context within the imagery, the photomontages were captured on opposing sides of the road (See photomontage 4A and 4B). Visual effects (including impact of cumulative intervisibility between Site A and Site B) arising from this location are comprehensively assessed in Appendix 11-1 and summarised in Section 11.6.3.2 – *Likely Significant Visual Effects.*

Plate 11-61 Junction between the R157 and the L2214-3 Local Road at Moygaddy

Plate 11-62 View south along the R157 on the approach to Maynooth.

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As shown in Plate 11-62, there is dense roadside screening along the R157 as it heads south towards Maynooth. A photomontage was captured at the crest of the hill midway between the junction shown previously (Plate 11-61) and the Dunboyne roundabout. This capture location (Viewpoint 06) is just visible in the background of the image Plate 11-62. Due to its close proximity, the Proposed Development (Site B) is likely to be clearly visible from this location. Visual effects arising from this location will be reported in the LVIA. Visual effects arising from this location are comprehensively assessed in Appendix 11-1 and summarised in Section 11.6.3.2 – *Likely Significant Visual Effects.*

Visibility from Local Stud Farms

Stud farms are deemed to be valuable contributors to the character of the surrounding rural landscape. four stud farms (excluding Moygaddy Stud) were identified in the LVIA Study Area; Leister Stud, Moyglare Stude, Airlie Stud, and Owenstown Stud. On-site appraisals determined that no visibility is anticipated from Leinster Stud. The Proposed Development is not likely to be visible from most areas comprising Moyglare Stud, however, there may be very slight visibility of the Site C from isolated areas in eastern fields of Moyglare Stud, although there will be substantial screening from intervening treelines and topography.

Due to its elevated location south-east of Maynooth, there may be some distant visibility of the Proposed Development (Site B) where open views occur from the grounds of Airlie Stud. However, with a substantial set back distance of 2.5 km and intervening screening elements, no significant visual effects are likely to occur. A Folly comprising a tall obelisk called 'Conolly's Folly' is located adjacent to Airlie Stud. Due to its height (42 metres) and elevated location, the tall slender structure of the obelisk is a recognisable feature within the landscape and is discernible from Site B where there are some relatively open views south and south-east across the Rye Water River. The substantial set back distance (~2.5 km) and screening from woodland immediately north of the folly limit visibility of the Proposed Development and it will have little to no impact on the setting of the Folly.

Plate 11-63 Connolly's Folly

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Owenstown Stud is located approximately 600m north-east of the EIAR Site Boundary (Site A). It is likely to have the most visibility of the Proposed Development (Site A) than from any other stud farm due to its close proximity. Two field boundaries of mature woodland are located between the proposed office blocks at the north-east of the site and the stables at Owenstown Stud. There is likely to be very limited visibility of the Proposed Development above the treelines from Owenstown Stud. Photomontage Viewpoint 01 is located in closer proximity to the Proposed Development than Owenstown Stud where visual effects are anticipated to be greater.

11.4.2 Summary of Visibility and Views

Disproportionate Screening Effect

Any landscape feature that blocks a view and prevents a clear onward view has a visual screening effect, whether it is a one-metre-tall wall, a two-metre-high roadside hedgerow, a five-metre-high building, or a 10-metre-tall tree. As a full visual screen, such features only allow a person to see over them, thereby pushing the person's line of sight higher into the sky rather than along the level of the ground. The impact of screening elements such as vegetation (road-side hedgerows and trees) and buildings (particularly within towns and villages) on long range visibility are accentuated in flat lowland landscapes, this is called a disproportionate screening effect. It can be difficult to see beyond a few kilometres above screening within flat landscapes, excepting from elevated vantage points.

Visibility and Views towards the Proposed Development

Visibility appraisals were informed by site investigations, photos captured in the field and the production of 17 No. verified photomontages presented in the Volume 2 Photomontage Booklet accompanying this EIAR.

In a general sense the landscape of the LVIA study area and beyond is representative of a flat lowland landscape. The landscape comprises many screening elements such as the townscape of Maynooth and the mature vegetation demarking field boundaries in the surrounding rural landscape to the north of the Rye Water. A disproportionate screening effect is likely to greatly restrict visibility of the Proposed Development from a vast majority of the LVIA study area (areas >750 metres form the EIAR Study Boundary). On-site appraisal and photomontages determined that actual visibility of the Proposed Development only occurs from locations in very close proximity to the Proposed Development site itself. The Proposed Development is only likely to be seen within medium range views from the south and south-west across the low elevated land of the Rye Water floodplain at the northern margins of Maynooth town.

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11.4.3 Photomontage Viewpoint Locations

Photomontage viewpoints were selected upon the criteria outlined previously in Section 11.2.4.1 in consideration of the visibility assessments conducted during site visits. A total of 15 no. photomontage viewpoint locations were selected and 17 No. Photomontages were produced. The viewpoints are described in Table 11-9 below. A map showing the locations of the photomontage viewpoints is seen below in Figure 11-22, a viewpoint map is also contained within the Volume 2 Photomontage Booklet.

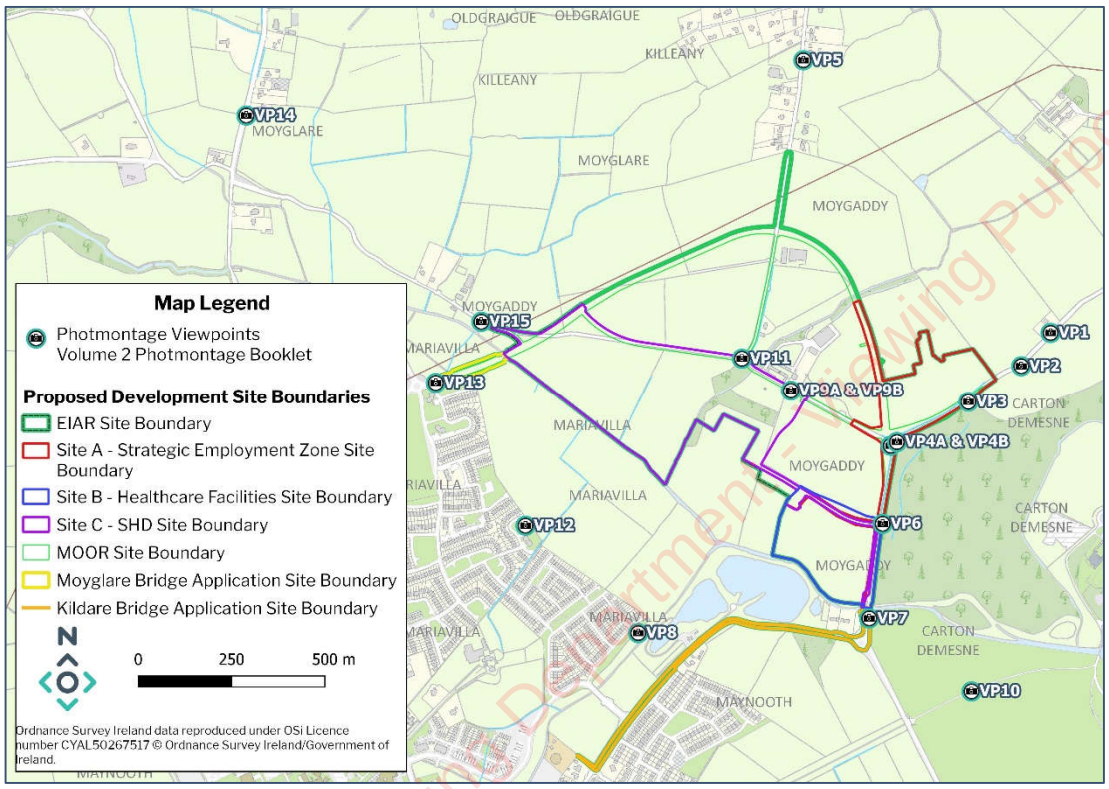

Figure 11-22 Photomontage Viewpoint Locations.

Table 11-9 Photomontage Viewpoint Locations

Viewpoint	Description	Grid Ref (ITM)
1	View west from a residential property on the R157 Regional Road as it approaches Site A and Maynooth from the north-east. This viewpoint is located on the verge of the R157 Regional Road approximately 205 metres east of the nearest proposed building (Office Block C) within Site A.	E: 695,157 N: 739,327
2	View west from the R157 Regional Road as it approaches Site A and Maynooth from the north-east. This viewpoint is located on the verge of the R157 Regional Road approximately 105 metres east of the nearest proposed building (Office Block C) within Site A.	E: 695,078 N: 739,238
3	View west from Queen Victoria Gate, an old disused access gate into the woodland east of the R157 Regional Road. This viewpoint is located within the EIAR Study Boundary and at the south-eastern extent of Site A on the verge of the R157 Regional Road where there is a gap in the roadside hedgerow.	E: 694,937 N: 739,141

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Viewpoint	Description	Grid Ref (ITM)
4A	View north towards Site A from the existing junction between the L2214-3 Local Road and R157 Regional Road. This viewpoint is located on the verge of the L2214-3 Local Road, approximately 62 metres south of the nearest proposed Office Block of the proposed Site A at its closest point. **Photomontage Viewpoint 4B was captured from the opposite side of the junction, the view presented in 4B is focussed in the opposite direction – to the south.*	E: 694,728 N: 739,023
4B	View south-west towards Site B from the R157 Regional Road at the existing junction with the L2214-3 Local Road. This viewpoint is on the verge of the R157 Regional Road approximately 250 metres north of Site B at its closest point.	E: 694,745 N: 739,033
5	View south-south-east from the L2214 Local Road as it approaches the Proposed Development from the north. This viewpoint represents a small cluster of residential receptors on situated on this local road. The viewpoint is located approximately 250 metres north of the EIAR Study Boundary.	E: 694,494 N: 740,058
6	View south-west towards Site B from the R157 Regional Road. This viewpoint is located on the verge of a public road, within the EIAR Study Boundary, immediately adjacent to the proposed vehicular access road into Site B.	E: 694,707 N: 738,814
7	View north-west towards Site B from a location on the R157 Regional Road. This viewpoint is located on the public footpath approximately 10 metres south of existing Kildare Bridge structure and the location/origin of County Kildare Designated Scenic View RW-4. The photomontage imagery was captured immediately south of the designated scenic view in order to show a wider perspective and an open view towards the Proposed Development, slightly set back from existent roadside screening.	E: 694,671 N: 738,561
8	View north-east from the Lyreen Housing Development in the townland of Mariavilla. This viewpoint is located adjacent to an area of recreational green space at the eastern extent of the Lyreen Housing Development. The viewpoint is approximately 500 metres south-west of the proposed nursing home building in Site B.	E: 694,051 N: 738,522
9A	View focused south-south-east towards Site B from the L2214-3 Local Road in proximity to Moygaddy House and Moygaddy Castle Ruins. The viewpoint is located within the EIAR Study Boundary and approximately 295 metres north of the proposed nursing home building in Site B at its closest point. **Photomontage Viewpoint 9B was captured from the opposite side of the road from 9A, the view presented in 9B is focussed in the opposite direction – to the west.*	E: 694,461 N: 739,171

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Viewpoint	Description	Grid Ref (ITM)
9B	View focused west towards Site C and Moygaddy Castle Ruins from the L2214-3 Local Road in proximity to Moygaddy House. The viewpoint is located within the EIAR Study Boundary.	E: 694,447 N: 739,187
10	View north-west towards Site B from Lime Walk within Carton Demesne. The viewpoint is located on a popular walking path (Extension of Carton Avenue) through the Carton House Golf Course.	E: 694,945 N: 738,366
11	View south-west towards Site C from the T junction between the L6219, L2214 and the L2214-3 Local roads. The viewpoint is located within the EIAR Study Boundary.	E: 694,339 N: 739,258
12	View north towards Site C from a residential housing estate (Mariavilla/Moyglare Hall) south of the Rye Water. The viewpoint is located approximately 340 metres south of the EIAR Site Boundary at its closest point.	E: 694,447 N: 739,187
13	View north-east towards Site C from Moyglare Hall Road, the viewpoint is located adjacent to Maynooth Community College Campus. The viewpoint is located just within the EIAR Site Boundary, on the southern perimeter of the Moyglare Bridge Application.	E: 693,551 N: 739,208
14	View south-west from an elevated vantage point on the L1012 Local Road in the townland of Moyglare.The viewpoint is located approximately 850 metres west of the EIAR Study Boundary at its closest point.	E: 693,003 N: 739,904
15	View east-south-east towards Site C along the L6219 Local Road. The viewpoint is approximately 10 metres from the EIAR Study Boundary.	E: 693,621 N: 739,358

The photomontages are comprehensively assessed in Appendix 11-1 – *Photomontage Assessment Tables.* It is recommended that Appendix 11-1 is read in conjunction with the Volume 2 Photomontage Booklet. Each viewpoint assessment table (within Appendix 11-1) describes the 'Baseline VVM', this is the existing view and baseline conditions at each viewpoint. Then the 'Proposed VVM' photomontage is described and the changed occurring within the photomontage is determined. The likely significance of visual effects at each viewpoint is then determined using the methodology outlined in Section 11.2.4 of this chapter. Mitigation measures are also noted and factored into the assessment process to give a residual visual effect classification following the EPA (2022) Definition of Significance.

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11.5 Cumulative Baseline

Considering the linkages, shared utilities and proximity of the various elements of the Proposed Development (Site A; Site B; Site C; MOOR; Kildare Bridge; Moyglare Bridge), this LVIA considers the cumulative and in-combination landscape and visual effects of the various development components. Cumulative assessments also consider other planned or permitted large scale developments in the surrounding area. Figure 11-23 shows developments identified in a planning search that, details of which are reported in Chapter 2 of the EIAR.

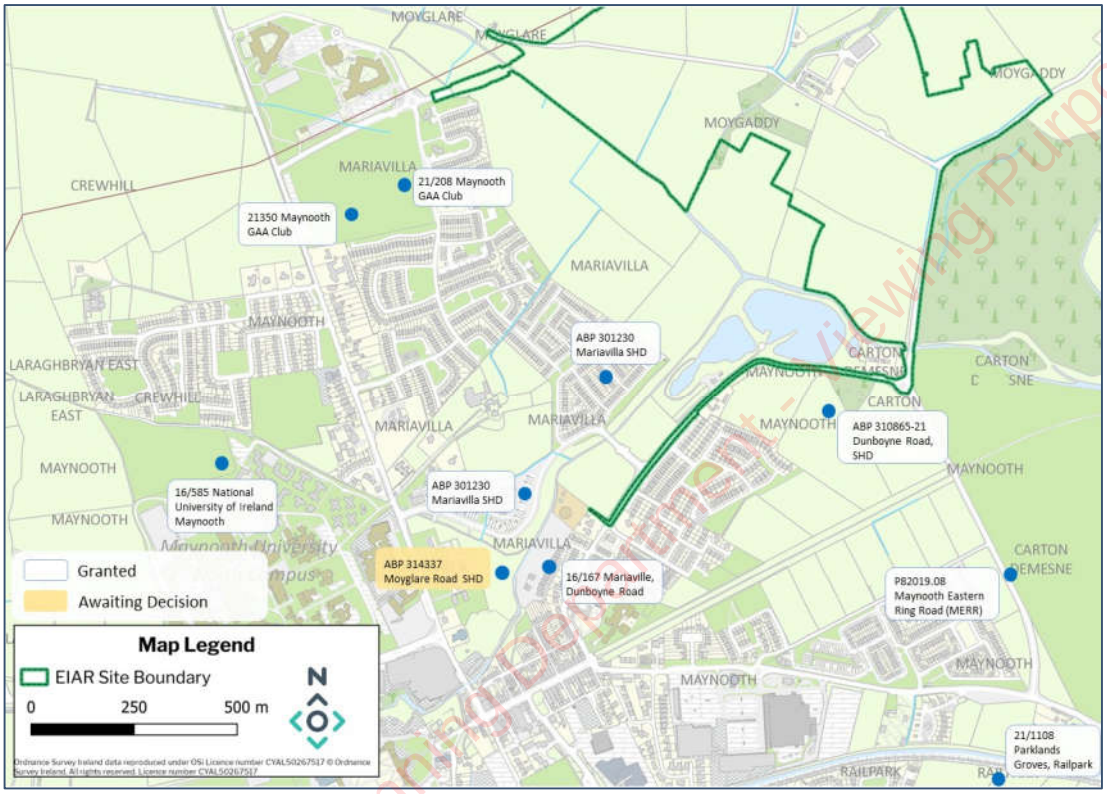

Figure 11-23 Cumulative Developments Identified in the Planning Search contained in Chapter 2

Some of the developments identified in the map above are already constructed and are existing elements within the landscape, these will therefore already be naturally assessed in this LVIA as they are real, visible features of the landscape. Following the Visual Baseline exercise, many of these other developments were screened out for cumulative assessment as they are either already constructed or there is not likely to be any visual or landscape connectivity with the Proposed Development.

Three planned and permitted developments screened in for cumulative landscape and visual assessment. These are:

- The permitted Dunboyne Road SHD (ABP 310856-21) is currently under construction and is located in the Indicative Area of Likely Visibility;
- The proposed Moyglare Road SHD (ABP 314337) is slightly set-back within the townscape of Maynooth however there may be some very minor visual connectivity with the Proposed Development;
- Maynooth Eastern Ring Road (MERR – P82019.08) Proposed Development and is therefore screened in for cumulative assessment. The associated works may have minor connectivity with the Proposed Development;

When applicable, the potential for cumulative landscape and visual impacts with these developments are considered and assessed in the photomontage Assessment Tables in Appendix 11-1.

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11.6 Likely Significant Landscape and Visual Effects

The assessment of likely significant landscape and visual effects in this section follows the methodology detailed previously in Section 11.2.3 - *Assessing Landscape Effects* and Section 11.2.4 – *Assessing Visual Effects.*

11.6.1 'Do Nothing' Scenario

If the Proposed Development were not to proceed, no changes would be made to the current land-use practice. The site would continue to be managed under the existing farming and agricultural practices and no landscape and visual impact would occur.

11.6.2 Construction Phase Effects

During the construction phase, potential landscape and visual effects will result as the site changes from an area of agricultural land to a construction site of considerable size. This is expected to be carried out across a period of approximately 3.5 years. Potential landscape effects include vegetation removal, earthworks and a subsequent change in character. These effects will include permanent negative effects, where vegetation is removed, and the land is re-graded, and short-term effects such as the activities of machinery, resulting in noise and dust in the landscape. Construction phase visual effects include potential negative effects on the nearby visual receptors as a result of the vegetation removal, earthworks and operation of machinery. These visual effects will be most pronounced in the immediate vicinity of the site. Cranes may be required to facilitate construction of the taller buildings of the Proposed Development (e.g. Office Block A – 5 storeys); these are likely to be visible from greater distances than other components of the construction phase and are accounted for in the determination of visual effects. The construction phase effects will be short term in duration.

11.6.2.1 Likely Landscape Effects – Construction Phase

The predicted direct impacts upon the landscape arising from the construction phase will include the transformation of the landscape from requisite earthworks and construction activities, as well as the noise and dust from construction operations, material transport, and increased site traffic.

The mitigation measures proposed include the implementation of appropriate site management procedures – such as the control of site lighting, storage of materials, placement of compounds, delivery of materials and appropriate car parking.

Significance of Landscape Effects – Construction Phase

Overall, the Proposed Development will have a localised **Moderate**, but **Short-Term Negative Effect** on the landscape during the construction phase. The effect on the landscape is localised and will have a minor impact upon the wider character of the landscape surrounding the site. The effects of the operational phase are outlined in the following sections.

11.6.2.2 Likely Visual Effects – Construction Phase

In general, visibility of the Proposed Development site is largely restricted by screening from vegetation and topographical characteristics of the surrounding area. It can only be seen from a very limited area outside the site as demonstrated by the assessments conducted as part of the Visual Baseline in Section 11.4. As illustrated by the photomontages, visibility is confined to locations in close proximity (limited visibility beyond distances of approximately 500 metres) to the site. The Proposed Development site will only be partially visible due to the presence of mature trees and hedges immediately adjacent to roads in the intervening landscape which obscure views.

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Visual impact during the construction phase will be mitigated somewhat through appropriate site management measures, work practices and a waste management plan to ensure the site is kept tidy, dust is kept to a minimum and that public areas are kept free from building material and site rubbish.

Site hoarding will be appropriately scaled, finished and maintained for the period of construction of each section of the works as appropriate. To reduce the potential negative impacts during the construction phase, good site management and housekeeping practices will be adhered to. The visual impact of the site compound and scaffolding visible during the construction phase are of a temporary to short term nature only and, therefore, it is expected that this will require no remedial action other than as stated above. As tall slender features, cranes will cause the greatest and far-reaching visual impact during the construction phase, however, visibility will be limited by the screening elements within the surrounding landscape.

Significance of Visual Effects – Construction Phase

There are likely to be **Short-term Slight Negative** Visual impacts associated with the construction works. This will be due to the process of substantial site clearance, earthworks and building processes required to construct the Proposed Development. Effects on visual receptors are limited in that there are few sensitive receptors located in the immediate vicinity of the site, however, any impacts by their nature are predominantly negative. Visual effects of the construction phase are deemed to be **Short-term** in duration and of **Slight** significance.

11.6.3 Operational Phase Effects

The operational phase commences following completion of construction works. Mitigation, remedial and avoidance measures have been integral in the design of the Proposed Development. Strategic siting and design of infrastructure components reduce the potential landscape and visual effects of the Proposed Development and are therefore factored into the following assessments of the Proposed Development. The Proposed Development has been designed with the intention of becoming a lasting benefit to the local area, and in this regard, all operational effects will be long-term.

A dedicated landscape design is included as part of the Proposed Development and is included as Appendix 4-7. An overriding principle of the proposed scheme's landscape design philosophy is to retain, where possible, the existing trees, hedgerows and field boundaries present on the site, creating a high-quality external setting. Retention of these trees and hedgerows will allow continued function as wildlife corridors for the area. As well as conserving important biodiversity corridors and providing visual screening from visual receptors, retention of existing field boundary vegetation will enable the site to retain some of its existing rural landscape character. Provision of pedestrian pathways and cycleways are also an important element of the landscape design. The implementation of these safe public access routes enhance the recreational value of the landscape (e.g. access to the Rye Water and Moygaddy Castle Ruins) as well as providing a platform to connect with Maynooth Town.

The designated landscape plan also includes planting of trees, shrubs and other vegetation. The planting will naturally mitigate the effects of the Proposed Development through replacement of green spaces and biodiversity which will be lost during the construction phase, as well as providing some additional visual screening of the Proposed Development from visual receptors. It is noted that this mitigation will improve over time as vegetation establishes following the commencement of the operational phase.

11.6.3.1 Likely Significant Landscape Effects – Operational Phase

A desktop study of landscape policy did not identify any designated landscape receptors pertaining to the lands of the Proposed Development site itself. A designated scenic view (RW-4: Views of the Rye Water from Kildare Bridge) was identified within the EIAR Study Area. As this designation is of a visual nature, it is considered and assessed in the following section – *Likely Significant Visual Effects* –

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Operational Phase (Also, see Photomontage Viewpoint 7). The desktop study and site investigations identified other sensitive landscape receptors in the immediate setting and wider area such as the Rye Water and Carton Demesne which contribute value to the landscape of the site and its overall character. Archaeological features of the Proposed Development site such as Moygaddy Castle Ruins, Moygaddy House and old stone walls contribute cultural heritage value to the local landscape. Field boundaries within the Proposed Development comprising mature woodland and hedgerows were identified as the most valuable and sensitive landscape receptors located within the site itself.

Landscape Effects - Proposed Development Site (EIAR Study Area)

Indications of landscape value of the site and its setting are summarised in Table 11-8 previously. The existing landscape of the site and its setting was found to have some attributes and qualities of medium to high value. As the landscape of the Moygaddy Masterplan Area is zoned to accommodate growth such as that of the Proposed Development, the susceptibility of this landscape to the proposed change is deemed to be Low. On balance, the landscape sensitivity of the Proposed Development Site is deemed to be of **Medium** Sensitivity.

During the operational phase, the Proposed Development will result in a substantial change to the physical fabric of the landscape of the site, as well as its landscape character within its immediate vicinity. Although the development type is consistent with the zoning and planning of the lands at Moygaddy, the scale of the change will be substantial as the character, structure and composition of the site transitions from a rural environment to a well-developed landscape of a semi-urban nature. The magnitude of change within the site is deemed to be **Substantial**.

Some rural qualities of the site will be lost, however, retention of boundary vegetation and implementation of the designated landscape plan will mitigate the extent of the change and replace valuable landscape attributes lost during the construction phase and potentially enhance the recreational value of the landscape. On balance, considering the mitigating factors and the alignment of the Proposed Development with the zoning of the subject lands, direct effects on the landscape of the site are deemed to be long-term effects and of **Moderate Significance** – "An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends" (EPA, 2022).

Landscape Effects – Wider Landscape Setting and Specific Landscape Receptors

As shown by the visual baseline exercise and the photomontages, the abundance of vegetation screening surrounding the Proposed Development and its siting in a relatively flat landscape result in relatively limited visibility from locations beyond its immediate vicinity. Therefore, effects of the Proposed Development on the aesthetic and perceptual elements of the wider landscape setting and landscape character are of **Slight Significance** – "An effect which causes noticeable changes in the character of the environment without affecting its sensitivities" (EPA, 2022).

Due to the very limited visibility of the Proposed Development from Carton Demesne (visibility only occurs from a small, localised area, view shown in Photomontage Viewpoint 10), it is deemed that landscape effects on the landscape of the Carton Demesne are **Not Significant.**

The Proposed Development is located within County Meath landscape Character Area (LCA) 11 – South-East Lowlands which is designated as having a medium sensitivity. Considering the very limited visibility of the Proposed Development from the north, west and east (where the rest of LCA 11 is located) effects on the character of the LCA are negligible. On balance, it is deemed that landscape effects on LCA 11 are **Not Significant.**

Other LCAs in the LVIA Study Area include Meath LCA 14 – *Royal Canal* and Kildare LCA – *Northern Lowlands.* Considering the set-back distances from these LCAs, and the extremely limited

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visibility of the Proposed Development from within these landscapes, the Proposed Development will have a negligible magnitude of change on these LCAs and No Significant effects will occur.

11.6.3.2 Likely Significant Visual Effects

The desktop study, site visit and photomontages all inform the assessment of visual effects. In a general sense the landscape of the LVIA study area and beyond is representative of a flat lowland landscape. The landscape comprises many screening elements such as the townscape of Maynooth and the mature vegetation demarking field boundaries in the surrounding rural landscape to the north of the Rye Water. A disproportionate screening effect greatly restricts visibility of the Proposed Development from a vast majority of the LVIA study area. On-site appraisal determined that in most instances actual visibility of the site will only occur within relatively short-range views from locations in very close proximity to the site. However, the Proposed Development will be visible within medium range views from the south and south-west across the low-lying land of the Rye Water floodplain at the northern margin of Maynooth town.

The locations chosen for photomontages follow a detailed and extensive process including review of baseline policy information, site visits and high-quality photo taking at multiple locations within the LVIA study area. Many locations, which based on a desktop review had the potential for views of the site, had complete intervening screening or were screened to such an extent that the development of photomontages was not considered useful in terms of the assessment process i.e. little or no visibility towards the Proposed Development.

Visual Effects - Photomontage Assessment

A comprehensive and detailed assessment of each individual photomontage is presented in Appendix 11-1 – *Photomontage Assessment Tables*. The determination of likely significance of visual effects for each viewpoint is included in Appendix 11-1 as well as the significance of residual visual effects accounting for mitigating factors. Table 11-10 (below) summarises the residual visual effects presented in each of the 17 No. photomontages. Table 11-10 and the Volume 2 Photomontage Booklet should be viewed whilst reading Appendix 11-1. All visual effects are deemed to be long-term negative visual effects.

Table 11-10 Viewpoint Assessment Summary

VP No	Brief Descriptor	Visual Sensitivity	Magnitude of Change	Residual Significance of Visual Effect
01	Residential Receptor on the R157 north-east	Medium	Moderate	**Slight**
02	R157 Approach from the north-east	Low	Moderate	**Slight**
03	Queen Victoria Gate on the R157	Low	Substantial	**Moderate**
04 - A	View focussed on Site A from Existing Junction (R157 & L2214-3)	Low	Substantial	**Moderate**
04 - B	View focussed on Site B from Existing Junction (R157 & L2214-3)	Low	Moderate	**Slight**
05	Residential Receptors on the L2214 north-west	High	Negligible	**Not Significant**

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VP No	Brief Descriptor	Visual Sensitivity	Magnitude of Change	Residual Significance of Visual Effect
06	Site B from the R157 Regional Road	Low	Substantial	**Moderate**
07	Kildare Bridge and County Kildare Designated Scenic View RW-4	Medium	Moderate	**Slight**
08	Lyreen Housing Estate	Medium	Moderate	**Moderate**
09A	View Focused on Site B from Mogaddy House & Moygaddy Castle Ruins	Medium	Slight	**Not Significant**
09B	View Focused on Site C from Mogaddy House & Moygaddy Castle Ruins	Medium	Moderate	**Moderate**
10	Carton Demesne	High	Slight	**Slight**
11	Moygaddy Local Road T-Junction	Low	Substantial	**Moderate**
12	Residential Development South of the Rye Water	Medium	Moderate	**Moderate**
13	Moyglare Hall Road	Medium	Substantial	**Moderate**
14	L1012 Local Road, Moyglare	Medium	Negligible	**Not Significant**
15	L6219 Local Road West	Medium	Moderate	**Slight**

The significance of the residual visual effect was not considered to be 'Profound', 'Very Significant' or 'Significant' at any of the 15 No. viewpoint locations. * no. of the photomontages were deemed to have a residual visual effect of "Moderate" significance, six 'Slight' significance, and three were deemed to be 'Not Significant'.

As shown by the photomontage booklet and assessment tables in Appendix 11-1, the greatest visual effects will occur in very close proximity to the site. For instance, Viewpoints 03, 4A and 5 recorded visual effects of 'Moderate' significance. These viewpoints were all located within the EIAR Study Area in very close proximity (30-60 metres) to large buildings proposed as part of the Proposed Development where a substantial magnitude of change will occur. These viewpoints (03, 4A, 6) were not representative of sensitive visual receptors, therefore no significant visual effects are likely to occur. In a general sense, visual effects from the local roads surrounding the site were deemed to be 'Not Significant' when receptors (viewpoints) are greater than 200 metres from buildings of the Proposed Development.

As reported in the visual baseline, most open visibility of the Proposed Development will occur from the south, where the Rye Water valley affords more open views towards the Proposed Development than elsewhere in the surrounding landscape. Viewpoints 07, 08, 10, 12 and 13 are representative of key visual receptors with visibility of the Proposed Development from the south. Due to separation distances, intervening screening elements and various other factors (reported specifically for each photomontage in Appendix 11-1), the Proposed Development will not have a significant effect on visual amenity to the south.

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Due to the characteristics of the local landscape and screening surrounding the site, the Proposed Development will have limited visibility within the wider LVIA study area and will not have any significant effects on designated scenic amenity. Considering the highly localised visibility of the Proposed Development, as well as measures such as vegetation boundary retention and a landscaping plan which will provides some additional screening, overall, visual effects are deemed to be **Long-Term** and of **'Slight'** significance.

11.6.4 Cumulative Effects

There are many potential scenarios and interactions where cumulative visual effects may occur. While cumulative landscape and visual effects can occur due to the interaction of the Proposed Development with any other permitted or planned developments, the focus in the LVIA are those scenarios that are likely to give rise to significant cumulative effects. These scenarios can include interactions between differing development elements the Proposed Development, as well as the three other developments of similar scope and scale within the surrounding landscape that were identified previously in Section 11.5 – *Cumulative Baseline* (Permitted Dunboyne SHD; Proposed Moyglare Road SHD; Proposed MERR).

11.6.4.1 Cumulative Landscape Effects

All components of the Proposed Development are linked by the MOOR, shared utility infrastructure, as well as the pathways and landscape designs included in the master plan. Therefore, direct landscape effects resulting from both the construction and operational phases are connected. Direct effects on the landscape of Site A, Site B, Site C, the MOOR, Kildare Bridge and Moyglare Bridge are additive, and this was factored into the assessment of direct landscape effects reported previously.

Due to the highly localised visibility of the proposed infrastructure at Site A it is rarely viewed in combination (Viewpoint 08 only) with Site B, and it will not be viewed in combination with Site C, Kildare Bridge or Moyglare Bridge. There is some intervisibility between the substantial features of Site A and Site B (See Viewpoint 4a and 4B), however, due to the spatial separation and intervening treelines cumulative visual effects are very minor. Both Site A and Site B are viewed in combination from Viewpoint 08. Site B, Site C, Moyglare Bridge and the south-western portion of the MOOR are located within a slightly more exposed landscape to the south of the EIAR study Area, near to the Rye Water. Consequently, there is some intervisibility and combined cumulative effects amongst these elements, which do have a minor cumulative effect on the aesthetic attributes of the wider landscape. The cumulative landscape effects are additive but are not deemed to be significant.

11.6.4.2 Cumulative Visual Effects

Several factors must be considered when determining cumulative visual effects; Combined visibility (simultaneously and successional) and sequential visibility.

Combined Visibility - Simultaneous

Combined visibility occurs where an observer is able to see two or more developments from one viewpoint. Simultaneous combined visibility occurs when two developments are simultaneously seen within the same field of view from one viewpoint. As the MOOR is a common feature linking the entirety of the Proposed Development it will be viewed simultaneously with every other element and therefore cumulative visual effects will arise.

Simultaneous combined visibility of both Site A and Site B (and a very small portion of Site C) only occurs within medium ranging views from the south-west, as shown in Photomontage viewpoint 08, where visual effects were deemed to be of 'Moderate' Significance. Simultaneous combined visibility of Site A and Site C occurs when viewed from the south-east (Viewpoint 10). Site C, the MOOR and

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Moyglare Bridge will have combined simultaneous visibility, this is particularly evident in viewpoint 13, which was deemed to have a visual impact of 'Moderate' significance.

It is likely that there will be some in-combination visibility of the Proposed Development with the permitted Dunboyne Road SHD form Viewpoint 10 which may be partially visible to the left of the view shown in the photomontage, beyond a distant treeline. In this photomontage, the Proposed Development and this proposed SHD would add minor visibility of built infrastructure to the landscape seen from within Carton Demesne, however, cumulative visual effects are not deemed to be significant.

Combined Visibility - Successional

Successional visibility is when a receptor can view two developments from the same location but within differing arcs or fields of view. Combined successional visibility of Site A and Site B will occur from some locations between the various sites. As shown by the combination of Photomontages 4A and 4B where Site A and Site B have combined successional visibility. Also, Photomontage 9A and 9B show combined successional visibility of Site B and Site C. In both instances, landscape elements such as the mature vegetation along the field boundaries and large fields act as a buffer, visually separating the various proposed infrastructure, therefore mitigating the potential for significant cumulative visual effects as a result of intervisibility.

There will be combined successional visibility of the Proposed Development with several other SHD developments located to the south (Proposed Moyglare Road – ABP 314337) and east (Permitted Dunboyne Road ABP 310865-21) of photomontage Viewpoint 08 located adjacent to the Lyreen River. These developments may be partially visible in opposing fields of view to the Proposed Development. They will add to the existing residential and suburban character of the landscape immediately east and west of Viewpoint 08. These developments and the Proposed Development will have a cumulative effect aligning with the current trend of urbanisation in this area. Considering the separation distances and screening elements obscuring full intervisibility between the Proposed Development and these two developments, significant cumulative visual effects are not likely to occur.

Plans for the proposed Maynooth Eastern Ring Road (MERR – P82019.08) include a transport network linking with the Dunboyne roundabout. Associated works for this development may be visible to the south of Viewpoint 07, combined successional visibility may occur with the MOOR and Kildare Bridge works. It is anticipated however, that cumulative visual effects will not be significant.

Sequential Visibility

Sequential impacts occur when an observer has to move to another viewpoint to see different developments. Sequential cumulative effects should be assessed for travel along regularly-used routes like major roads, railway lines, ferry routes, popular paths, etc. In a 'Journey Scenario' the magnitude of sequential effects will be affected by speed of travel and distance between viewpoints. Sequential cumulative visual impacts are likely to occur as receptors travel along the R157 Regional Road. Visual effects will be brief and momentary as road users pass various locations in close proximity to Both Site A and Site B where open visibility will occur. No significant cumulative visual effects are anticipated to occur along this route. As the proposed MOOR is a transport network designed to link all of the Proposed Development components sequential visibility will inevitably occur on this route.

In a general sense, cumulative visual effects of some form (combined or sequential) will occur, however, they are not deemed to be significant due to the landscape features which provide a visual and spatial buffer between the various proposals. It is also noteworthy in this regard that any cumulative visual effects experienced as a result of the visual interactions between the various components of the Proposed Development, are in line with what is clearly envisioned in planning and development policy. The Sites where the various elements of the Proposed Development are located, are aligned with the zoning of these lands in the Maynooth Environs Written Statement.

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11.7 Conclusion

Desk studies and site visits determined that there would be very limited visibility of the Proposed Development beyond distances of 600 metres (only from the south, reduced visibility from all other geographical perspectives) from the site and therefore there will be no effects on sensitive visual and landscape receptors or landscape designations in the LVIA Study Area beyond 600 metres. Photomontage assessments determined that most open visibility of the Proposed Development would occur from the local road network immediately surrounding the site as well as from the embankments to the south of the Rye Water.

Perceptual and aesthetic changes to the wider landscape character surrounding the site are likely to be insignificant as a result of the very limited and localised visibility. The greatest changes will occur on the footprint of the development site where the landscape will be materially altered from an unkept green field site of grassland to a landscape of a more suburban nature. Considering the proposed retention of existing woodland along existing field boundaries, a dedicated landscape plan and the zoning of these lands for development, landscape effects are not deemed to be significant.

Due to very effective screening of the Proposed Development by existing vegetation there will be in minimal visual changes in the landscape of the wider LVIA Study Area. Sensitive receptors with potential to be impacted by the Proposed Development were identified during a desk study and site visit. Visual effects were then assessed using photomontages. A walking path at the western extent of Carton Demesne was identified as one of the most sensitive receptors where some visibility of the Proposed Development may occur; residual visual effects were deemed to be of 'Slight' significance from this location. A cluster of residential receptors to the north-west of Site A were found to have open views of a scenic nature towards the site within their primary residential visual amenity, the photomontages showed very little visibility of the Proposed Development and residual visual effects were deemed to be 'Not Significant'.

Other sensitive receptors assessed using photomontages include a designated scenic view on Kildare Bridge, the Lyreen Housing estate to the south of the Rye Water, and a view in proximity to Moygaddy Castle ruins and Moygaddy House; visual effects were recorded as 'Slight,', 'Moderate,' and 'Moderate' from these locations respectively. Visual effects of 'Moderate' significance was recorded from photomontage viewpoints located south of the Rye Water, adjacent to housing estates and Maynooth Community College; where Site C (SHD), the MOOR and Moyglare bridge will be seen within relatively open views across the small Rye Water Valley. A substantial magnitude of change will occur from the local road network in the immediate vicinity of the site. The road network represents motorised traffic which are not deemed to be sensitive visual receptors. Therefore, residual visual effects recorded for the viewpoints in very close proximity to the Proposed Development infrastructure were of 'Moderate' significance.

No significant cumulative landscape and visual effects are likely to arise as a result of the Proposed Development. As noted in the previous section, any cumulative visual effects experienced (combined or sequentially) as a result of views of both Site A, Site B, Site C, the MOOR, Kildare Bridge and Moyglare Bridge, are in line with what is clearly envisioned in planning and development policy for the areas within which these developments are located, given that all developments are aligned with the zoning of these lands in the Maynooth Environs Written Statement.

To conclude, likely landscape and visual effects anticipated from the Proposed Development are not deemed to be significant. Considering the mitigation plans in place, and the zoning of these lands, residual effects upon the landscape and visual amenity are deemed to be acceptable and in line with the sustainable development of the area.

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12. CULTURAL HERITAGE

12.1 Introduction

This EIAR chapter was prepared by Frank Coyne of Aegis Archaeology Ltd. This chapter presents the results of an impact assessment of the Proposed Development, as described in Chapter 4 of this EIAR, upon local archaeology, built heritage and cultural heritage.

The purpose of this chapter is to assess the potential effects of the Proposed Development on the surrounding archaeological, architectural and cultural heritage landscape. This chapter of the EIAR has been completed in accordance with the guidance set out in Chapter 1. The assessment is based on both a desktop review of the available cultural heritage and archaeological data and a comprehensive site visit and walkover survey that was carried out on 4th November 2022

The report amalgamates desk-based research and the results of site visit to identify areas of archaeological/architectural/cultural significance or potential, likely to be impacted by the Proposed Development. A description of the potential impacts is presented, and mitigation measures are recommended where appropriate. The potential visual impact of the proposed development on recorded monuments is also assessed.

12.1.1 Statement of Authority

Frank Coyne MA graduated from University College Galway in 1989 with a BA (honours) degree in archaeology and history. He graduated from the City of Birmingham University with an MA (Distinction) in Conservation of the Historic Environment in 2021. He is licensed to carry out archaeological excavations in Ireland since 1997 and has 26 years of experience in the provision of archaeology and cultural heritage services to public and private sector clients. He is a director of Aegis Archaeology Ltd which was established in 1997 and has undertaken major archaeological projects from pre-planning assessment stage to archaeological excavation (preservation by record) of sites. Frank Coyne won the 2020 Donald Insall award in the UK, and also the HSBC award for 'Best Conservation Management Plan' for Mutton Lighthouse in Galway.

12.2 Receiving Environment

12.2.1 Proposed Development

Sky Castle Ltd. intends to submit to a total of six planning applications as part of the Moygaddy Mixed Use Development. A total of three planning applications will be submitted to Meath County Council as the competent authority. One planning application seeks to provide a Strategic Employment Zone (Biotechnology & Life Sciences Campus), one planning application for Healthcare Facilities which includes a Nursing Home and Primary Care Centre, and one planning application for the delivery of the proposed Maynooth Outer Orbital Road (MOOR).

A planning application for a Strategic Housing Development (SHD) will be submitted to An Bord Pleanála under the Strategic Housing Provisions of the Planning and Development (Housing) and Residential Tenancies Act, 2016.

There will also be two separate planning applications submitted to Kildare County Council for shared infrastructure and proposed services and utilities connection to Maynooth town in County Kildare. One planning application to Kildare includes a proposed pedestrian / cycle bridge adjacent to the existing Kildare Bridge, as well as a proposed wastewater connection to the Maynooth Municipal Wastewater Pumping Station to the southeast of the Proposed Development. The other planning application to be

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submitted to Kildare County Council is located to the southwest of the Proposed Development for the provision of an integral single span bridge over the Rye Water River with associated flood plain works and embankments, as well as services and utilities connections.

As outlined in Chapter 1: Introduction, this EIAR assess the impact of all six planning applications under the one 'Proposed Development' due to the proximity, timeline and links between the applications.

While these developments will be subject to separate planning applications, it was considered prudent to consider all six applications together under one EIAR, due to the proximity, construction timelines and shared infrastructure between the developments. **Site A, Site B, Site C, MOOR, Kildare Bridge and Moyglare Bridge** will be collectively referred to as the 'Proposed Development' henceforth.

A full description of the Proposed Development is provided in Chapter 4 of this EIAR. All elements of the overall project have been assessed as part of this EIAR.

12.2.2 Site Location and Topography

Sites A, B and C of the Proposed Development are located in County Meath on the northern environs of Maynooth town, Co. Kildare. The proposed strategic employment zone (Site A) is located approximately 1km north of Maynooth at its closest point. The proposed healthcare facilities (Site B) are located approximately 500m north of Maynooth town at its closest point. The SHD housing development (Site C) is located approximately 750m N of Maynooth, while the MOOR site boundary is approximately 500m N of Maynooth. The Moyglare Bridge site is in Co. Kildare approximately 700m N of Maynooth, while the Kildare Bridge, also located in Co. Kildare, is approximately 400m N of Maynooth. Please refer to Figure 1-1 of Chapter: Introduction, for the site location. Both the healthcare site and the strategic employment zone within the Proposed Development are accessed by the existing R157 Regional Road. The SHD site (Site C) is accessed by the L6219 & L22143 Local Roads which runs westwards from the R157 Regional Road.

Site A: Strategic Employment Zone Application

The site boundary for the proposed Site A is approximately 6.8 hectares (ha). The site is bounded by the R157 Regional Road to the east, the L22143 Local Road to the west, and farmland to the north, south and west. Site A is currently a green-field site which supports small-scale agriculture. The site is relatively flat with a topography ranging from approximately 56m OD (Ordnance Datum) in the south of the site to 60m OD in the centre and north of the site.

Site B: Healthcare Application

The site boundary for the proposed Site B is approximately 6.6 hectares (ha). The site is bounded by the Rye Water River to the south and the R157 regional road to the east. The site is currently a green-field site which supports small-scale agricultural practices. The areas to the north and west of the site are also used for small scale agriculture. The site is relatively flat where infrastructure is proposed although the topography slopes gradually down towards the Rye Water River to the south. The topography ranges from approximately 56m OD (Ordnance Datum) in the north of the site to 46m OD at the southern boundary of the site at the Rye Water River.

Site C: Strategic Housing Development

The site boundary for Site C is approximately 19.5 hectares (ha). The site is bounded by a regional road to the north, and by the Rye Water River to the south. A bridge is proposed over this river. The Blackhall Little Stream runs in a northeast-southwest direction at the eastern side of Site C. a pedestrian band cycle bridge is proposed. The site is currently two green field and a portion of a third, which

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support small scale agricultural practices. The site boundary also includes a Recorded Monument, (Moygaddy castle), which is currently enclosed by mature trees on its west, south and east sides. The castle will be included as part of communal open space.

MOOR: Maynooth Outer Orbital Road

The site boundary for the proposed Maynooth Outer Orbital Road (MOOR) is approximately 6.6 hectares (ha). The site is bounded by the R157 Regional Road to the east, the site is bounded by the Moyglare Hall road to the southwest, the L22143 and L6129 Local Roads to the west, the L2214 Local Road to the north and the R157 Regional Road to the east and southeast. The MOOR, once constructed will provide connectivity from the R157 to the southeast of the site to the L2214 to the north and finally to the Moyglare Hall road to the west. The site is relatively flat, with a topography ranging from approximately 48m OD (Ordnance Datum) in the south of the site to 62m OD to the north of the site. There are existing drainage ditches adjacent to the existing roads in which upgrade works will be carried out as part of the MOOR.

Kildare Bridge Application

The site boundary for the proposed Kildare Bridge application is approximately 1.2 hectares (ha). The site includes upgrade works to the R157 Regional Road to the north of the site along with a standalone pedestrian and cycle bridge across the Rye Water River adjacent to the existing Kildare Bridge. The site boundary is bounded by the L1013 Local Road to the south of the site. The wastewater pumping station (WWPS) which is part of the Proposed Development and the associated rising main will cross the Rye Water River along the public road and footpath to the Maynooth Municipal WWTP.

Moyglare Bridge Application

The site boundary for the proposed Moyglare Bridge application is approximately 0.5 hectares (ha). The site includes a single span bridge over the River Rye Water as well as services and utilities connection from the proposed onsite pumping station at Site C (SHD) to Moyglare Close Wastewater Pumping Station in Co. Kildare. The Moyglare Close housing estate is located approximately 5m from the site boundary at its closest point. There are no existing buildings or structures within the site boundary The site is relatively flat ranging from 48m OD at the north of the site to 55m OD to the west.

12.3 Statutory Context

12.3.1 Current Legislation

Archaeological monuments are safeguarded through national and international policy, which is designed to secure the protection of the cultural heritage resource. This is undertaken in accordance with the provisions of the European Convention on the Protection of the Archaeological Heritage (Valletta Convention). This was ratified by Ireland in 1997.

Both the National Monuments Acts 1930-2004 and the relevant provisions of the Cultural Institution Act 1997 are the primary means of ensuring protection of archaeological monuments, the latter of which includes all man-made structures of whatever form or date. There are a number of provisions under the National Monuments Acts which ensure protection of the archaeological resource. These include the Register of Historic Monuments (1997 Act), which means that any interference to a monument is illegal under that act. All registered monuments are included on the Record of Monuments and Places (RMP).

Section 12(1) of the National Monuments (Amendments) Act 1994 provided for the establishment of a Record of Monuments and Places (RMP) to list (with accompanying mapping) where, in the opinion of the Minister, monuments are believed to exist. Two months' notice must be given to the Minister in

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advance of any works being undertaken at or in the vicinity of a monument so recorded, save in the case of urgent necessity and with the consent of the Minister. Section 12 (3) of the 1994 Amendment Act states that any person proposing to carry out work at or in relation to a recorded monument must give notice in writing to the Minister (Culture, Heritage and the Gaeltacht) and shall not commence the works for a period of two months after having given the notice. All proposed works, therefore, within or around any archaeological monuments are subject to statutory protection and legislation (National Monuments Acts 1930-2004).

Under the Heritage Act 1995 (as amended) architectural heritage is defined to include *'all structures, buildings, traditional and designed, and groups of buildings including streetscapes and urban vistas, which are of historical, artistic, engineering, scientific, social or technical interest, together with their setting, attendant grounds, fixtures, fittings and contents...'*. A heritage building is also defined to include *'any building, or part thereof, which is of significance because of its intrinsic architectural or artistic quality or its setting or because of its association with the commercial, cultural, economic, industrial, military, political or religious history of the place where it is situated or of the country or generally'.*

12.3.2 Granada Convention

The Council of Europe, in Article 2 of the 1985 Convention for the protection of the architectural heritage of Europe (Granada Convention), states that *'for the purpose of precise identification of the monuments, groups of structures and sites to be protected, each member state will undertake to maintain inventories of that architectural heritage'*. The Granada Convention emphasises the importance of intervention in underpinning conservation policies.

The NIAH was established in 1990 to fulfil Ireland's obligations under the Granada Convention, through the establishment and maintenance of a central record, documenting and evaluating the architectural heritage of Ireland. Article 1 of the Granada Convention establishes the parameters of this work by defining 'architectural heritage' under three broad categories of Monuments, Groups of Buildings, and Sites:

- Monument: all buildings and structures of conspicuous historical, archaeological, artistic, scientific, social or technical interest, including their fixtures and fittings;
- Groups of Buildings: homogenous groups of urban or rural buildings conspicuous historical, archaeological, artistic, scientific, social or technical interest, which are sufficiently coherent to form topographically definable units;
- Sites: the combined works of man and nature, being areas which are partially built upon and sufficiently distinctive and homogenous to be topographically definable, and are of conspicuous historical, archaeological, artistic, scientific, social or technical interest.

The Council of Europe's definition of architectural heritage allows for the inclusion of structures, groups of structures and sites which are considered to be of significance in their own right, or which are of significance in their local context and environment. The NIAH believes it is important to consider the architectural heritage as encompassing a wide variety of structures and sites as diverse as post boxes, grand country houses, mill complexes and vernacular farmhouses.

12.3.3 Valetta Convention

The 1992 European Convention on the Protection of the Archaeological Heritage (the 'Valletta Convention'), which aims to 'protect the archaeological heritage as a source of the European collective memory and as an instrument for historical and scientific study' (Article 1). It is an internationally binding treaty within Europe, and deals with the protection, preservation and scientific research of archaeological heritage in Europe. In particular it focuses on the conservation of archaeological heritage in the face of development projects.

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Objectives of the convention include;

- To integrate the conservation and archaeological investigation of archaeological heritage in urban and regional planning policies;
- To establish a co-operation and consultation processes between archaeologists, and project developers.

12.3.4 Non-Statutory Consultation

The Department of Culture, Heritage and the Gaeltacht (Development Applications Unit (DAU)) were issued with a non-statutory EIAR scoping document on the 9th of August 2021. In addition, the scoping document was also issued to the Heritage Council and the heritage officers of Meath and Kildare County Councils. No scoping responses were received from the DAU, the Heritage Council and County Councils.

12.3.5 Meath County Development Plan 2021-2027

The Meath County Development Plan 2021-2027 outlines a number of objectives relating to archaeological, architectural and cultural heritage.

Archaeological Heritage

The plan has adopted policies HERPOL 1-5-ARC6 and objectives HER OBJ 1-6 for the protection of archaeological heritage. The policies are as follows:

HER POLICY 1: To protect sites, monuments, places, areas or objects of the following categories:

Sites and monuments included in the Sites and Monuments Record as maintained by the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht;

Monuments and places included in the Record of Monuments and Places as established under the National Monuments Acts;

Historic monuments and archaeological areas included in the Register of Historic Monuments as established under the National Monuments Acts;

National monuments subject to Preservation Orders under the National Monuments Acts and national monuments which are in the ownership or guardianship of the Minister for Culture, Heritage and the Gaeltacht or a local authority;

Archaeological objects within the meaning of the National Monuments Acts; and Wrecks protected under the National Monuments Acts or otherwise included in the Shipwreck Inventory maintained by the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht.

ARC 2: Seek to promote awareness and access to archaeological sites in the county where appropriate

ARC 3: Consult with the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht in relation to proposed developments adjoining archaeological sites

ARC 4: Support the preservation, conservation and management of archaeological sites and monuments, together with the settings of these monuments

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ARC 5: Ensure the protection and sympathetic enhancement of archaeological sites

ARC 6: Facilitate where possible the identification of important archaeological landscapes in the county

HER POLICY 2-To protect all sites and features of archaeological interest discovered subsequent to the publication of the Record of Monument and Places, in situ (or at a minimum preservation by record) having regard to the advice and recommendations of the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht and The Framework and Principles for the Protection of the Archaeological Heritage (1999).

HER POLICY 3. To require, as part of the development management process, archaeological impact assessments, geophysical survey, test excavations or monitoring as appropriate, for development in the vicinity of monuments or in areas of archaeological potential. Where there are upstanding remains, a visual impact assessment may be required.

HER POLICY 4. To require, as part of the development management process, archaeological impact assessments, geophysical survey, test excavations or monitoring as appropriate, where development proposals involve ground clearance of more than half a hectare or for linear developments over one kilometre in length; or developments in proximity to areas with a density of known archaeological monuments and history of discovery as identified by a suitably qualified archaeologist.

HER POLICY 5. To seek guidance from the National Museum of Ireland where an unrecorded archaeological object is discovered, or the National Monuments Service in the case of an unrecorded archaeological site.

HER OBJ 1: To implement in partnership with the County Meath Heritage Forum, relevant stakeholders and the community the County Meath Heritage Plan and any revisions thereof.

HER OBJ 2: To ensure that development in the vicinity of a Recorded Monument or Zone of Archaeological Potential is sited and designed in a sensitive manner with a view to minimal detraction from the monument or its setting.

HER OBJ 3: To protect important archaeological landscapes from inappropriate development.

HEROBJ 4: To encourage the management and maintenance of the County's archaeological heritage, including historic burial grounds, in accordance with best conservation practice that considers the impact of climate change.

HER OBJ 5: To promote awareness of, and encourage the provision of access to, the archaeological resources of the county.

HER OBJ 6: To work in partnership with key stakeholders to promote County Meath as a centre for cultural heritage education and learning through activities such as community excavation and field/summer schools.

Architectural Heritage

The Meath County Development Plan contains a number of policies relating to architectural heritage. These include:

Her Pol 14: To protect and conserve the architectural heritage of the County and seek to prevent the demolition or inappropriate alteration of Protected Structures.

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Her Pol 15: To encourage the conservation of Protected Structures, and where appropriate, the adaptive re-use of existing buildings and sites in a manner compatible with their character and significance. In certain cases, land use zoning restrictions may be relaxed in order to secure the conservation of the protected structure.

Her Pol 16: To protect the setting of Protected Structures and to refuse permission for development within the curtilage or adjacent to a protected structure which would adversely impact on the character and special interest of the structure, where appropriate.

Her Pol 17: To require that all planning applications relating to Protected Structures contain the appropriate accompanying documentation in accordance with the Architectural Heritage Protection Guidelines for Planning Authorities (2011) or any variation thereof, to enable the proper assessment of the proposed works.

Her Pol 18: To require that in the event of permission being granted for development within the curtilage of a protected structure, any works necessary for the survival of the structure and its re-use should be prioritised in the first phase of development.

Vernacular Architecture

The Meath County Development Plan objectives relating to vernacular architecture. These include:

HER POL 21: To encourage the retention, sympathetic maintenance and sustainable re-use of historic buildings, including vernacular dwellings or farm buildings and the retention of historic streetscape character, fabric, detail and features.

Record of Protected Structures

A record of Protected Structures (RPS) is included as an appendix in Meath County Development Plan. Objectives include:

HER OBJ 15: To review and update the Record of Protected Structures on an on-going basis and to make additions and deletions as appropriate.

Landscape

The Meath County Development Plan objectives relating to landscape include:

HER OBJ 48: To support the aims and objectives of the European Landscape Convention by implementing the relevant objectives and actions of the National Landscape Strategy 2015-2025 and any revisions thereof.

HER OBJ 50: To require landscape and visual impact assessments prepared by suitably qualified professionals be submitted with planning applications for development which may have significant impact on landscape character areas of medium or high sensitivity.

12.3.6 Maynooth Local Area Plan 2013-2019

The Maynooth Local Area Plan 2013-2019 outlines a number of policies in relation to built heritage and archaeology. These include:

BH 1 To resist the demolition of vernacular architecture of historical, cultural and aesthetic merit, which make a positive contribution to the character, appearance and quality of the local streetscape and the sustainable development of Maynooth

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AH 1: To require an appropriate archaeological assessment to be carried out by a licensed archaeologist in respect of any proposed development likely to have an impact on a Recorded Monument or its setting.

12.3.7 Maynooth Environs Local Area Plan 2009-2015

The Maynooth Environs Local Area Plan 2009-2015 outlines a number of policies and objectives, specifically relating to Moygaddy. These include:

LAP 9: Protect the existing built heritage of Moygaddy Castle, Moygaddy House and stud.

LAP 10: Protect the existing built heritage of Carton Demesne and its curtilage

LAP 11: Support the provision of mixed-use neighbourhood retail/commercial facilities, on lands within Carton Demesne and Moygaddy.

12.3.8 Kildare County Development Plan 2017-2023

The Kildare County Development Plan (Chapter 12 of the CDP) has a number of strategies and policies for the architectural and archaeological heritage of the county. These include;

-- Protect and conserve buildings, structures and sites of special architectural, historic, archaeological, artistic, cultural, scientific, social or technical interest.

-- Protect and conserve the archaeological heritage of the county. The Council will favour the preservation in situ of all sites, monuments and features of significant historical or archaeological interest in accordance with the recommendation of the Framework and Principles for the Protection of Archaeological Heritage (1999) or any superseding national policy.

-- Protect and conserve areas that have particular environmental qualities that derive from their overall layout, design and character.

-- Protect and conserve historic milestones, street furniture, and other significant features of interest wherever feasible.

-- Encourage the rehabilitation, renovation and reus of existing older buildings where appropriate.

-- Maintain the views to and from Carton House and within Carton Demesne.

Record of Protected Structures

A record of Protected Structures (RPS) is included as an appendix in Kildare County Development Plan 2017-2023.

12.3.9 County Kildare Heritage Plan 2019-2025

The County Kildare Heritage Plan contains a number of objectives in relation to heritage.

Strategic Objective 2: Promote best practice in the conservation and management of County Kildare's heritage resource.

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Strategic Objective 4: Promote heritage as a resource that contributes to quality of life and to cultural and economic development in County Kildare.

12.4 Methodology

The assessment of the archaeology, architecture and cultural heritage of the area of the Proposed Development included desk-based research and field inspection. A desk-based study of the Proposed Development site was undertaken in order to assess the archaeological, architectural and cultural heritage potential of the area and to identify constraints or features of archaeological/cultural heritage significance within or near to the site of the Proposed Development. A site visit and walkover survey of the study area was undertaken on the 4th of November 2021 to determine if previously unrecorded archaeological, architectural or cultural heritage features were located in the area of the Proposed Development and to assess any potential impacts on known or previously unrecorded sites or monuments within the EIAR study area.

12.4.1 Desktop Assessment

A primary cartographic source and base-line data for the archaeological assessment was the consultation of the Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP) for County Meath. All known recorded archaeological monuments are indicated on six-inch Ordnance Survey (OS) maps and are listed in this record. The first edition OS six-inch (1838-9) and twenty-five inch (1890-1898) maps for the area were consulted. The site of the Proposed Development was inspected by Frank Coyne on the 4th of November 2021. A photographic record was made of the Proposed Development area.

The following sources were consulted for this assessment report:

- The Sites and Monuments Record (SMR);
- The Record of Monuments and Places (RMP);
- First edition Ordnance Survey maps (www.osi.ie);
- 25-inch Ordnance Survey maps (RMP maps for Co. Meath and Kildare);
- Down Survey maps for County Meath (www.downsurvey.tcd.ie);
- Aerial images (www.osi.ie);
- The Topographical Files of the National Museum of Ireland;
- Excavations Bulletins (www.excavations.ie);
- Meath County Development Plan 2021-2027, Meath County Council;
- Maynooth Local Area Plan 2013-2019;
- Maynooth Environs Local Area Plan 2009-2015, and
- National Inventory of Architectural Heritage (NIAH).

12.4.2 Record of Monuments and Places

A primary cartographic source and base-line data for the archaeological assessment was the consultation of the RMP (paper map and list) and SMR (online)for County Meath. All known recorded archaeological monuments are indicated on six-inch OS maps and are listed in this record. The SMR is not a complete record of all monuments as newly discovered sites may not appear in the list or accompanying maps. In conjunction with the consultation of the RMP and SMR the electronic database of recorded monuments which may be accessed at www.archaeology.ie was also consulted. There is one Recorded Monument within the Proposed Development Area. This is Moygaddy Castle (ME053-001—; referred in this chapter as CH1). There are three recorded monuments located within 1km of the study area (see Section 12.5.1.5).

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12.4.3 Cartographic Sources and Aerial Photography

Down Survey map 1656-8

The Down Survey undertaken by William Petty between 1656 and 1658 was a systematic mapping of Ireland for the purpose of administering the Cromwellian Confiscations. It was based on the earlier Civil Survey and recorded land ownership and features by townland. No useful information was derived. Moygaddy Castle is not marked on the Down Survey map displayed as Figure12-1 below.

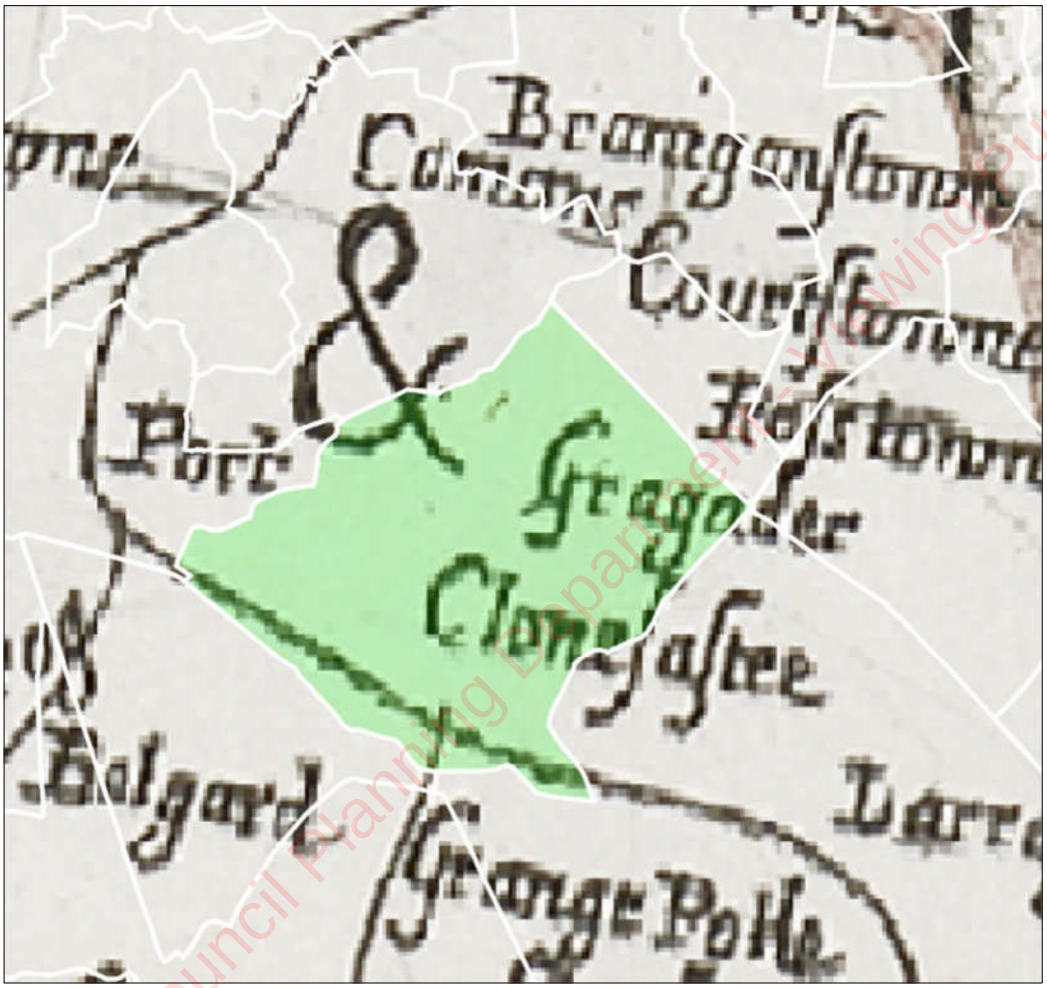

Figure 12-1 Down Survey map extract showing the townland of Moygaddy (http://downsurvey.tcd.ie/landowners.php#mc=53.397589,-6.560752&z=14).

Ordnance Survey first edition six-inch map c. 1840

The first edition OS six-inch map 1838-9 (displayed below as Figure 12-2) shows the site of the Proposed Development as a series of fields. Carton Demesne is depicted, as is Pebble Mill. A farmyard is marked on the south side of the road where Moygaddy Castle is located. Moygaddy Castle is not annotated. It appears to be incorporated into the farmyard complex at this time. Kildare Bridge is depicted.

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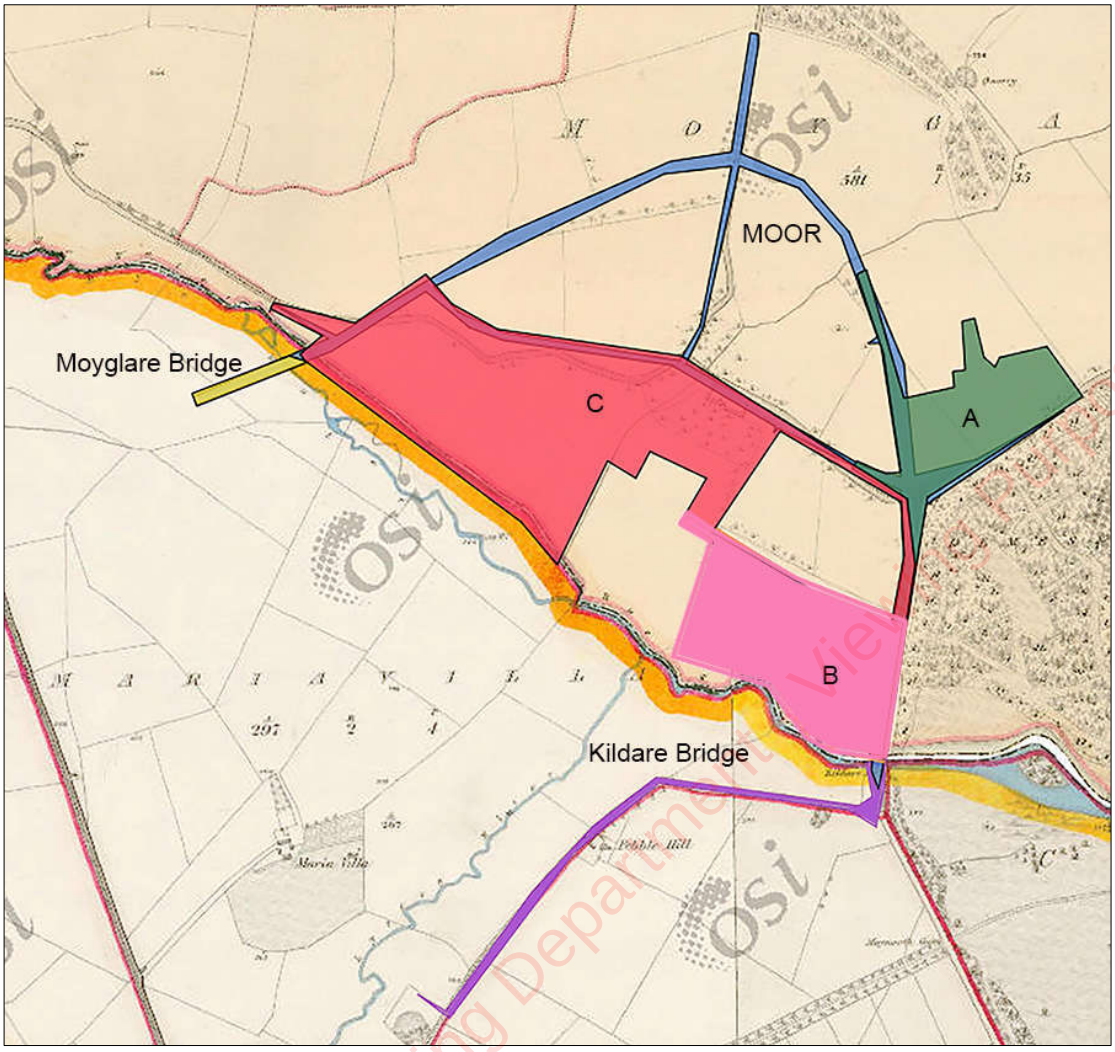

Figure 12-2 Proposed development on First Edition OS (c.1839) six-inch map, sheet 53, Co. Meat, Sheet 5 Kildare. Site A in green, Site B in pink , Site C in red, Moyglare Bridge in yellow, MOOR in blue, Kildare Bridge in purple.. (after www.heritagemaps.ie). North to top.

The twenty-five inch OS map (displayed below as Figure 12-3) shows that the fields in the Proposed Development site have been enlarged, with some of the field boundaries depicted on the 1st Edition map removed. Carton House Demesne is depicted, as is Pebble Mill House. Moygaddy House and outbuildings have since been built, located on the northern side of the roadway, and Moygaddy Castle is depicted, and annotated as 'Moygaddy Castle'. The Maynooth Environs Local Area Plan 2009-2015 states that 'Moygaddy House is a two storey over basement Georgian house. The complex appears to have been purpose built for breeding racehorses in the mid to late 19th Century, where the extensive stables and paddock formed part of the original development'. Kildare Bridge is also depicted.

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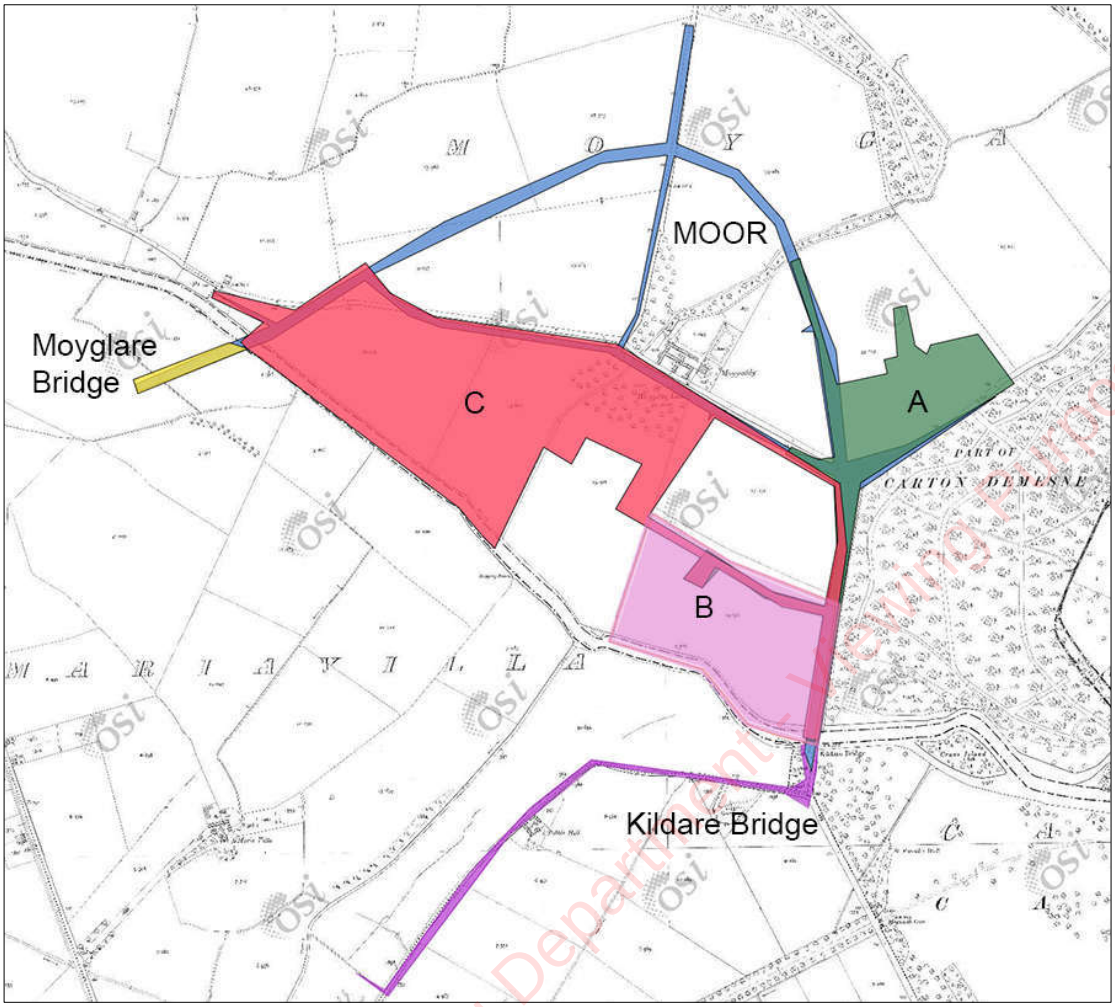

Figure 12-3 Proposed development on 25-inch OS map (after www.archaeology.ie),, sheet 53, Co. Meat, Sheet 5 Kildare. Site A in green, Site B in pink , Site C in red, Moyglare Bridge in yellow, MOOR in blue, Kildare Bridge in purple.. (after www.heritagemaps.ie). North to top. North to top.

Aerial Images

A series of aerial images of the site from 1995-2013 were examined (available at www.osi.ie) and are displayed below as Figure 12-4 and 12-5 respectively.. Google Earth images dating from 1985 -2021 were also examined. No potential archaeological sites were identified from examination of the series of aerial images. Lidar imagery was also assessed. A possible roadway was noted in Site C, and also crosses the proposed route of the Maynooth Outer Orbital Road (MOOR). This is also visible on aerial images, and also was identified in the geophysical survey. Possible field boundaries of uncertain date were notes in Site A. These were also identified on the geophysical survey.

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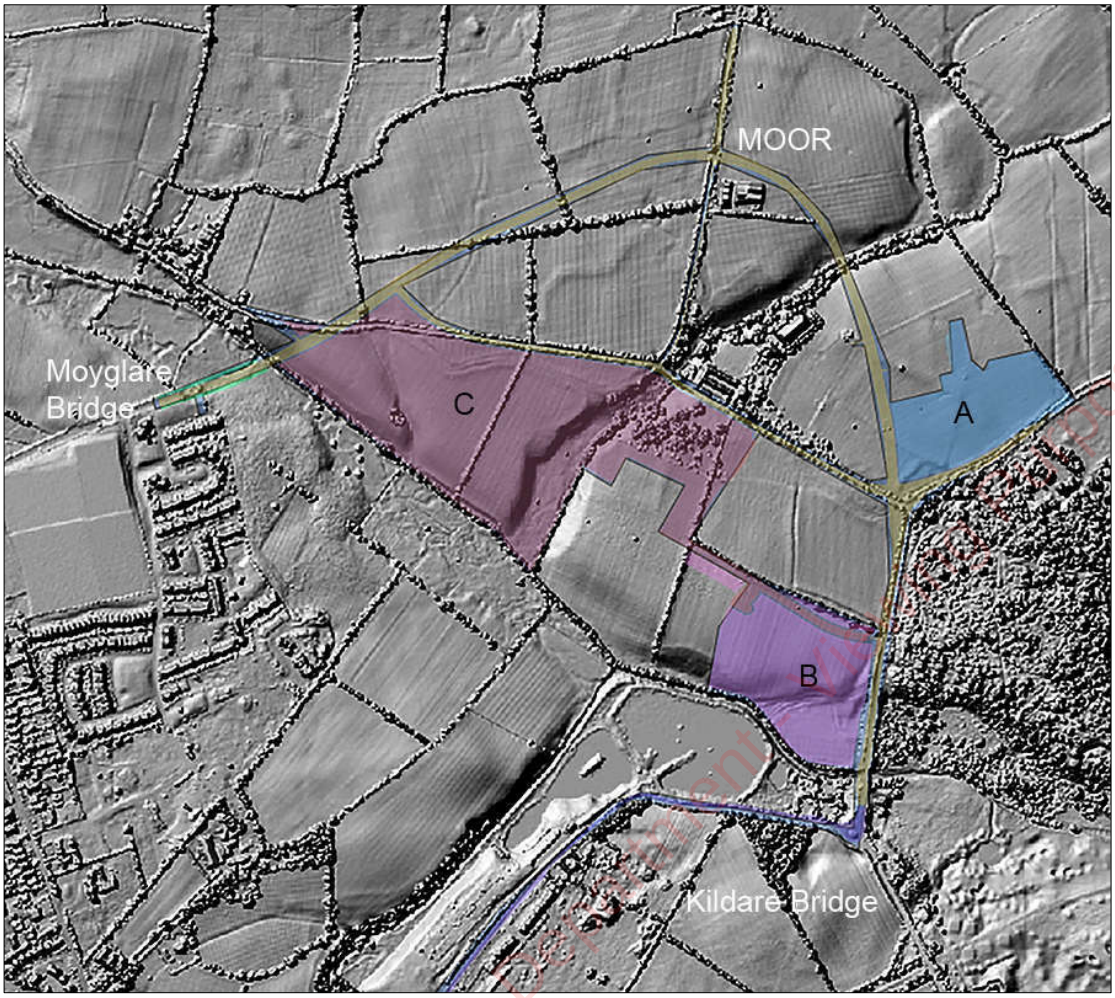

Figure 12-4 Proposed Development site on Lidar Imagery (Open Togographic data Viewer). Site A in Blue, Site B in purple, Site C in pink, Moyglare Bridge in green, MOOR in yellow, Kildare Bridge in dark blue..

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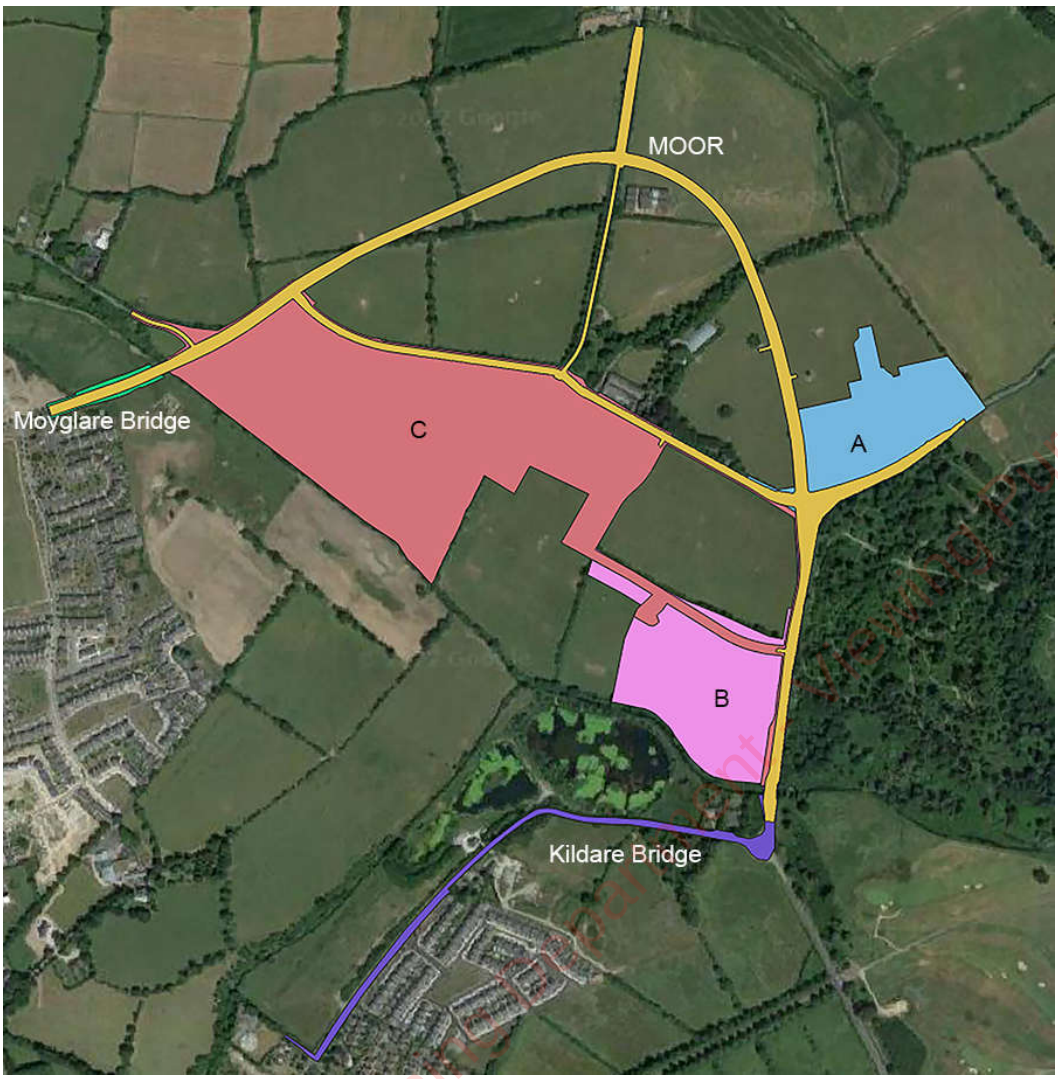

Figure 12-5 Proposed Development site on Digital Globe Aerial Photograph. Site A in Red, Site B in Blue, Site C in pink, Moyglare Bridge in green, MOOR in yellow, Kildare Bridge in purple.

12.4.4 Topographical Files – National Museum of Ireland

Details relating to finds of archaeological finds from various townlands in the county are contained in the topographical files held in the National Museum of Ireland. The townlands Moygaddy, Mariaville and Maynooth were consulted. There are no recorded finds from the townland of Moygaddy in which the Proposed Development is located. There are several finds from the townland of Maynooth Co. Kildare, located south of the Proposed Development, which are detailed in Table 12-1 below.

Table 12-1 List of stray finds from the Topographical Files

NMI Register No	Simple Name	Component	Townland	ID	Find Place
1945:259	Axehead	Stone	Maynooth	68197	N/A
1967:101	Axehead	Stone	Maynooth	13424	Walls of an old house
1984:140	Ingot	Copper alloy	Maynooth	5030	Field, 6ft deep

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NMI Register No	Simple Name	Component	Townland	ID	Find Place
1995:2001	Button - Decorative copper alloy button	Copper alloy	Maynooth	7452	N/A
1995:2002	Mount	Copper alloy	Maynooth	7453	Dredged canal bed
1995:2003	Object - Decorated lead object	Lead	Maynooth	7454	N/A
1995:2004	Ring	Copper alloy	Maynooth	7455	N/A
1995:2005	Ring	Copper alloy	Maynooth	7456	N/A
1995:2006	Ring	Copper alloy	Maynooth	7457	N/A
1995:2007	Ring	Copper alloy	Maynooth	7458	N/A
SA1925:8	Brooch – Annular	Bronze	Maynooth	94672	

12.4.5 Record of Protected Structures (RPS) Meath County Development Plan 2021-2027 and Kildare County Development Plan 2017-2023

The County Development Plans were consulted for the schedule of buildings (Record of Protected Structures) and items of cultural, historical or archaeological interest which may be affected by the Proposed Development. The townlands within and surrounding the study area were searched in the list of protected structures in the development plan to assess the proximity and potential impact of the Proposed Development on such structures. The development plans also outline policies and objectives relating to the protection of the archaeological, historical and architectural heritage landscape of County Meath and County Kildare (see Section 12.3.5 and Section 12.3.8 above). Protected structures/buildings within 1km of the Proposed Development are included in Table 12-4 below for the purposes of assessing impact on immediate setting. Buildings/structures on the Record of Protected Structures located within the Proposed Development site are Moygaddy House (RPS No. MH053-102, referred to as CH2 in this chapter) and Carton Demesne Wall (RPS No. MH053-100, referred to as CH3 in this chapter), which is along the public road and is immediately adjacent to the Proposed Development (less than 10m east of the Proposed Development site boundary).

A second table (Table 12-5) is provided to show monuments within 2km of the Proposed Development. There are 99 in total, of which almost all are within Maynooth town to the south of the Proposed Development.

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12.4.6 National Inventory of Architectural Heritage (NIAH)

This source lists some of the architecturally significant buildings and items of cultural heritage and is compiled on a county-by-county basis. The National Inventory of Architectural Heritage is a state initiative under the administration of the Department of Housing, Local Government and Heritage and established on a statutory basis under the provisions of the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999. This Act requires the Minister to establish a survey to identify, record, and assess the architectural heritage of the country. The National Inventory of Architectural Heritage (NIAH) was duly established in 1990. While the inclusion of a site in the inventory does not in itself provide statutory protection, the survey information is used in conjunction with the Architectural Heritage Protection: guidelines for planning authorities (published by the Department of Environment, Heritage and Local Government) to advise local authorities on the compilation of a Record of Protected Structures as required by the Part IV of the Planning and Development Act, 2000.

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 the Department of Housing, Local Government and Heritage to the planning authorities for the inclusion of particular structures in their Record of Protected Structures (RPS). The published surveys are a source of information on the selected structures for relevant planning authorities. They are also a research and educational resource. It is hoped that the work of the NIAH will increase public awareness and appreciation of Ireland's architectural heritage. Sites within 1km and 2km of the Proposed Development site were assessed.

Building Surveys

There are 98 structures within 2km of the Proposed Development included on the National Inventory of Architectural Heritage. The majority of these are in Maynooth town. The closest is recorded below.

Name	Mariaville
Reg. No.	11803095
Date	1720 - 1760
Townland	Mariavilla
Co-ordinates	293735/238390
Distance	160m to SW

Garden Surveys

The NIAH has begun a process of recording Irelands designed landscapes, specifically demesnes which appeared on the first edition ordnance survey six-inch maps. This inventory includes over 6000 records of historic gardens and designed landscapes. The initial survey was carried out in two phases. Phase 1 commenced in 2003 with a search to identify sites. Phase 2, which commenced in 2005, was a desk-based initial assessment of condition and survival. The results of the garden surveys are added to the NIAH website as this work progresses. There are no recorded designed landscapes on the site of the Proposed Development site, according to a search of www.buildingsofireland.com/Surveys/Gardens/.

12.4.7 Excavations Bulletins

The Excavations Bulletins is an annual account of all archaeological investigations carried out under licence on the island of Ireland. The database is available online at www.excavations.ie and includes entries from 1985 to the present. This database was consulted as part of the desktop research for this assessment to establish if any archaeological investigations had been carried out within or near to the

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area of the Proposed Development. There are no entries relation relating to investigations in Moygaddy townland. There is one entry for Mariavilla townland in Co. Kildare.

Licence No. 17E0208

Excavations Ref.	2017:504
Townland	Mariavilla, Maynooth
ITM	693717/738242m
Site Type	Ring-ditches and cremation pits?
Author	Tim Coughlan
Description:	A programme of archaeological testing was undertaken at Mariavilla, Co. Kildare in order to inform the Cultural Heritage chapter of an Environmental Impact Assessment.

A geophysical survey was carried out on this site in advance of test trenching by J.M. Leigh Surveys Ltd (Licence 17R0066). This involved a detailed gradiometer survey over an area measuring c.19ha. The survey identified 2 no. clear archaeological features: a circular ditched enclosure, measuring c.30m in diameter with an entrance-way in the east in the northern area of the proposed development and a smaller 7m diameter circular response was noted 13m east of the entrance to the larger enclosure, suggesting a second ditched enclosure. A further spread of increased response was noted 13m to the east of this again, possibly representing a cluster of large pits, or possibly a small pond feature. These features and any features of archaeological potential were subsequently investigated during testing. Sixty-three test trenches were excavated within the area of proposed development totalling 3,516 linear metres and covering 6,328 metres squared of the proposed development area. The proposed development area comprised a total of 211,427m squared; however, not all of this was tested owing to local topography and ground conditions. The area south of the Lyreen River was not examined owing to the steep slope as well as previous construction and associated disturbance. An area c. 98,000m squared was deemed suitable for testing. The investigated area c. 6328m squared accounts for c. 6.4% of the total suitable development area. A total of three areas of potential archaeological significance were identified during the testing programme. These are labelled Archaeological Areas (AA) 1-3. The activity revealed included two linear features and two circular features interpreted as potential ring-ditches as well as over ten separate areas of localised burning some of which may be cremation pits. These features were apparent as positive responses or magnetic anomalies in the geophysical survey. Ground works associated with construction of the proposed residential units and access roads will have a significant direct negative impact on the potential archaeological features identified in AA1-3.

12.4.8 Fieldwork

The Proposed Development site was inspected by Frank Coyne on the 4th of November 2021. The inspection consisted of a comprehensive extensive walkover examination of the site and an assessment of any recorded monuments, architectural, built or cultural heritage items. The location was first assessed through a desk-based analysis of aerial photography and mapping. Nothing of potential as an unrecorded (or 'new') feature was identified on available maps. The available aerial imagery and available LiDAR imager was also inspected. A possible roadway was noted in Site C. This is also visible on aerial imagery, and was also identified in the geophysical survey. The site was inspected in good weather conditions. The Proposed Development site comprises several agricultural fields used for livestock grazing. Moygaddy Castle, Moygaddy House, a stretch of Carton House boundary wall, field boundaries, and a field gate were identified as cultural heritage features of interest during the walkover inspection (CH1-CH5). Finally, a geophysical survey has established that there are potential sub-surface archaeological features present at the site (CH6). There are no visible above ground indications of these sub-surface features. Public road widening, and road realignment works will take place along the existing R157 Regional Road and L22143 Local Road. The locations of the two proposed bridges at Kildare Bridge and Moyglare Bridge locations were visually assessed. No in-water or underwater assessment was carried out as part of this fieldwork. A photographic record of the inspection was made

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(Plates 12-1 to 12-12). For the purposes of clarity all cultural heritage features identified within the Proposed Development are listed as follows.

Table 12-2 – Cultural Heritage Features within the Proposed Development

Cultural Heritage Number (CH)	Name/Description	Status	Code	Proposed Development location
CH1	Moygaddy Castle	Recorded Monument (RMP)	ME053-001—	Site C
CH2	Moygaddy House	Record of Protected Structures (RPS Meath)	MH053-102	Site C
CH3	Stretch of Carton House Demesne Boundary Wall	Record of Protected Structures (RPS Meath)	MH053-100	Site A and Site B
CH4	County, Townland and field boundaries	unrecorded	none	Site B and Site C; Kildare Bridge Moyglare Hall
CH5	Gate	unrecorded	none	Site C
CH6	Geophysical Survey Anomolies	Unrecorded: Not proven archaeological until ground truthed through targeted testing	none	Site A, Site B, Site C, MOOR

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Plate 12-1 View across Site A, from S

Plate 12-2 View across Site B , from NW

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Plate 12-3 View of public road and Carton Demesne wall, from S

Plate 12-4 View across Site A, towards Moygaddy House (in trees), from E. Moygaddy Castle is located behind the trees on the left.

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Plate 12-5 -View across Site C, Rye water on the left., Moyglare Bridge site to rear behind trees, from W.

Plate 12-6 Remnant of old gateway (granite pier0, road portion of Site C.

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Plate 12-7 Route of MOOR – Maynooth Outer Orbital Road to right of sheds, from SE.

Plate 12-8 Route of MOOR – Maynooth Outer Orbital Road to right of sheds, from SW.

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Plate 12-9 Kildare bridge, from SE.

Plate 12-10 River Rye Water (county boundary), from E.

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Plate 12-11 Moygaddy House, from S.

Plate 12-12 Moygaddy Castle, from NE..

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12.4.8.1 Limitations Associated with Fieldwork

No limitations were encountered during the field survey.

12.4.9 Assessment of Likely Significant Effects

The likely effects on the existing archaeological and cultural heritage environment are assessed using the criteria as set out in the guidance referred to in Chapter 1 of this EIAR, in particular the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022). The following terminology is used when describing the likely effects of the Proposed Development from a Cultural Heritage Perspective.

12.4.9.1 Types of Impact

Direct impacts arise where an archaeological heritage feature or site is physically located within the footprint of the Proposed Development whereby the removal of part or all of the feature or site is thus required.

Indirect impacts may arise as a result of subsurface works undertaken outside the footprint of the development, secondary environmental change such as a reduction in water levels and visual impacts.

Cumulative impacts arise when the addition of many impacts create a large more significant impact.

Residual impacts are the degree of environmental changes that will occur after the proposed mitigation measures have been implemented.

12.4.9.2 Magnitude of Effects (Significance)

This section of the EIAR has been completed in accordance with the guidance set out in Chapter 1 of this EIAR. The assessment uses standard terminology to describe the likely significant effects associated with the proposed development. Further information on the classification of effects used in this assessment is presented in Section 1.9.2 of this EIAR.

Profound: Applies where mitigation would be unlikely to remove adverse effects. Reserved for adverse, negative effects only. These effects arise where an archaeological site is completely and irreversibly destroyed.

Very Significant: An effect which by its character, magnitude, duration or intensity significantly alters most of the sensitive aspect of the environment.

Significant: An effect which by its character, magnitude, duration or intensity alters most of the sensitive aspect of the environment. An effect like this would be where part of a site would be permanently impacted upon, leading to a loss of character, integrity and data about an archaeological site.

Moderate: A moderate effect arises where a change to an archaeological site is proposed which though noticeable, is not such that the integrity of the site is compromised, and which is reversible. This arises where an archaeological site can be incorporated into a modern-day development without damage and that all procedures used to facilitate this are reversible.

Slight: An effect which causes changes in the character of the environment which are not high or very high and do not directly impact or affect an archaeological site.

Imperceptible: An effect on an archaeological site capable of measurement but without noticeable consequences.

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12.5 Description of Existing Environment

For the purpose of this section of Chapter 12: Cultural Heritage, the existing environment of the Proposed Development has been considered in whole, due to the proximity and shared infrastructure of the 6 applications proposed.

12.5.1 Proposed Development

12.5.1.1 Archaeological Heritage

For the purposes of this report archaeological heritage includes

- UNESCO World Heritage Sites;
- Archaeological Landscapes or Areas of High Amenity (County Development Plan);
- National Monuments (Ownership, Guardianship and Preservation Orders);
- Recorded Archaeological Monuments listed in the RMP/SMR;
- Newly discovered archaeological sites, and,
- Sites recorded in the Excavations Database.

12.5.1.1.1 *UNESCO World Heritage Sites*

A World Heritage Site (WHS) is a property inscribed on the UNESCO World Heritage List because of its outstanding universal value. The closest World Heritage site to the proposed development is *Brú na Bóinne*, which is approximately 33km to the north (www.worldheritageireland.ie).

12.5.1.1.2 *National Monuments*

The term '*national monument'* as defined in Section 2 of the National Monuments Act (1930 means a monument '*the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto'*. National Monuments in state care include those which are in the ownership or guardianship of the Minister for Housing, Local Government and Heritage. Section 5 of the National Monuments Act (1930) allows owners of national monuments to appoint the Minister for Housing, Local Government and Heritage or the relevant local authority as guardian of such monuments, subject to their consent. National monuments in the ownership or guardianship of the State or of the Local Authority cannot be interfered with without the written consent of the Minister Housing, Local Government and Heritage. Monuments are also protected by Preservation Orders. Under the original National Monuments Act 1930 any monument in danger of injury or destruction can be allocated Preservation Orders, making any work on or in the vicinity the monument illegal. Such works can only take place with the written consent, and at the discretion, of the Minister. These powers were extended under the National Monuments (Amendments) Act 1954, such that Temporary Preservation Orders, with a time limit of six months, can be allocated to monuments deemed to be in danger of injury or destruction. National Monuments within 15km of the Proposed Development site were assessed.

The closest National Monument to the Proposed Development site is Maynooth Castle (KD005-015---), a National Monument in the Ownership of the Minister (NM number 485), located approximately 650m to the southwest of the Proposed Development.

Dunshaughlin Church (Carved door lintel), ME044-03002– is a National Monument in the Guardianship of the Minister (NM number 400) in Co. Meath, located approximately 13km to the north of the Proposed Development.

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Rathcoffey Castle (Castle gatehouse), KD010-018001– is a National Monument in the Ownership of the Minister in Co. Kildare (NM number 404), located approximately 8km southwest of the Proposed Development.

Taghadoe (Round Tower & Church) KD010-014002- & KD010-014004-, is a National Monument in the Ownership of the Minister in Co. Kildare (NMN 70 and 578), located approximately 3.8km southwest of the Proposed Development.

12.5.1.1.3 *Recorded Archaeological Monuments located within the Proposed Development Site Boundary*

There is one Recorded Monument located within the Proposed Development. (Site C) This is Moygaddy Castle (CH1).

ME053-001—

Class: Castle - tower house

Townland: MOYGADDY

Scheduled for inclusion in the next revision of the RMP: Yes.

Description: Situated on a slight rise with a small NE-SW stream in its valley c. 60m to the NW and the NW-SE Rye Water River is c. 500m to the SW. According to the Civil Survey (1654-6) Sir George Wentworth owned 487 acres at Moygaddy in 1640, and on the property were 'a large stone house, a Mill, a pigeon house and two farme houses' (Simington 1940, 153). He also owned 1400 acres elsewhere in Moyglare parish, amounting to almost all of it (ibid. 153-6). The castle was conserved by the fifth Duke of Leinster in 1892 as it was in danger of collapsing and so close to his principal residence at Carton, Co. Kildare (FitzGerald 1903-05, 2-30).

As it survives this is a three-storey tower house (ext. dims c. 5.5m NW-SE; 4.65m NE-SW) with a modernised parapet and a buttress supporting the E angle. There is a secondary entrance (Wth 1.1m) towards the S end of the SE wall that leads directly into a small chamber (int. dims 3.75m NW-SE; 3.3m NE-SW). The original entrance, now blocked, is in the NW wall and there is a newel stairs at the N angle. The main chamber has a cupboard and a single light in the SW wall, but two corbels (H 1.5m from the floor) in both the NE and SW walls provide support for the first floor under the NW-SE barrel-vault that has evidence of wicker-centring. A small chamber (int. dims 1.2m NW-SE; 0.67m NE-SW) in the NE wall off the stairs from the ground floor was probably a garderobe and has two lights. The first floor has a single light in the NW wall and a small chamber at the N end of the NE wall entered by a lintelled doorway from the main chamber. The stairs in the N angle continue to the second floor, which is over the vault and has a window with a light in each wall, that on the NW being blocked. From this chamber a newel stairs in the E angle rises to the modern parapet, but it is likely that there was at least one other upper floor originally.

The above description is derived from the published 'Archaeological Inventory of County Meath' (Dublin: Stationery Office, 1987). In certain instances, the entries have been revised and updated in the light of recent research.

Compiled by: Michael Moore. Date of revision: 13 July 2016

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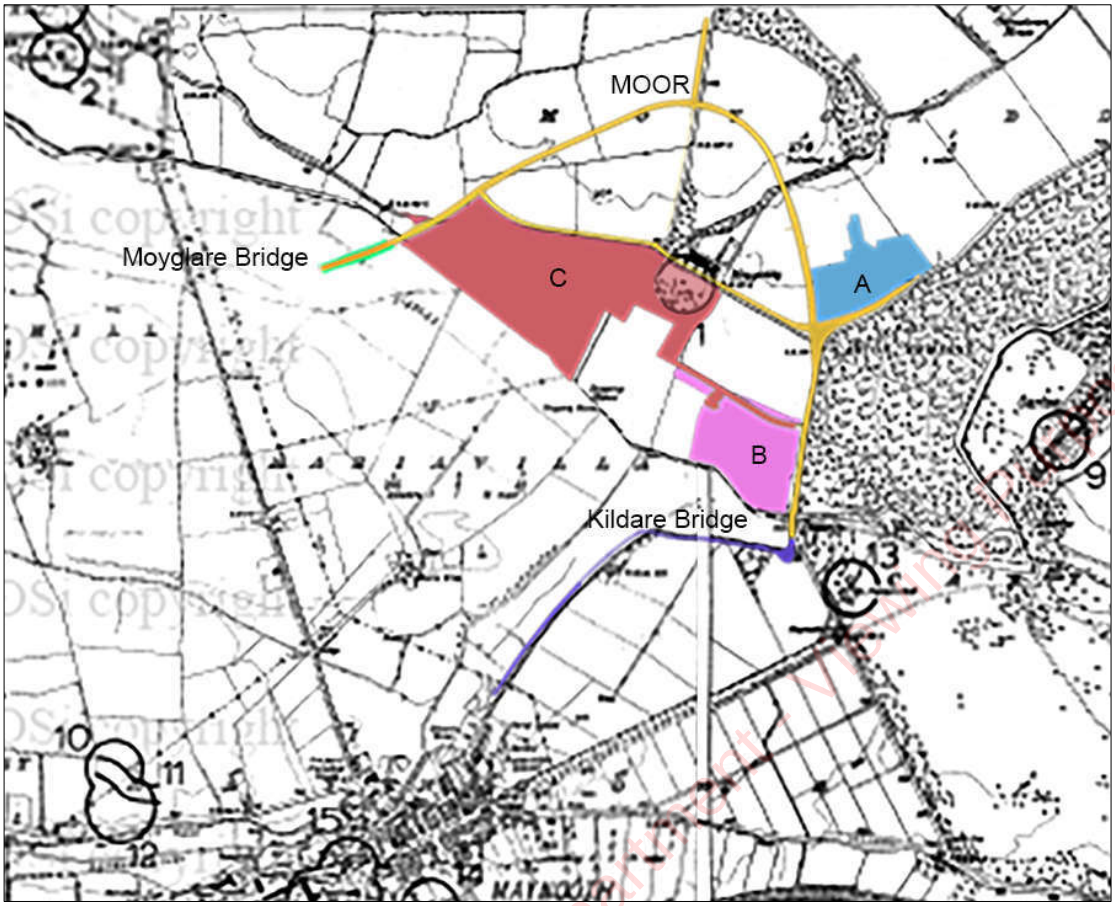

Figure 12-6 Proposed Development site on RMP map, sheet 53, Co. Meat, Sheet 5 Kildare(SMR detail on 1906 edition). Proposed Development Site A in Red, Site B in Blue, Site C in pink, Moyglare Bridge in green, MOOR in yellow, Kildare Bridge in purple..

12.5.1.1.4 New Potential Archaeology Recorded within Proposed Development Site Boundary

All areas proposed for development were examined by a walkover survey. No intrusive investigation was undertaken, and the survey was limited to visual inspection only. No in-water or underwater assessment was undertaken. No significant new potential archaeological features were noted within the study area boundary. A number of boundaries (county, townland and field) and a gate (granite pier) were noted (CH4 and CH5). The County and townland boundary is formed to the south of the proposed development site by the Rye Water River. The geophysical survey undertaken by Joanna Leigh Surveys has shown that there is a significant potential for archaeological features sub-surface on the Proposed Development site, at Sites A, B and C and MOOR (CH6). The potential effect is mitigated against (see section 12.6.2.2).

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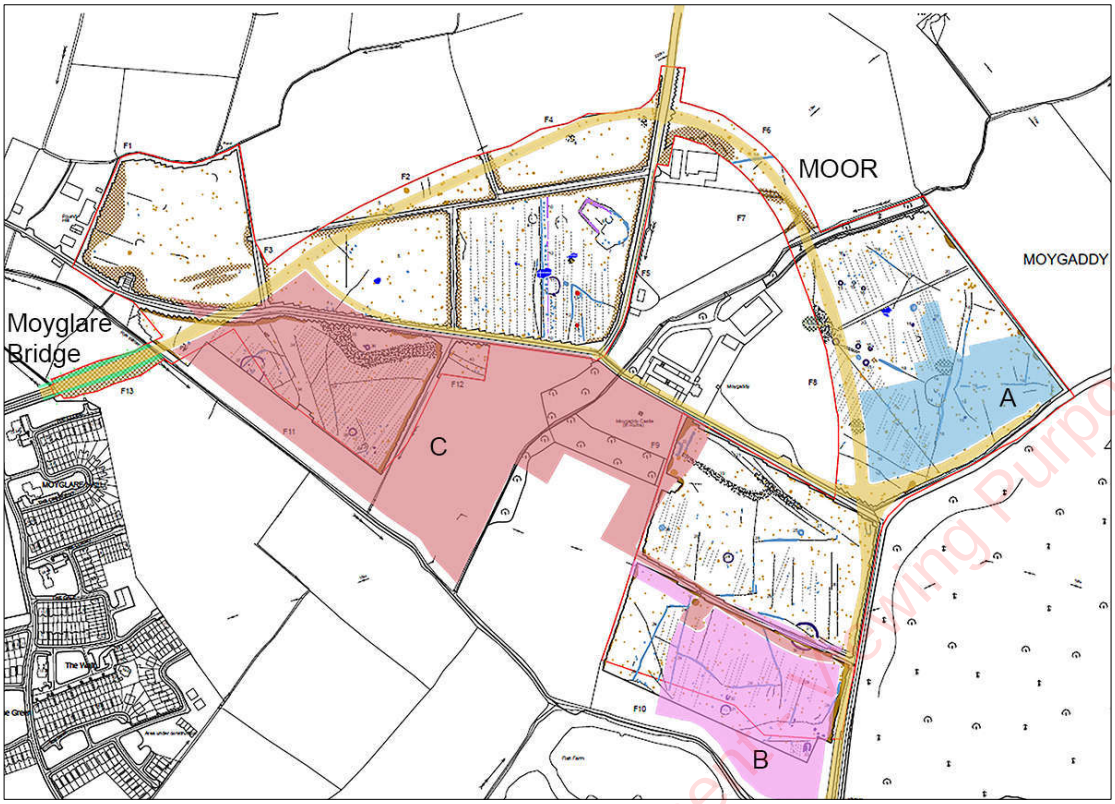

Figure 12-7 Extract from geophysical survey (after Joanna Leigh Surveys). Proposed Development Site A in blue, Site B in pink, Site c in red, MOOR in yellow, Moyglare Bridge in green.

12.5.1.1.5 *Recorded Archaeological Monuments within 2km of Proposed Development*

For the purpose of assessing effects on the setting of recorded monuments in the vicinity and wider vicinity of the Proposed Development, all RMP sites within 2km of the study area are included here (34 monuments) A 1km buffer zone is an appropriate study area in terms of identifying impacts on recorded monuments in the immediate landscape (see table 12-2), and a 2km buffer was considered for monuments in the wider landscape. The density of monuments in the area is high when the town of Maynooth is included. There are 15 recorded monuments within 1km of the Proposed Development site (excluding the rising main portion). Three of these are approximately 500m or less from the proposed development area. Of the three recorded monuments, one is a holy well (KD006-013—), of probable Early Medieval date. The others are a church and graveyard in Moyglare (ME049A002—- & ME049A002001)-, and Carton House (KD006-009—.), a house 17th century date, only a small portion of which survives and is incorporated into the later house. The 3 monuments are included here for the purpose of establishing the archaeological context of the surrounding environs of the Proposed Development site. The monuments are listed in Table 12-2 with the distance of each monument to the Proposed Development also provided. The monument locations are indicated on Figure 12-7. Monuments within 2km of the Proposed Development site are listed in Table 12-3.

Carton House

KD006-009—
Scope note
Class: House - 17th century
Townland: CARTON DEMESNE
Scheduled for inclusion in the next revision of the RMP: Yes

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Description: The lands at Carton were owned by the Earls of Kildare and in the late-17th century were leased to the Talbot family who erected the first building, a Dutch-style house with a pedimented breakfront which is recorded in a painting by Van der Hagen (SMR file). Carton was subsequently forfeited to the Crown and sold in 1703 to Maj. Gen. Richard Ingolsby, Lord Justice of Ireland who added a two storey, nine bay pedimented front with wings joined to the main block by curved sweeps, in the Palladian manner. In 1739 the estate was sold back to the 19th Earl of Kildare who made Carton his principal seat, employing Richard Castle to enlarge the house, which led to works obliterating all trace of the older house except for a cornice on the entrance front and unusually thick internal walls. The house was again remodelled and enlarged c. 1815 by Sir Richard Morrison for the Kildares who had by the become the Dukes of Leinster. The great demesne, covering c.1000 acres, was formally landscaped in the 18th Century, with further improvements in the 19th century (Bence Jones 1978, 60; Horner 1975 - reference in 1976 Foras Forbartha report in SMR file).

Compiled by: Gearóid Conroy
Date of upload: 10 June 2011

Carton Demesne Holy Well

KD006-013—
Scope note
Class: Ritual site - holy well
Townland: CARTON DEMESNE
Scheduled for inclusion in the next revision of the RMP: Yes

Description: In a slight hollow on a gentle west–facing pasture slope at the western edge of Carton Demesne, a spring well is enclosed by a small square. The structure is a small, tent-like feature (dims. L 1.75m N-S; Width 1.7m; H 1.5m) of well-built mortared-stone, with a pointed-arched opening (Width 0.7m) facing north. Three stone steps lead down to the water surface.

Compiled by: Gearóid Conroy
Date of upload: 10 June 2011

Church and Graveyard

ME049A002—
Class: Church

Townland: MOYGLARE

Scheduled for inclusion in the next revision of the RMP: Yes

Description: Located on a level landscape with the W-E Rye Water River, which forms the boundary with Co. Kildare, c. 200m to the S. A church at Mynclare (Moyglare) is listed in the ecclesiastical taxation (1302-06) of Pope Nicholas IV (Cal. doc. Ire., 5, 255). Ussher (1622) describes the church as in good repair but the chancel as ruined (Erlington 1847-64, 1, lxxvi). According to the Dopping (1682-5) and Royal (1693) visitations the parish church of Moyglare had been repaired, but the chancel was in ruins since 1641. The church was roofed with slates, the floor was clay and there was glass in the windows. In addition the graveyard was described as 'well fenced' (Ellison 1972, 4). This church continued in use until c. 1870 when St. Paul's church, a four bay Church of Ireland church with an attached spire, was built. This is now a private dwelling within a sub-rectangular graveyard (dims c. 65m E-W; c. 40-60m N-S) defined by masonry walls. There is no evidence of the medieval structure.

Class: Graveyard

Townland: MOYGLARE

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Scheduled for inclusion in the next revision of the RMP: Yes

Description: Located on a level landscape with the W-E Rye Water River, which forms the boundary with Co. Kildare, c. 200m to the S. The site of the parish church of Moyglare (ME049A-002—) is within a sub rectangular graveyard (dims c. 65m E-W; c. 40-60m N-S) defined by masonry walls. According to the Dopping (1682-5) and Royal (1693) visitations the graveyard was 'well fenced' at that time (Ellison 1972, 4).

The above description is derived from the published 'Archaeological Inventory of County Meath' (Dublin: Stationery Office, 1987). In certain instances, the entries have been revised and updated in the light of recent research.

Compiled by: Michael Moore

Date of revision: 10 April, 2015

Table 12-3 RMP's within 2km of the Proposed Development

RMP No.	ITM E	ITM N	Townland	Classification	Distance (m)
KD006-013—-	694785	738416	Carton Demesne	Ritual site - holy well	138
KD005-023—-	693847	737747	Maynooth	Field boundary	425
KD006-009—-	695331	738796	Carton Demesne	House - 17th century	515
KD005-014—-	693737	737556	Maynooth	Architectural feature	637
KD005-015—-	693512	737661	Maynooth	Castle - Anglo-Norman masonry castle	652
KD005-015005-	693515	737658	Maynooth	Well	652
KD005-015006-	693515	737658	Maynooth	Well	652
KD005-015001-	693514	737658	Maynooth	House - prehistoric	652
KD005-015002-	693515	737657	Maynooth	House - early medieval	653
KD005-015003-	693515	737657	Maynooth	House - early medieval	653
KD005-015004-	693515	737657	Maynooth	Building	653
KD005-016—	693531	737589	Maynooth	Church	698

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RMP No.	ITM E	ITM N	Townland	Classification	Distance (m)
KD005-013---	693441	737573	Collegeland	Building	765
ME049A002---	692690	739742	Moyglare	Church	981
ME049A002001-	692690	739763	Moyglare	Graveyard	993
KD005-010---	692911	737906	Maynooth	Ring-ditch	1011
KD005-011001-	KD005-011001-	KD005-011001-	Maynooth	Enclosure	1015
KD005-011002-	692921	737856	Maynooth	Road - road/trackway	1017
KD005-012---	692936	737791	Maynooth	Field system	1028
ME049A001---	692703	739889	Moyglare	House - 16th/17th century	1059
ME050-022---	695530	740325	Owenstown	Field system	1185
KD006-011---	696455	739172	Carton Demesne	Ritual site - holy well	1444
KD005-021---	692383	737855	Laraghbryan	Ecclesiastical enclosure	1534
KD006-007001-	696569	739369	Oldcarton	Church	1567
KD006-007003-	696569	739369	Oldcarton	Religious house - unclassified	1567
KD006-007002-	696571	739359	Oldcarton	Graveyard	1568
KD005-009003-	692240	737748	Laraghbryan East	Graveyard	1699
KD005-009002-	692229	737743	Laraghbryan East	Church	1711
KD005-008---	692204	737812	Laraghbryan East	Castle - unclassified	1718
KD005-009001-	692219	737732	Laraghbryan East	Ecclesiastical site	1723

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RMP No.	ITM E	ITM N	Townland	Classification	Distance (m)
ME050-023---	696029	740789	Kilgraigue	Enclosure	1847
KD006-015---	696380	737766	Carton demesne	Ritual site - holy well	1859
ME050-018---	694820	741635	Harristown (Moyfenrath Upper By.)	Field system	1860
KD010-040---	694439	736275	Moneycooley	Burial ground	1957

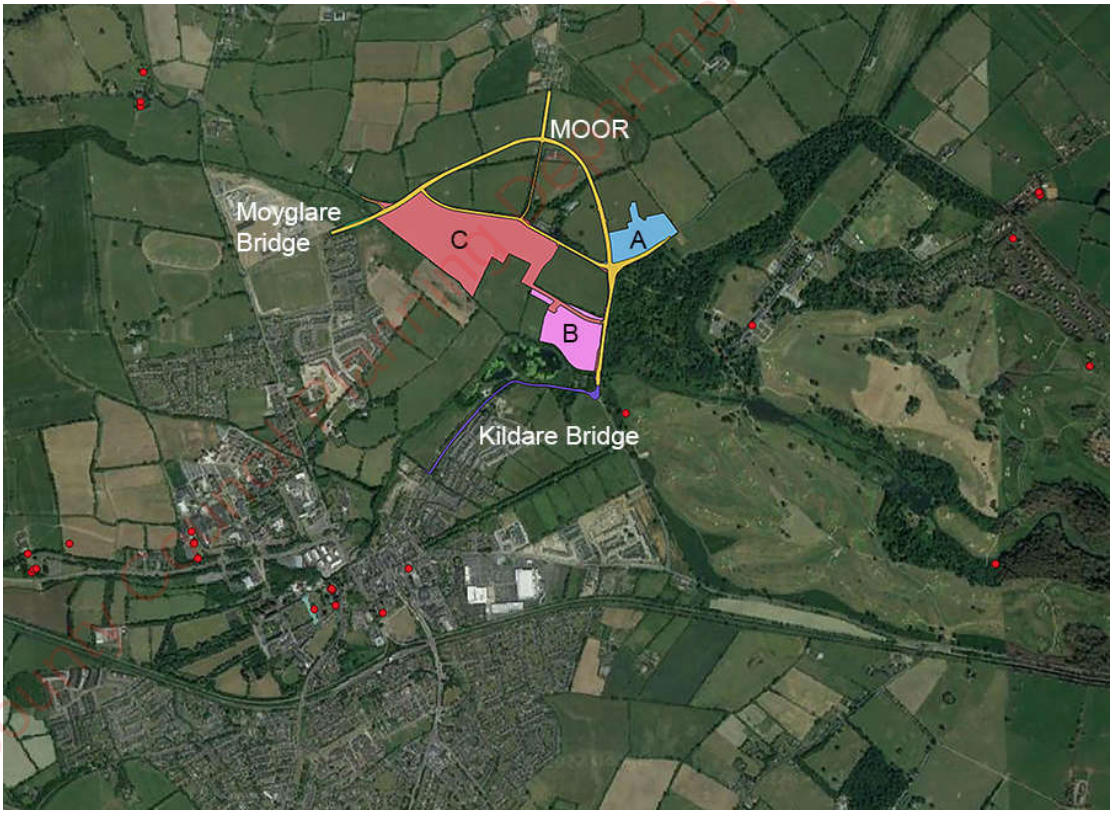

Figure 12-8 Recorded Monuments (red dots) within 2km of Proposed Development. Site A in Red, Site B in Blue, Site C in pink, Moyglare Bridge in green, MOOR in yellow, Kildare Bridge in purple.

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12.5.1.1.6 Archaeological and Historical Background

The Prehistoric Period

There are no known monuments from the prehistoric period on or immediately adjacent to the Proposed Development (within 1km).

Early Medieval Period

Holy Wells

Religious cults associated with water have a long history in Ireland, dating back to the prehistoric period. Though holy wells may at first appear to be Christian monuments, much of the ritual, folklore may pre-date-the Christian element of the site. A holy well may be defined as a well or spring, though in some unusual cases a natural rock basin, which usually bears a saint's name and is often reputed to possess miraculous healing properties. These may have their origins in prehistory but are associated with devotions from the medieval period (5th-16th centuries AD) onwards.

A holy well is recorded at Carton Demesne (KD006-013—) to the southeast of the Proposed Development *'In a slight hollow on a gentle west–facing pasture slope at the western edge of Demesne, a spring well is enclosed by a small square. The structure is a small, tent-like feature (dims. L 1.75m N-S; Width 1.7m; H 1.5m) of well-built mortared-stone, with a pointed-arched opening (Width 0.7m) facing north. Three stone steps lead down to the water surface'* (www.archaeology.ie). Later Medieval Period.

Castles

Castles are typically a fortified residence in the form of a tower, usually four or five storeys high, and for the most part slightly more rectangular than square in plan. Castles from the later medieval period were typically constructed by a lord or landholder and were often partially or completely enclosed by a bawn. The majority of castles date to the 15th and 16th centuries AD. Moygaddy Castle (ME053-001—) is located approximately 250m to the west of the Proposed Development, surviving as a three-storey tower house.

Church and Graveyard

A church may be defined as a building used for public Christian worship. These can be of any date from c. 500 AD onwards. A graveyard may be defined as the burial area around a church. These date from the medieval period (5th-16th centuries) onwards. The church at Moyglare is first mentioned in the ecclesiastical taxation records of 1302-6 (www.archaeology.ie).

Post-Medieval and Early Modern period

House - 17th century

Houses may be defined as a building for human habitation which dates to the 17th century AD, and which is not a tower house or a fortified house. One site from the post-medieval period, Carton House, is located approximately 600m to the east of the Proposed Development. The remaining structure is a portion of a seventeenth-century house, which has been incorporated into the present Carton House. The lands at Carton were owned by the Earls of Kildare and in the late-17th century were leased to the Talbot family who erected the first building, a Dutch-style house with a pedimented breakfront which is recorded in a painting by Van der Hagen (SMR file). Carton was subsequently forfeited to the Crown

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and sold in 1703 to Maj. Gen. Richard Ingolsby, Lord Justice of Ireland who added a two storey, nine bay pedimented front with wings joined to the main block by curved sweeps, in the Palladian manner. In 1739 the estate was sold back to the 19th Earl of Kildare who made Carton his principal seat, employing Richard Castle to enlarge the house, which led to works obliterating all trace of the older house except for a cornice on the entrance front and unusually thick internal walls. The house was again remodelled and enlarged c. 1815 by Sir Richard Morrison for the Kildares who had by the become the Dukes of Leinster. The great demesne, covering c.1000 acres, was formally landscaped in the 18th Century, with further improvements in the 19th century (www.archaeology.ie). Moygaddy House is a structure dating to the latter half of the nineteenth century. It appears to have been built as part of a stud farm and stables. This is defined on www.archaeology.ie as a 'building for human habitation which dates to the 19th century and which is not classifiable as either a country house or a vernacular house'.

12.5.1.2 Architectural and Cultural Heritage

For the purpose of this report, architectural heritage includes known (documented) and newly recorded features, if present.

- Record of Protected Structures;
- NIAH structures;
- NIAH Garden Surveys;
- Any other structures / features noted during field assessment;
- Cultural heritage items likely to be affected by the Proposed Development.

12.5.1.2.1 *Protected Structures*

The Record of Protected Structures as listed in the Meath County Development Plan 2021-2027 and the Kildare County Development Plan 2017-2023 was consulted for protected structures which may be present within the site of the Proposed Development. There are two Protected Structure located within the Proposed Development area. Moygaddy House (MH053-102, referred to as CH2), which is located immediately adjacent to Site C. Site C abuts the curtilage of Moygaddy House so is included here. Moygaddy House is a three-bay two-storey over basement house, built c. 1850, hipped roof with and pilastered porch, ranges of outbuildings forming narrow rectangular courtyard (CH2). Included are its gates, piers and boundary walls (MH053-10).

One structure, Carton Demesne Wall (MH053-100) is located immediately adjacent to the Proposed Development (referred to as CH3 less than 10m from Site B and MOOR). Carton Demesne Wall (CH3, RPS MH053-100) is a length of rubble stone demesne wall, built c. 1760 including piers and gates.

The Record of Protected Structures as listed in the Kildare County Development Plan 2017-2023 was consulted, Maria Villa (B05-09), is approximately 800m to the southwest, and a house B05-77 is situated approximately 375m to the southwest of the Proposed Development. Carton House (B06-09) and interiors (B06-09i) are located approximately 600m to the east of the Proposed Development.

Overall, there are 47 no. protected structures located within 1km of the Proposed Development. There are 55 Protected Structures located within 2km of the Proposed Development; (see Table 12-4 below). Most of these are located within the town of Maynooth.

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Table 12-4 Protected structures within 2km of the Proposed Development

RPS	NIAH Ref.	Townland	Description	Distance (m)
B05-77	N/a	Maynooth	Pebble Mill House.	33
B05-30	11803095	Moyglare	House. 44 Mariaville, Dunboyne road.	162
B05-10	11803067	Maynooth	House. Butler's House, Convent Lane, Dillon's Row	243
B05-09	11900506	Mariavilla	House	305.
B05-44	11803022	Maynooth	House. Main Street, Convent Lane.	334
B05-51	11803078	Maynooth	House. 28 Leinster Cottages, Double Lane/Back Lane.	339
B05-43	11803020	Maynooth	House (Rye House, Main Street).	343
B05-55	11803096	Maynooth	Gate lodge (Carton (House), Main Street, Dublin Road.	346
B05-27	11803090	Maynooth	House (Finnerty House, Dublin Road).	377
B05-29	11803092	Maynooth	House (Dublin Road).	384
B05-28	11803091	Maynooth	House (D.R. Glas, Ryebank House, Dublin Road).	389
B05-52	11803079	Maynooth	Church/Parish Hall (Pound Lane).	420
B05-76	11803138	Maynooth	House (Pound Lane).	430
B05-63	11803108	Maynooth	Maynooth Parochial House, Mill Street.	437
B05-58	11803101	Maynooth	Saint Mary's Catholic Church, Mill Street.	438
B05-45	11803035	Maynooth	Public House (Brady's, Main Street, Courthouse Square).	440
B05-46	11803041	Maynooth	House (Court House Square, Main Street,	482
B05-14	11803039	Maynooth	Lyreen House, Court House Square	495
B05-47	11803042	Maynooth	Public House (The Leinster Arms, Main Street).	507

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RPS	NIAH Ref.	Townland	Description	Distance (m)
B06-09	N/a	Carton Demesne	Carton House and associated outhouses, stables and yards	510
B06-09i	N/a	Carton Demesne	Interiors of Carton Demesne (House and Gardens)	510
B05-53	11803087	Maynooth	Bridge (William Bridge, Maynooth).	518
B05-13	11803043	Maynooth	House with shop, Nuzstop, Main Street	524
B05-48	11803044	Maynooth	Shop (Dawson's, Main Street).	535
B05-50	11803055	Maynooth	House (Mill Street).	548
B05-49	11803049	Maynooth	Maynooth Garda Siochana Station,	583
B06-12	11803102	Maynooth	House (Castle View House, Parson Street).	584
B05-11	11803050	Maynooth	Buckley House, Main Street .	596
B05-54	11803093	Maynooth	School-former() (Geraldine Hall, Leinster Street).	644
B06-12	11803102	Maynooth	Castle View House, Parson Street	677
B05-57	11803100	Maynooth	Church (Saint Mary's Church, Parson Street).	696
B05-60	11803103	Railpark	Bridge (Mullen Bridge).	734
B05-62	11803107	Greenfield	Signal Box (Maynooth Railway Station, Straffan Road (off)).	833
B05-70	11803125	Collegeland	Building misc. (St. Patrick's College (Riverstown Lodge), Parson Street).	837
B05-33	11803106	Greenfield	Maynooth Railway Station (former), Straffan Road (off)	849
B05-56	11803099	Maynooth	House (Maynooth Rectory (former), Parson Street).	861
B05-34	11803109	Railpark	House (202 Railpark).	862
B05-75	11803134	Collegeland	Building misc. (St. Patrick's College (Senior Infirmary), Parson St.).	904
B05-69	11803123	Collegeland	Building misc. (St. Patrick's College (Rhetoric House), Parson Street).	904

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RPS	NIAH Ref.	Townland	Description	Distance (m)
B05-72	11803127	Collegeland	Church (St. Patrick's College (Collegiate Chapel), Parson Street).	904
B05-68	11803118	Collegeland	Building misc. (St. Patrick's College, Parson Street).	905
B05-65	11803113	Collegeland	University (St. Patrick's College (Entrance Block), Parson Street).	907
B05-32	11803104	Maynooth	House (141 Greenfield Cottages).	923
B05-66	11803114	Collegeland	Engine House (St. Patrick's College (Loftus Hall), Parson Street).	943
B05-71	11803126	Collegeland	Building misc. (St. Patrick's College (Junior House/Logic Ho, Parson St.).	961
B05-73	11803128	Collegeland	Building misc. (St. Patrick's College (The Quadrangle), Parson St.).	967
91518	14404901	Moyglare	House - Former Church (C of I). Co. Meath.	977
B05-67	11803117	Collegeland	Exam Hall (St. Patrick's College (Loftus Hall), Parson Street).	1026
B05-64	11803112	Collegeland	Hospital-former (St. Patrick's College (Junior Hospital), Parson Street).	1068
B05-74	11803133	Greenfield	Bridge (Bond Bridge, Maynooth).	1126
B06-06	N/a	Railpark	Lime kiln	1323
B05-01	N/a	Laraghbryan East	Laraghbryan Church (in ruins), RMP KD005-009002, KD005-009003"	1710
91517	N/a	Moyglare	Moyglare House (Co. Meath)	1971
B06-13	11900601	Railpark	Field system	1989

12.5.1.2.2 National Inventory of Architectural Heritage - Building Survey

No structures listed in the National Inventory of Architectural Heritage (NIAH) are located within the Proposed Development. There are 91 no. NIAH sites located within 1km of the Proposed Development, 98 no. NIAH sites located within 2km of the Proposed Development. Almost all of these are situated in Maynooth Town listed in Table 12-5 in Figure 12-8 below.

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Table 12-5 NIAH Sites located within 2km of the Proposed Development

NIAH Ref.	Townland	Classification	Distance (m)
11803095	Maynooth	House	163
11803067	Maynooth	Butler's House	243
11900506	Mariavilla	House, Maria Villa	296
11803022	Maynooth	House, Main St, Convent Lane	335
11803021	Maynooth	House, Main St.	338
11803078	Maynooth	House. 28 Leinster Cottages, Double Lane/Back Lane	340
11803020	Maynooth	Rye House, Main Street	344
11803096	Maynooth	Carton House Gate Lodge, Main Street	348
11803019	Maynooth	Main Street	352
11803018	Maynooth	House, c.1770, Main Street	357
11803023	Maynooth	House, c. 1770, Main Street, Doctor's Lane.	362
11803017	Maynooth	House, c. 1790, Main Street	364
11803024	Maynooth	House c. 1770, Main Street (Maynooth Jewellers).	367
11803016	Maynooth	House c. 1800, Main Street.	368
11803015	Maynooth	House c. 1800, Main Street (Maynooth Dry Cleaners).	373
11803090	Maynooth	House c. 1825, Dublin Road	378
11803014	Maynooth	House c. 1800, Main Street, Double Lane	382
11803026	Maynooth	House c. 1770 (Maynooth Credit Union) Main Street.	382
11803092	Maynooth	House, Dublin Road	385
11803027	Maynooth	House c. 1770 (Maynooth Library), Main Street	386
11803013	Maynooth	House c. 1775. Main Street/Double Lane (Ua Buacalla)	389
11803091	Maynooth	House c. 1825, Dublin Road	390
11803028	Maynooth	House c. 1770, Main St (Matt Bruton/Declan Bolger).	393
11803012	Maynooth	House c. 1900, Main St (McCormack's Pharmacy.	394
11803029	Maynooth	House c. 1750, Main St.	398

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NIAH Ref.	Townland	Classification	Distance (m)
11803011	Maynooth	House c. 1775, Main St. (Coonan).	403
11803030	Maynooth	House c. 1750, Main St.	405
11803030	Maynooth	House, c. 1750, Main Street.	405
11803056	Maynooth	House, c. 1800, Main Street.	409
11803079	Maynooth	Former church, Pound Lane	422
11803033	Maynooth	House c. 1880 (Elite Confectionery) Main Street.	426
11803138	Maynooth	Former school, Pound Lane.	430
11803034	Maynooth	House c. 1880 (Caulfields), Main Street.	438
11803101	Maynooth	Saint Mary's Catholic Church, Mill Street.	440
11803108	Maynooth	Maynooth Parochial House, c. 1840, Mill St.	442
11803035	Maynooth	House 1896 (Brady's), Main St, Court House Square.	442
11803040	Maynooth	House c. 1830 (Brady's), Doctors Lane.	461
11803036	Maynooth	House c. 1780, Court House Square.	462
11803046	Maynooth	Limestone sculpture, erected 1993, Court House Square	462
11803007	Collegeland	House c. 1800 (Hula-Bou), Main st/Fagan's Lane.	465
11803037	Maynooth	House c. 1780, Court House Square	468
11803006	Maynooth	House c. 1800 (Little China), Court House Square	471
11803038	Maynooth	House c. 1780 (Pottery Barn), Court House Square/Doctor's Lane	474
11803005	Maynooth	House c. 1800 (Romayo's Takeaway), Main St/Kelly's Lane	475
11803041	Maynooth	House c. 1870, Court House Square/Main St.	486
11803004	Maynooth	House c. 1800, (Maguire and Company Solicitors) Court House Square.	495
11803039	Maynooth	Lyreen House c. 1781, Court House Square	496
11803097	Maynooth	Boundary Wall 1821 (The Pound), Pound Lane/Mill St.	503
11803042	Maynooth	Hotel c. 1777 (The Leinster Arms), Main St.	511

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NIAH Ref.	Townland	Classification	Distance (m)
11803087	Maynooth	William Bridge c. 1795, Main St.	521
11803043	Maynooth	House c. 1830 (Nuzstop), Main St	524
11803098	Maynooth	House c. 1820 , Leinster St.	528
11803044	Maynooth	House c. 1875 (Dawson's), Main St.	537
11803137	Maynooth	House c. 1875, Main St.	546
11803055	Maynooth	House c. 1760 , Mill St.	552
11803054	Maynooth	House c. 1760 , Mill St.	556
11803045	Maynooth	House c. 1760 (Harbour House (Bean House), Leinster St.	586
11803049	Maynooth	Houses c. 1800 (Maynooth Garda Station)	586
11803048	Maynooth	House c. 1800, Leinster St.	592
11803047	Maynooth	House c. 1800, Leinster St.	597
11803050	Maynooth	House c. 1770 (Buckley House), Main St.	599
11803141	Maynooth	Footbridge c. 1840 (Castle View House), Parson St.	631
11803093	Maynooth	Church of Ireland School c. 1860 (Geraldine Hall), Leinster St..	643
11803094	Maynooth	Former presbytery 1903, Leinster St.	660
11803142	Maynooth	Footbridge c. 1840 (Castle View House), Parson St.	668
11803102	Maynooth	House c.1725, (Castle View House), Parson St.	681
11803100	Maynooth	Saint Mary's CoI Church, 1859, Parson St.	698
11803103	Maynooth	Mullen Bridge c. 1795	750
11803113	Collegeland	House, c.1796-9, Saint Patrick's College (Entrance Block), Parson St.	801
11803107	Greenfield	Signal Box (Maynooth Railway Station), Straffan Road (off)	833
11803125	Collegeland	House c.1817 (Saint Patrick's College (Riverstown Lodge), Parson St.	842
11803120	Collegeland	Exam hall 1892-3 (Saint Patrick's College (Aula Maxima), Parson St.	844

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NIAH Ref.	Townland	Classification	Distance (m)
11803106	Greenfield	Station Master's House 1884 (Maynooth Railway Station), Straffan Road (off)	851
11803110	Collegeland	Library 1984 (Saint Patrick's College (Pope John Paul II Memorial)	857
11803109	Railpark	House 1860	864
11803099	Maynooth	Maynooth Rectory (former) c1726. Parson St.	867
11803136	Maynooth	Section of Royal Canal, built 1790-1796	872
11803124	Collegeland	Building c. 1850 (Saint Patrick's College), Parson St.	880
11803134	Collegeland	Infirmary, 1862-3 (Saint Patrick's College), Parson St.	905
11803118	Collegeland	Building 1902 (Saint Patrick's College), Parson St.	908
11803127	Collegeland	Saint Patrick's College (Collegiate Chapel), 1875-1891, Parson St.	908
11803105	Greenfield	House c. 1905, Greenfield Cottages	909
11803123	Collegeland	House c. 1831-33 (Saint Patrick's College (Rhetoric House), Parson St.	909
11803104	Greenfield	House c. 1905, Greenfield Cottages	926
11803114	Collegeland	Engine House c. 1870 Saint Patrick's College (Saint Patrick's House), Parson St.	934
11803128	Collegeland	Saint Patrick's College, c. 1845-51 (The 'Quadrangle'), Parson St.	959
11803115	Collegeland	Saint Patrick's College c. 1860 (Saint Patrick's House), Parson St.	961
11803119	Collegeland	Outbuilding c. 1860. (Saint Patrick's College), Parson St.	965
11803126	Collegeland	Saint Patrick's College c. 1831-3 (Junior House/Logic House)	966
14404901	Moyglare	Saint Paul's Church of Ireland Church, Parson St.	986
11803129	Collegeland	Ball alleys c. 1930. (Saint Patrick's College), Parson St.	993
11803116	Collegeland	Saint Patrick's College 1932 (Museum), Parson St.	998
11803117	Collegeland	Saint Patrick's College c. 1880 (Loftus Hall), Parson St.	1030

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NIAH Ref.	Townland	Classification	Distance (m)
11803112	Collegeland	Saint Patrick's College1835-6, (Junior Hospital), Parson St.	1072
11803122	Collegeland	Ball alleys 1837, St. Patrick's College, Parson St.	1075
11803133	Collegeland	Bond Bridge 1795	1114
11803132	Collegeland	Railway bridge c. 1850	1142
11803121	Collegeland	1810-present. Saint Patrick's College (Priest's Burial Ground), parson St.	1161
11900601	Carton Demesne	Pike Bridge, 1793.	1786

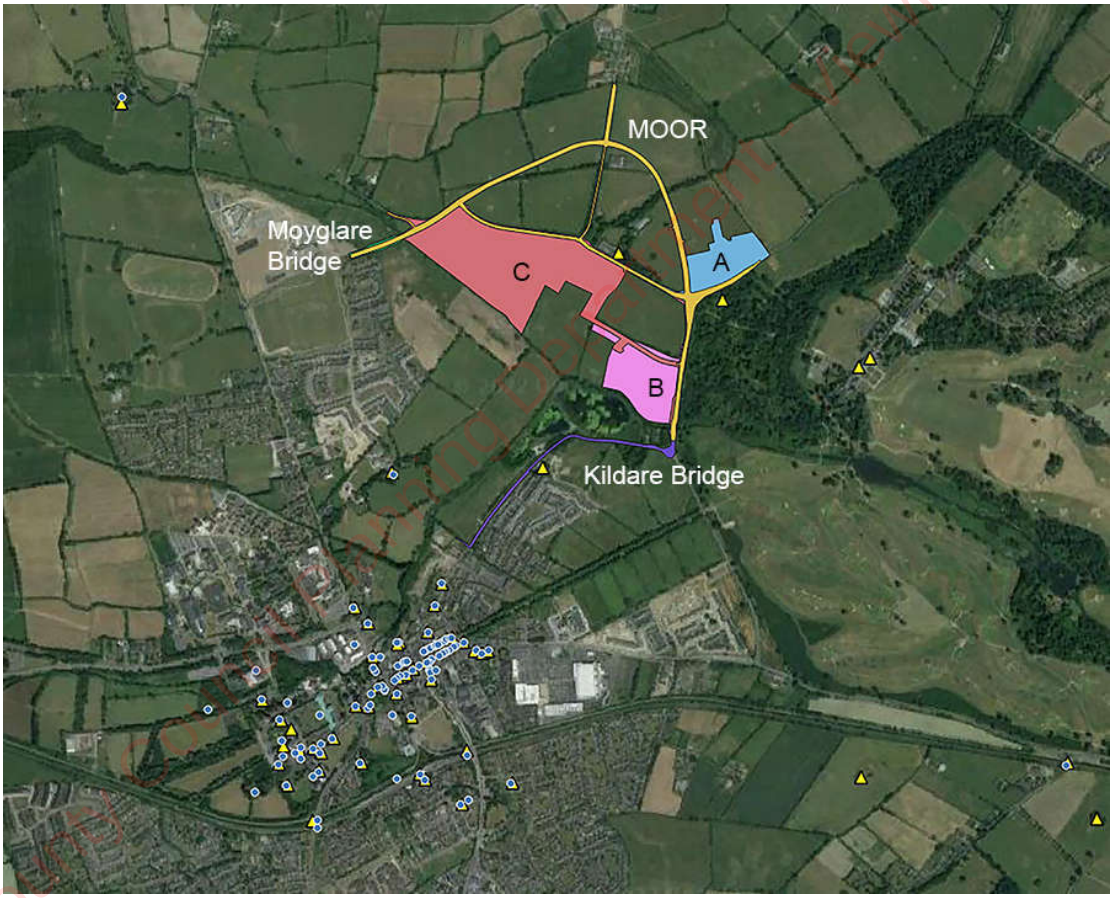

Figure 12-9 NIAH Structures (blue dots) and RPS (yellow triangles) within 2km of Proposed Development-note the cluster in Maynooth town. Site A in Red, Site B in Blue, Site C in pink, Moyglare Bridge in green, MOOR in yellow, Kildare Bridge in purple.

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12.5.1.2.3 National Inventory of Architectural Heritage - Garden Survey

There are no recorded historic gardens/ designed landscapes within 1km of the proposed development.

12.5.1.2.4 Vernacular Structures

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There are no vernacular structures within the proposed development.

12.5.1.2.5 *Townland Boundaries*

Townland boundaries were recorded for the first edition Ordnance Survey mapping of the 19th century. The townlands were then utilised as formal administrative units for the census and as the basic framework for Griffith's Valuation. The boundaries take a variety of forms and may consist of earth and stone banks and associated ditches, or stone walls, or natural features. The townland boundary between Moygaddy (Co. Meath) and Mariaville (Co. Kildare) is formed by the Rye Water River. This is also the county boundary between Meath and Kildare. Impacts are predicted as neutral as impacts have previously occurred to the boundary. (Mitigation measures are proposed for in water and underwater assessment for Kildare Bridge and Moyglare Bridge developments.) These have been included as boundaries CH4.

12.5.1.2.6 *Other Cultural Heritage Items*

Some of the field boundaries depicted on the 1st edition Ordnance Survey map still survive. A granite gate pier also survives in Site C. (CH 5). The field boundaries are predominantly a mixture of mounded earthen banks with modern post and rail fencing. These are now substantial hedgerows. These have been included as field boundaries CH4 and CH5 gate pier.

12.5.1.2.7 *Place Name Evidence*

Place names may be derived from geological, archaeological or topographical features within the landscape or may also have taken the name of an important or famous person who once lived in the area. Place name evidence can refer to archaeological monuments within the vicinity which may no longer be visible in the landscape, or which are now only documented through local history or tradition. The database of Irish place names www.logainm.ie and the Ordnance Survey Name Books 1824-46 were consulted for the meaning of the place names located within the study area boundary and in the general environs of the site. The following was reported in the database:

- Moygaddy – *Moygaddy derives from* Irish *Maigh Gadaí* meaning 'magh' or 'plain' and '*gadaí*', meaning 'thief;
- Mariaville – The townland is named after the house 'Mariaville';
- Carton Demesne. The townland is named after the Carton House.

12.6 Potential Effects and Associated Mitigation Measures

12.6.1 Do Nothing Scenario

If the Proposed Development were not to proceed, the potential effects on heritage assets from the Proposed Development would not occur. The existing land-uses of small-scale agriculture for pasture and livestock grazing at the Proposed Development would continue and the natural effects of erosion and decay over time would take place.

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12.6.2 Site A (Strategic Employment Zone)

12.6.2.1 Construction Phase (Direct Effects)

Direct effects refer to a physical effect on a monument or site. The construction phase of Site A consists largely of mechanical excavations such as topsoil stripping and the digging of all associated groundworks and site works. The potential effects on the known and potential archaeological and cultural heritage of the area are outlined below with the suggested mitigation measures.

12.6.2.1.1 *Effects on Recorded Archaeology and Cultural Heritage*

As no UNESCO World Heritage Sites, National Monuments or Recorded Monuments are located within the footprint of Site A, no direct effects on these aspects of the archaeological resource are identified. Similarly, as no Protected Structures, NIAH structures or historic gardens are located within the footprint of Site A, no direct effects on these aspects of the archaeological and cultural heritage resource are identified.

12.6.2.1.2 *Effects on Unrecorded Potential Sub-Surface Sites*

While no new upstanding archaeological sites were detected during the walkover survey, the geophysical survey (CH6) has established that there are potential sub-surface archaeological features present within Site A. Topsoil stripping and development excavations may affect these features.

Pre-Mitigation Impact

Should new archaeological sites or features be present beneath the topsoil (currently not visible on the surface) the impact is likely to be significant negative and permanent (i.e., development excavations would permanently remove the sites resulting in a significant negative impact).

Proposed Mitigation Measures

Pre-development targeted archaeological test trenching under licence from the National Monuments Service should take place to ascertain if the sub-surface features identified in the geophysical survey are archaeological in nature. Test trenching should also take place in areas of the site not covered by the geophysical survey, if development is proposed in these areas. A report on the results of targeted test trenching and a detailed archaeological impact assessment shall be compiled and submitted to the relevant authorities. If any archaeological sites or features are identified during the pre-construction test trenching, they will be preserved by record (archaeologically excavated) or preserved in-situ (avoidance) and therefore a full record made of same.

Residual Impact

The potential impact following implementation of the mitigation measures is considered to be permanent, slight, and negative.

12.6.2.1.3 *Effects on Cultural Heritage Items*

The development of Site A will require the removal of cultural heritage sites located within the Site A development footprint. Cultural heritage items identified during fieldwork are the existing field boundaries (CH4), which appear to date from the late eighteenth and early nineteenth centuries.

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Pre-Mitigation Impact

The removal of the late eighteenth/nineteenth century field boundaries will result in a slight permanent negative impact on these cultural heritage items.

Proposed Mitigation Measures

- The development footprint of the project has been mitigated by design to avoid removal of townland and field boundaries wherever possible. Where it is not possible to maintain by design, an archaeological record (written and photographic) will be made of them prior to their removal.

Residual Impact

When the suggested mitigation measures are implemented during construction the effects on cultural heritage items will be permanent, imperceptible, and negative.

12.6.2.2 Construction Phase (Indirect Effects)

No indirect effects will occur at the construction phase of the development of Site A. All indirect effects are likely to occur at the operational phase of the Proposed Development (see Section 12.6.5).

12.6.2.3 Operational Phase (Direct Effects)

No direct effects will occur during the operational phase of the development of Site A. Any likely direct effects will occur at the construction phase of the development of site A (see Section 12.6.2).

12.6.2.4 Operational Phase (Indirect Effects)

Indirect effects are where a feature or site of archaeological, architectural heritage merit or their setting is located in close proximity to Site A. Indirect impacts here are mainly concerned with impacts on setting.

Impacts on setting of sites may arise when a development is proposed immediately adjacent to a recorded monument or cluster of monuments. While Site A may not physically impact on a site, it may alter the setting of a monument or group of monuments. There is no standardised industry-wide approach for assessing the degree of impact to the setting of a monument. For purposes of assessing visual impact on setting, the uniqueness of the monuments, the potential interrelationships of monuments, the inter-visibility of monuments, visual dominance and whether a setting is altered or unaltered can be used to assess impact.

Potential impact to the visual amenity of a site or area and the significance of same is dependent on a number of factors regarding the sensitivity of the location or 'receptor' and the scale or magnitude of the Proposed Development. Similarly, the extent of the development and its duration and reversibility should all be considered (*Guidelines for Landscape and Visual Impact Assessment 3rd edition* – Consultation Draft, Landscape Institute, 2013).

12.6.2.4.1 *Impact on setting of UNESCO World Heritage Sites (Tentative List)*

No monuments on the World Heritage Sites list and tentative list are located within 25km of the Site A. There will therefore be no impact on UNESCO sites as a result of the development of Site A.

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12.6.2.4.2 *Impact on setting of National Monuments*

Impact on setting of National Monuments within 15km of the Proposed Development were considered for purposes of assessing potential impacts on visual setting. The assessments were based on the field survey and cartographic analysis. The National Monuments referred to in Section 12.5.1.1.2 are addressed here in terms of potential impacts on setting.

The closest National Monument to Site A is Maynooth Castle (KD005-015—), a National Monument in the Ownership of the Minister (NM 485). It is located approximately 1.5 km to the southwest of the Proposed Development. The other monuments vary in distance from the Proposed Development site from 4.6km to 13km.

Taghadoe (Round Tower & Church) KD010-014002- & KD010-014004-, is a National Monument in the Ownership of the Minister in Co. Kildare (NM 70 and 578), located approximately 4.6km southwest of the Proposed Development.

Rathcoffey Castle (Castle gatehouse), KD010-018001- is a National Monument in the Ownership of the Minister in Co. Kildare (NM 404), located approximately 8.5km to the southwest of the Proposed Development.

Dunshaughlin ME044-003002- is a National Monument in the Guardianship of the Minister (NM 400) in Co. Meath. It is 13km to the N of the Proposed Development site.

There is no inter-visibility between the monuments and the Site A. The impact on the setting of the monuments is therefore deemed to be imperceptible. There will be no impact on National Monuments as a result of the Proposed Development.

12.6.2.4.3 *Impact on setting of Recorded Monuments*

There are three recorded monuments within 1km of Site A. The table below presents the recorded archaeological monuments within 1km of Site A according to their sensitivity (visual dominance, above ground trace, uniqueness, proximity to site etc.) and the likely potential pre-mitigation impact on their setting. For example, low visibility monuments such as holy wells, could be considered to have less potential to be impacted by the proposed development of Site A and therefore their sensitivity could be regarded as low. High visibility monuments such as castles and houses visually dominant monuments on high ground within close proximity to the site of the proposed development of site A may be more at risk in terms of impact on their setting. Monuments that do not have any surface trace are not capable of having their setting impacted and these impacts are categorised as 'not significant'.

Development of Site A will not impact on the immediate setting of the monuments as no recorded monuments are located immediately adjacent to the Site A. Moygaddy Castle is over 200m from Site A is screened by trees. The Maynooth Environs Local Area Plan 2009-2015 states that *'it is a long-term strategy to create a homogenous intact woodland in Moygaddy; achieved through a combination of measures including woodland management, the establishment of new woodland and the retention of existing trees*'. The creation of a woodland around Moygaddy Castle will further screen the site from Site A. The likely pre-mitigation impacts for each monument are summarised below.

Pre-Mitigation Impact

Pre-mitigation impacts on the setting of RMP's are set out in Table 12-6 below.

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Table 12-6 Pre-Mitigation Impacts on setting of RMP's within 1km of Proposed Development

RMP No.	Townland	Classification	Distance (m)	Sensitivity of Asset	Significance of Effect
ME053-001—	Moygaddy	Castle	230m E	High	Permanent, Slight, Neutral
KD006-009—	Carton Demesne	House - 17th century	500mm	High	Permanent, Imperceptible, Neutral
KD006-013—	Carton Demesne	Holy Well	210 to SE	Low	Permanent, Imperceptible, Neutral

Proposed Mitigation Measures

No mitigation measures are proposed. The closest Recorded Monument is Moygaddy Castle (CH1). It is partially surrounded by a growth of mature trees, which lessens the visual impact of the proposed development of Site A.

Residual Impact

The residual impact on the setting of Recorded Monuments due to the proposed development of Site A will be permanent, imperceptible to slight, and neutral in effect.

12.6.2.4.4 *Impact on setting of RPS/NIAH structures*

Low visibility structures are less likely to have a setting associated with them and are less likely to be visually impacted in contrast to more dominant upstanding structures such as houses which often have obvious visible remains. The sensitivity of an asset together with the distance from the Proposed Development dictates the significance of potential impacts.

The closest Protected Structure is Carton Demesne Wall (CH3). There will be a slight impact on the wall. Moygaddy House (CH2) is 160m from Site A. This is partially screened from the Site A by mature trees along its avenue. There will be a slight impact on Moygaddy House -however, the house is screened by trees, and is located 160m from Site A. None of the structures listed below will be directly impacted and no significant or adverse impacts will take place.

Pre-Mitigation Impact

Pre-mitigation impacts on the setting of RPS and NIAH structures are set out in Table 12-7 below.

Table 12-7 Pre-Mitigation Impacts on setting of NIAH/RPS structures within 1 km of Site A.

RPS/ NIAH Ref.	Townland	Classification	Distance (m)	Sensitivity of Asset	Significance of Effect
MH053-100 Not on NIAH	Moygaddy	Carton Demesne Wall	Immediately adjacent < 10	High	Slight, Permanent, Neutral

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RPS/ NIAH Ref.	Townland	Classification	Distance (m)	Sensitivity of Asset	Significance of Effect
MH053-102 Not on NIAH	N/a	Moygaddy House, ranges and walls	160 to W	High	Slight, Permanent, Neutral
B05-09. NIAH 11900506	Maynooth	Maria Villa	990 to W	High	Imperceptible, Permanent, Neutral
B05-77. Not on NIAH	Maynooth	House (Pebble Mill	472 to WSW	High	Imperceptible, Permanent, Neutral
B06-09. Not on NIAH	Carton Demesne	Carton House	500m to E	High	Imperceptible, Permanent, Neutral
B06-091	Carton Demesne	Interiors of Carton Demesne	500m to E	High	Imperceptible, Permanent, Neutral
NIAH 11803095	Maynooth	House 1900-1910	999 to SW	High	Imperceptible, Permanent, Neutral

Proposed Mitigation Measures

No mitigation measures proposed.

Residual Impact

The residual impact of the proposed development of site A on setting of RPS/NIAH structures will be permanent, slight, and neutral in effect.

12.6.2.4.5 *Impact on setting of NIAH gardens*

There are no NIAH historic gardens within 1km of Site A.

Pre-Mitigation Impact

None, not applicable.

Proposed Mitigation Measures

No mitigation necessary, not applicable.

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Residual Impact

Not applicable.

12.6.3 Site B (Healthcare Site)

12.6.3.1 Construction Phase (Direct Effects)

Direct effects refer to a physical effect on a monument or site. The construction phase of the Site B consists largely of mechanical excavations such as topsoil stripping and the digging of all associated groundworks and site works. The potential effects on the known and potential archaeological and cultural heritage of the area are outlined below with the suggested mitigation measures.

12.6.3.1.1 *Effects on Recorded Archaeology and Cultural Heritage*

As no UNESCO World Heritage Sites, National Monuments or Recorded Monuments are located within the footprint of the proposed development, no direct effects on these aspects of the archaeological resource are identified. Similarly, as no Protected Structures, NIAH structures or historic gardens are located within the footprint of Site B, no direct effects on these aspects of the archaeological and cultural heritage resource have been identified.

12.6.3.1.2 *Effects on Unrecorded Potential Sub-Surface Sites*

While no new upstanding archaeological sites were detected during the walkover survey, the geophysical survey (CH6) has established that there are potential sub-surface archaeological features present within Site B. Topsoil stripping and development excavations may affect these features.

Pre-Mitigation Impact

Should new sites be present beneath the topsoil (currently not visible on the surface) the impact is likely to be significant negative and permanent (i.e., development excavations would permanently remove the sites resulting in a significant negative impact).

Proposed Mitigation Measures

Pre-development targeted archaeological test trenching under licence from the National Monuments Service should take place to ascertain if the sub-surface features identified in the geophysical survey are archaeological in nature. Test trenching should also take place in areas of the site not covered by the geophysical survey, if development is proposed in these areas. A report on the results of targeted test trenching and a detailed archaeological impact assessment shall be compiled and submitted to the relevant authorities. If any archaeological sites or features are identified during the pre-construction test trenching, they will be preserved by record (archaeologically excavated) or preserved in-situ (avoidance) and therefore a full record made of same.

Residual Impact

The potential impact following implementation of the mitigation measures is considered to be permanent, slight, and negative.

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12.6.3.1.3 *Effects on Cultural Heritage Items*

The proposed development of Site B will require the removal of all cultural heritage sites located within the development footprint. Cultural Heritage items identified during fieldwork are the existing field boundaries, which appear to date from the late eighteenth and early nineteenth centuries.

Pre-Mitigation Impact

The removal of the late eighteenth/nineteenth century field boundaries (CH 4) will result in a slight permanent negative impact on these cultural heritage items.

Proposed Mitigation Measures

The development footprint of the project has been mitigated by design to avoid removal of field boundaries wherever possible. Where it is not possible to maintain by design, an archaeological record (written and photographic) will be made of them prior to their removal.

Residual Impact

When the suggested mitigation measures are implemented during construction the effects on cultural heritage items will be permanent, imperceptible, and negative.

12.6.3.2 Construction Phase (Indirect Effects)

No indirect effects will occur at the construction phase of the Proposed Development of Site B. All indirect effects are likely to occur at the operational phase of the Proposed Development of site B (see Section 12.6.5).

12.6.3.3 Operational Phase (Direct Effects)

No direct effects will occur during the operational phase of the Proposed Development of site B. Any likely direct effects will occur at the construction phase of the Proposed Development of Site B (see Section 12.6.2).

12.6.3.4 Operational Phase (Indirect Effects)

Indirect effects are where a feature or site of archaeological, architectural heritage merit or their setting is located in close proximity to Site B. Indirect impacts here are mainly concerned with impacts on setting.

Impacts on setting of sites may arise when a development is proposed immediately adjacent to a recorded monument or cluster of monuments. While the Proposed Development of Site B may not physically impact on a site, it may alter the setting of a monument or group of monuments. There is no standardised industry-wide approach for assessing the degree of impact to the setting of a monument. For purposes of assessing visual impact on setting, the uniqueness of the monuments, the potential interrelationships of monuments, the inter-visibility of monuments, visual dominance and whether a setting is altered or unaltered can be used to assess impact.

Potential impact to the visual amenity of a site or area and the significance of same is dependent on a number of factors regarding the sensitivity of the location or 'receptor' and the scale or magnitude of the proposed development of Site B. Similarly, the extent of the development and its duration and reversibility should all be considered (*Guidelines for Landscape and Visual Impact Assessment 3rd edition* – Consultation Draft, Landscape Institute, 2013).

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12.6.3.4.1 *Impact on setting of UNESCO World Heritage Sites (Tentative List)*

No monuments on the World Heritage Sites list and tentative list are located within 25km of Site B. There will therefore be no impact on UNESCO sites as a result of the proposed development of Site B.

12.6.3.4.2 *Impact on setting of National Monuments*

Impact on setting of National Monuments within 15km of Site B were considered for purposes of assessing potential impacts on visual setting. The assessments were based on the field survey and cartographic analysis. The National Monuments referred to in Section 12.5.1.1.2 are addressed here in terms of potential impacts on setting.

The closest National Monument to the Proposed Development is Maynooth Castle (KD005-015—), a National Monument in State Ownership (NMO 485). It is located approximately 1.5 km to the southwest of the Proposed Development. The other monuments vary in distance from Site B from 4.6km to 13km.

Taghadoe (Round Tower & Church) KD010-014002- & KD010-014004-, is a National Monument in State Ownership in Co. Kildare (NMN 70 and 578), located approximately 4.6km southwest of the Site B.

Rathcoffey Castle (Castle gatehouse), KD010-018001- is a National Monument in State Ownership in Co. Kildare (NMN 404), located approximately 8.5km to the southwest of Site B.

Dunshaughlin ME044-003002- is a National Monument in State Guardianship (NMN 400) in Co. Meath. It is 13km to the N of Site B.

There is no inter-visibility between the monuments and Site B. The impact on the setting of the monuments is therefore deemed to be imperceptible. There will be no impact on National Monuments as a result of the proposed development of Site B.

12.6.3.4.3 *Impact on setting of Recorded Monuments*

There are three recorded monuments within 1km of Site B. The table below presents the recorded archaeological monuments within 1km of Site B according to their sensitivity (visual dominance, above ground trace, uniqueness, proximity to site etc.) and the likely potential pre-mitigation impact on their setting. For example, low visibility monuments such as holy wells, could be considered to have less potential to be impacted by the Proposed Development of Site B and therefore their sensitivity could be regarded as low. High visibility monuments such as castles and houses visually dominant monuments on high ground within close proximity to Site B may be more at risk in terms of impact on their setting. Monuments that do not have any surface trace are not capable of having their setting impacted and these impacts are categorised as 'not significant'.

Development will not impact on the immediate setting of the monuments as no recorded monuments are located immediately adjacent to Site B. The Maynooth Environs Local Area Plan 2009-2015 states that '*it is a long-term strategy to create a homogenous intact woodland in Moygaddy; achieved through a combination of measures including woodland management, the establishment of new woodland and the retention of existing trees'*. The creation of a woodland around Moygaddy Castle will further screen the site from Site B, which is already almost completely screened by existing trees. The likely pre-mitigation impacts for each monument are summarised below.

Pre-Mitigation Impact

Pre-mitigation impacts on the setting of RMP's are set out in Table 12-8 below.

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Table 12-8 Pre-Mitigation Impacts on setting of RMP's within 1km of Proposed Development

RMP No.	Townland	Classification	Distance (m)	Sensitivity of Asset	Significance of Effect
ME053-001—	Moygaddy	Castle	281m NW	High	Permanent, Slight, Neutral
KD006-009—	Carton Demesne	House - 17th century	609m to E	High	Permanent, Imperceptible, Neutral
KD006-013—	Carton Demesne	Holy Well	200 to SE	Low	Permanent, Imperceptible, Neutral

Proposed Mitigation Measures

No mitigations are proposed. The closest Recorded Monument is Moygaddy Castle. It is almost completely screened from Site B by a growth of mature trees, which lessens the visual impact of the Proposed Development.

Residual Impact

The residual impact on the setting of Recorded Monuments due to the proposed development of Site B will be permanent, imperceptible to slight, and neutral in effect.

12.6.3.4.4 *Impact on setting of RPS/NIAH structures*

Low visibility structures are less likely to have a setting associated with them and are less likely to be visually impacted in contrast to more dominant upstanding structures such as houses which often have obvious visible remains. The sensitivity of an asset together with the distance from Site B dictates the significance of potential impacts.

The closest Protected Structure is Moygaddy House, which is partially screened from the Proposed Development by mature trees along its avenue. There will be a slight impact on Mogaddy House - however, the house is screened by trees, and is located 270m from the Proposed Development. None of the structures listed below will be directly impacted and no significant or adverse impacts will take place.

Pre-Mitigation Impact

Pre-mitigation impacts on the setting of RPS and NIAH structures are set out in Table 12-7 below.

Table 12-9 Pre-Mitigation Impacts on setting of NIAH/RPS structures within 1 km of Proposed Development

RPS/ NIAH Ref.	Townland	Classification	Distance (m)	Sensitivity of Asset	Significance of Effect
MH053-100 Not on NIAH	*Moygaddy*	*Carton Demesne Wall*	Immediately adjacent < 10	High	Slight, Permanent, Neutral

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RPS/ NIAH Ref.	Townland	Classification	Distance (m)	Sensitivity of Asset	Significance of Effect
MH053-102 Not on NIAH	N/a	Moygaddy House, ranges and walls	270 to NW	High	Slight, Permanent, Neutral
B05-09. NIAH 11900506	Maynooth	Maria Villa	811 to SW	High	Imperceptible, Permanent, Neutral
B05-77. Not on NIAH	Maynooth	House (Pebble Mill	375 to SW	High	Imperceptible, Permanent, Neutral
B06-09. Not on NIAH	Carton Demesne	Carton House	510 to E	High	Imperceptible, Permanent, Neutral
B06-09i	Carton Demesne	Interiors of Carton Demesne	510 to E	High	Imperceptible, Permanent, Neutral
NIAH 11803067	Maynooth	House (Butler's House).	996 to SW	High	Imperceptible, Permanent, Neutral
11803092	Maynooth	House (1815 – 1835)	990 to SW	High	Imperceptible, Permanent, Neutral
11803095	Maynooth	House 1900-1910	920 to SW	High	Imperceptible, Permanent, Neutral

Proposed Mitigation Measures

No mitigations proposed

Residual Impact

The residual impact of the proposed development on setting of RPS/NIAH structures will be permanent, slight, and negative in effect.

12.6.3.4.5 *Impact on setting of NIAH gardens*

There are no NIAH historic gardens within 1km of the Proposed Development.

Pre-Mitigation Impact

No impact.

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Proposed Mitigation Measures

No mitigation necessary

Residual Impact

No residual impacts are predicted to occur.

12.6.4 Site C (SHD)

12.6.4.1 Construction Phase (Direct Effects)

Direct effects refer to a physical effect on a monument or site. The construction phase of the Proposed Development of Site C consists largely of mechanical excavations such as topsoil stripping. The potential effects on the known and potential archaeological and cultural heritage of the area are outlined below with the suggested mitigation measures.

12.6.4.1.1 *Effects on Recorded Archaeology and Cultural Heritage*

As no UNESCO World Heritage Sites or National Monuments are located within the footprint of the proposed development no direct effects on these aspects of the archaeological resource are identified. Similarly, as no Protected Structures, NIAH structures or historic gardens are located within the footprint of the Site B, no direct effects on these aspects of the archaeological and cultural heritage resource are identified. One Recorded Monument is located within Site C. this is Moygaddy Castle. However, no development is proposed near the location of the castle. There will be no direct physical effect on the castle. In order to mitigate the longer-term future protection of the Castle a Conservation and Management Plan should be prepared for the monument.

12.6.4.1.2 *Effects on Unrecorded Potential Sub-Surface Sites*

While no new archaeological sites were detected during the walkover survey, the geophysical survey has established that there are potential sub-surface archaeological features present within Site C. Topsoil stripping and development excavations may affect these features.

Pre-Mitigation Impact

Should new sites be present beneath the topsoil (currently not visible on the surface), or underwater at the proposed crossing of the Blackhall Little Stream, the impact is likely to be significant negative and permanent (i.e., development excavations would permanently remove the sites resulting in a significant negative impact).

Proposed Mitigation Measures

Pre-development targeted archaeological test trenching under licence from the National Monuments Service should take place to ascertain if the sub-surface features identified in the geophysical survey are archaeological in nature. Test trenching should also take place in areas of the site not covered by the geophysical survey, if development is proposed in these areas. Where works are proposed at Blackhall Little Stream, a dive/wade survey, undertaken under licence from the National Monuments Service should be undertaken at the location of the proposed bridge. A report on the results of targeted test trenching and underwater survey, and a detailed archaeological impact assessment shall be compiled and submitted to the relevant authorities. If any archaeological sites or features are identified during the

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pre-construction test trenching, they will be preserved by record (archaeologically excavated) or preserved in-situ (avoidance) and therefore a full record made of same.

Residual Impact

The potential impact following implementation of the mitigation measures is considered to be slight, permanent, and negative.

12.6.4.1.3 *Effects on Cultural Heritage Items*

The proposed development of Site C will require the removal of all cultural heritage sites located within the development footprint. Cultural Heritage items identified during fieldwork are the existing field boundaries, which appear to date from the late eighteenth and early nineteenth centuries, and also a gate pier (CH 5).

Pre-Mitigation Impact

The removal of the late eighteenth/nineteenth century field boundaries (CH4) and gate pier (CH 5) will result in a slight permanent negative impact on these cultural heritage items.

Proposed Mitigation Measures

The development footprint of the project has been mitigated by design to avoid removal of field boundaries wherever possible. Where it is not possible to maintain by design, an archaeological record (written and photographic) will be made of them prior to their removal. The gate pier should be recorded and re-used elsewhere on the land holding.

Residual Impact

When the suggested mitigation measures are implemented during construction the effects on cultural heritage items will be permanent, imperceptible, and negative.

12.6.4.2 Construction Phase (Indirect Effects)

No indirect effects will occur at the construction phase of the proposed development of site C. All indirect effects are likely to occur at the operational phase of the proposed development of Site C (see Section 12.6.5).

12.6.4.3 Operational Phase (Direct Effects)

No direct effects will occur during the operational phase of the proposed development of Site C. Any likely direct effects will occur at the construction phase of the proposed development of Site C (see Section 12.6.2).

12.6.4.4 Operational Phase (Indirect Effects)

Indirect effects are where a feature or site of archaeological, architectural heritage merit or their setting is located in close proximity to Site C. Indirect impacts here are mainly concerned with impacts on setting.

Impacts on setting of sites may arise when a development is proposed immediately adjacent to a recorded monument or cluster of monuments. While the proposed development of Site C may not physically impact on a site, it may alter the setting of a monument or group of monuments. There is no

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standardised industry-wide approach for assessing the degree of impact to the setting of a monument. For purposes of assessing visual impact on setting, the uniqueness of the monuments, the potential interrelationships of monuments, the inter-visibility of monuments, visual dominance and whether a setting is altered or unaltered can be used to assess impact.

Potential impact to the visual amenity of a site or area and the significance of same is dependent on a number of factors regarding the sensitivity of the location or 'receptor' and the scale or magnitude of the proposed development of Site C. Similarly, the extent of the development and its duration and reversibility should all be considered (*Guidelines for Landscape and Visual Impact Assessment 3rd edition* – Consultation Draft, Landscape Institute, 2013).

12.6.4.4.1 *Impact on setting of UNESCO World Heritage Sites (Tentative List)*

No monuments on the World Heritage Sites list and tentative list are located within 25km of Site C. There will therefore be no impact on UNESCO sites as a result of the proposed development of Site C.

12.6.4.4.2 *Impact on setting of National Monuments*

Impact on setting of National Monuments within 15km of Site C were considered for purposes of assessing potential impacts on visual setting. The assessments were based on the field survey and cartographic analysis. The National Monuments referred to in Section 12.5.1.1.2 are addressed here in terms of potential impacts on setting.

The closest National Monument to the Proposed Development is Maynooth Castle (KD005-015—), a National Monument in State Ownership (NMO 485). It is located approximately 1.4 km to the southwest of Site C. The other monuments vary in distance Site C from 4.6km to 13km.

Taghadoe (Round Tower & Church) KD010-014002- & KD010-014004-, is a National Monument in State Ownership in Co. Kildare (NMN 70 and 578), located approximately 4.5km southwest of Site C.

Rathcoffey Castle (Castle gatehouse), KD010-018001- is a National Monument in State Ownership in Co. Kildare (NMN 404), located approximately 8.4km to the southwest of Site C.

Dunshaughlin ME044-003002- is a National Monument in State Guardianship (NMN 400) in Co. Meath. It is approximately 13km to the N of Site C.

There is no inter-visibility between the monuments and Site C. The impact on the setting of the monuments is therefore deemed to be imperceptible. There will be no impact on National Monuments as a result of the Proposed Development of Site C.

12.6.4.4.3 *Impact on setting of Recorded Monuments*

There are three recorded monuments within 1km of the Site C. The table below presents the recorded archaeological monuments within 1km of Site C according to their sensitivity (visual dominance, above ground trace, uniqueness, proximity to site, etc.) and the likely potential pre-mitigation impact on their setting. For example, low visibility monuments such as holy wells, could be considered to have less potential to be impacted by the proposed development of Site C and therefore their sensitivity could be regarded as low. High visibility monuments such as castles and houses visually dominant monuments on high ground within close proximity to Site C may be more at risk in terms of impact on their setting. Monuments that do not have any surface trace are not capable of having their setting impacted and these impacts are categorised as 'not significant'.

There is 1 Recorded Monument in Site C (Moygaddy Castle). Development will not impact on the immediate setting of the monument. The Maynooth Environs Local Area Plan 2009-2015 states that *'it is a long-term strategy to create a homogenous intact woodland in Moygaddy; achieved through a*

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combination of measures including woodland management, the establishment of new woodland and the retention of existing trees'. The creation of a woodland around Moygaddy Castle will further screen the site from the proposed development of Site C. The likely pre-mitigation impacts for each monument are summarised below.

Pre-Mitigation Impact

Pre-mitigation impacts on the setting of RMP's are set out in Table 12-10 below.

Table 12-10 Pre-Mitigation Impacts on setting of RMP's within 1km of Proposed Development

RMP No.	Townland	Classification	Distance (m)	Sensitivity of Asset	Significance of Effect
ME053-001---	Moygaddy	Castle	On Site C E	High	Permanent, Slight, Neutral
KD006-009---	Carton Demesne	House - 17th century	880m to ESE	High	Permanent, Imperceptible, Neutral
KD006-013---	Carton Demesne	Holy Well	680m to SE	Low	Permanent, Imperceptible, Neutral

Proposed Mitigation Measures

No mitigation measures are proposed. The closest Recorded Monument is Moygaddy Castle. It is partially surrounded by a growth of mature trees, which lessens the visual impact of the proposed development of Site C.

Residual Impact

The residual impact on the setting of Recorded Monuments due to the proposed development of Site C will be permanent, imperceptible to slight, and neutral in effect.

12.6.4.4.4 *Impact on setting of RPS/NIAH structures*

Low visibility structures are less likely to have a setting associated with them and are less likely to be visually impacted in contrast to more dominant upstanding structures such as houses which often have obvious visible remains. The sensitivity of an asset together with the distance from site C dictates the significance of potential impacts.

The closest Protected Structure is Moygaddy House, which is partially screened from the area proposed for construction in Site C by mature trees which surround Moygaddy Castle. The trees which surround Moygaddy Castle also screen Moygaddy House from the proposed area of development area in Site C The boundary of Site C abuts the curtilage of Moygaddy House. No works are proposed to Moygaddy House or its curtilage. None of the structures listed below will be directly impacted and no significant or adverse impacts will take place.

Pre-Mitigation Impact

Pre-mitigation impacts on the setting of RPS and NIAH structures are set out in Table 12-11 below.

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Table 12-11 Pre-Mitigation Impacts on setting of NIAH/RPS structures within 1 km of Proposed Development

RPS/ NIAH Ref.	Townland	Classification	Distance (m)	Sensitivity of Asset	Significance of Effect
MH053-100 Not on NIAH	Moygaddy	Carton Demesne Wall	Immediately adjacent 281m to E	High	Imperceptible, Permanent, Neutral
MH053-102 Not on NIAH	N/a	Moygaddy House, ranges and walls	Immediately adjacent to N, < 10	High	Slight, Permanent, Neutral
B05-09. NIAH 11900506	Maynooth	Maria Villa	700 to SW	High	Imperceptible, Permanent, Neutral
B05-77. Not on NIAH	Maynooth	House (Pebble Mill	460m to SE	High	Imperceptible, Permanent, Neutral
B06-09. Not on NIAH	Carton Demesne	Carton House	880m to E	High	Imperceptible, Permanent, Neutral
B06-09i	Carton Demesne	Interiors of Carton Demesne	880m to E	High	Imperceptible, Permanent, Neutral
11803095	Maynooth	House 1900-1910	928 to SSW	High	Imperceptible, Permanent, Neutral

Proposed Mitigation Measures

No mitigations proposed

Residual Impact

The residual impact of the proposed development on setting of RPS/NIAH structures will be permanent, slight, and negative in effect.

12.6.4.4.5 *Impact on setting of NIAH gardens*

There are no NIAH historic gardens within 1km of the Proposed Development.

Pre-Mitigation Impact

No impacts.

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Proposed Mitigation Measures

No mitigation necessary

Residual Impact

No residual impacts have been predicted to occur.

12.6.5 MOOR

12.6.5.1 Construction Phase (Direct Effects)

Direct effects refer to a physical effect on a monument or site. The construction phase of the MOOR development consists largely of mechanical excavations such as topsoil stripping, and the construction of a single span bridge over the Rye Water River. The potential effects on the known and potential archaeological and cultural heritage of the area are outlined below with the suggested mitigation measures.

12.6.5.1.1 *Effects on Recorded Archaeology and Cultural Heritage*

As no UNESCO World Heritage Sites, National Monuments or Recorded Monuments are located within the footprint of the MOOR development no direct effects on these aspects of the archaeological resource are identified. A protected structure, Carton Demesne Wall (MH053-100) is located along the eastern side of the proposed MOOR development. However, no works are proposed to the wall. No NIAH structures or historic gardens are located within the footprint of the MOOR development. No direct effects on these aspects of the archaeological and cultural heritage resource are identified.

12.6.5.1.2 *Effects on Unrecorded Potential Sub-Surface Sites*

While no new archaeological sites were detected during the walkover survey, the geophysical survey has established that there are potential sub-surface archaeological features present within the proposed MOOR development. There is also a potential for previously unrecorded archaeological features to lie underwater at the location of the proposed bridge. Topsoil stripping and development excavations may affect these features.

Pre-Mitigation Impact

Should new sites be present beneath the topsoil (currently not visible on the surface), or under water at the proposed bridge crossing the impact is likely to be significant negative and permanent (i.e., development excavations would permanently remove the sites resulting in a significant negative impact).

Proposed Mitigation Measures

Pre-development targeted archaeological test trenching under licence from the National Monuments Service should take place to ascertain if the sub-surface features identified in the geophysical survey are archaeological in nature. Test trenching should also take place in areas of the site not covered by the geophysical survey, if development is proposed in these areas. A dive survey, undertaken under licence from the National Monuments Service should be undertaken at the location of the proposed bridge(s). A report on the results of test trenching shall be compiled and submitted to the relevant authorities detailing the results of the test trenching. If any sites are identified during the pre-construction test trenching, they will be preserved by record (archaeologically excavated) or preserved in-situ (avoidance) and therefore a full record made of same.

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Residual Impact

The potential impact following implementation of the mitigation measures is considered to be slight, permanent, and negative.

12.6.5.1.3 *Effects on Cultural Heritage Items*

The Proposed Development will require the removal of all cultural heritage sites located within the MOOR development footprint. Cultural heritage items identified during fieldwork are the existing field boundaries (CH 4), which appear to date from the late eighteenth and early nineteenth centuries.

Pre-Mitigation Impact

The removal of the late eighteenth/nineteenth century field boundaries will result in a slight permanent negative impact on these cultural heritage items.

Proposed Mitigation Measures

The development footprint of the project has been mitigated by design to avoid removal of field boundaries wherever possible. Where it is not possible to maintain by design, an archaeological record (written and photographic) will be made of them prior to their removal.

Residual Impact

When the suggested mitigation measures are implemented during construction the effects on cultural heritage items will be permanent, imperceptible, and negative.

12.6.5.2 Construction Phase (Indirect Effects)

No indirect effects will occur at the construction phase of the proposed MOOR development. All indirect effects are likely to occur at the operational phase of the Proposed Development (see Section 12.6.5).

12.6.5.3 Operational Phase (Direct Effects)

No direct effects will occur during the operational phase of the proposed MOOR development. Any likely direct effects will occur at the construction phase of the Proposed Development (see Section 12.6.2).

12.6.5.4 Operational Phase (Indirect Effects)

Indirect effects are where a feature or site of archaeological, architectural heritage merit or their setting is located in close proximity to the MOOR development. Indirect impacts here are mainly concerned with impacts on setting.

Impacts on setting of sites may arise when a development is proposed immediately adjacent to a recorded monument or cluster of monuments. While the proposed MOOR development may not physically impact on a site, it may alter the setting of a monument or group of monuments. There is no standardised industry-wide approach for assessing the degree of impact to the setting of a monument. For purposes of assessing visual impact on setting, the uniqueness of the monuments, the potential interrelationships of monuments, the inter-visibility of monuments, visual dominance and whether a setting is altered or unaltered can be used to assess impact.

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Potential impact to the visual amenity of a site or area and the significance of same is dependent on a number of factors regarding the sensitivity of the location or 'receptor' and the scale or magnitude of the proposed MOOR development. Similarly, the extent of the development and its duration and reversibility should all be considered (*Guidelines for Landscape and Visual Impact Assessment 3rd edition* – Consultation Draft, Landscape Institute, 2013).

12.6.5.4.1 *Impact on setting of UNESCO World Heritage Sites (Tentative List)*

No monuments on the World Heritage Sites list and tentative list are located within 25km of the proposed MOOR development. There will therefore be no impact on UNESCO sites as a result of the proposed MOOR development.

12.6.5.4.2 *Impact on setting of National Monuments*

Impact on setting of National Monuments within 15km of the proposed MOOR development were considered for purposes of assessing potential impacts on visual setting. The assessments were based on the field survey and cartographic analysis. The National Monuments referred to in Section 12.5.1.1.2 are addressed here in terms of potential impacts on setting.

The closest National Monument to the MOOR development is Maynooth Castle (KD005-015—), a National Monument in State Ownership (NMO 485). It is located approximately 1.5 km to the southwest of the Proposed Development. The other monuments vary in distance from the Proposed Development site from 4.6km to 13km.

Taghadoe (Round Tower & Church) KD010-014002- & KD010-014004-, is a National Monument in State Ownership in Co. Kildare (NMN 70 and 578), located approximately 4.6km southwest of the Proposed Development.

Rathcoffey Castle (Castle gatehouse), KD010-018001- is a National Monument in State Ownership in Co. Kildare (NMN 404), located approximately 8.5km to the southwest of the Proposed Development.

Dunshaughlin ME044-003002- is a National Monument in State Guardianship (NMN 400) in Co. Meath. It is 13km to the N of the Proposed Development site.

There is no inter-visibility between the monuments and the Proposed Development. The impact on the setting of the monuments is therefore deemed to be imperceptible. There will be no impact on National Monuments as a result of the Proposed Development.

12.6.5.4.3 *Impact on setting of Recorded Monuments*

There are three recorded monuments within 1km of the proposed MOOR development. The table below presents the recorded archaeological monuments within 1km of the proposed MOOR development according to their sensitivity (visual dominance, above ground trace, uniqueness, proximity to site etc.) and the likely potential pre-mitigation impact on their setting. For example, low visibility monuments such as holy wells, could be considered to have less potential to be impacted by the proposed MOOR development and therefore their sensitivity could be regarded as low. High visibility monuments such as castles and houses visually dominant monuments on high ground within close proximity to the site of the proposed MOOR development may be more at risk in terms of impact on their setting. Monuments that do not have any surface trace are not capable of having their setting impacted and these impacts are categorised as 'not significant'.

Development will not impact on the immediate setting of the monuments as no recorded monuments are located immediately adjacent to the Proposed Development site. The Maynooth Environs Local Area Plan 2009-2015 states that '*it is a long-term strategy to create a homogenous intact woodland in*

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Moygaddy; achieved through a combination of measures including woodland management, the establishment of new woodland and the retention of existing trees'. The creation of a woodland around Moygaddy Castle will further screen the site from the proposed MOOR development. The likely pre-mitigation impacts for each monument are summarised below.

Pre-Mitigation Impact

Pre-mitigation impacts on the setting of RMP's are set out in Table 12-12 below.

Table 12-12 Pre-Mitigation Impacts on setting of RMP's within 1km of Proposed Development

RMP No.	Townland	Classification	Distance (m)	Sensitivity of Asset	Significance of Effect
ME053-001---	Moygaddy	Castle	230m E	High	Permanent, Slight, Neutral
KD006-009---	Carton Demesne	House - 17th century	250m	High	Permanent, Imperceptible, Neutral
KD006-013---	Carton Demesne	Holy Well	210	Low	Permanent, Imperceptible, Neutral

Proposed Mitigation Measures

No mitigations are proposed. The closest Recorded Monument is Moygaddy Castle. It is partially surrounded by a growth of mature trees, which lessens the visual impact of the proposed MOOR development.

Residual Impact

The residual impact on the setting of Recorded Monuments due to the proposed MOOR development will be permanent, imperceptible to slight, and neutral in effect.

12.6.5.4.4 *Impact on setting of RPS/NIAH structures*

Low visibility structures are less likely to have a setting associated with them and are less likely to be visually impacted in contrast to more dominant upstanding structures such as houses which often have obvious visible remains. The sensitivity of an asset together with the distance from the Proposed Development dictates the significance of potential impacts.

The closest Protected Structure is Moygaddy House, which is partially screened from the proposed MOOR development by mature trees along its avenue. There will be a slight impact on Mogaddy House -however, the house is screened by trees, and is located 160m from the proposed MOOR development. None of the structures listed below will be directly impacted and no significant or adverse impacts will take place.

Pre-Mitigation Impact

Pre-mitigation impacts on the setting of RPS and NIAH structures are set out in Table 12-7 below

Table 12-13 Pre-Mitigation Impacts on setting of NIAH/RPS structures within 1 km of Proposed Development

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RPS/ NIAH Ref.	Townland	Classification	Distance (m)	Sensitivity of Asset	Significance of Effect
MH053-100 Not on NIAH	Moygaddy	Carton Demesne Wall	Immediately adjacent < 10	High	Slight, Permanent, Neutral
MH053-102 Not on NIAH	N/a	Moygaddy House, ranges and walls	160 to W	High	Slight, Permanent, Neutral
B05-09. NIAH 11900506	Maynooth	Maria Villa	811 to SW	High	Imperceptible, Permanent, Neutral
B05-77. Not on NIAH	Maynooth	House (Pebble Mill	375 to SW	High	Imperceptible, Permanent, Neutral
B06-09. Not on NIAH	Carton Demesne	Carton House	510 to E	High	Imperceptible, Permanent, Neutral
B06-09i	Carton Demesne	Interiors of Carton Demesne	510 to E	High	Imperceptible, Permanent, Neutral
NIAH 11803067	Maynooth	House (Butler's House).	996 to SW	High	Imperceptible, Permanent, Neutral
11803092	Maynooth	House (1815 – 1835)	990 to SW	High	Imperceptible, Permanent, Neutral
11803095	Maynooth	House 1900-1910	920 to SW	High	Imperceptible, Permanent, Neutral

Proposed Mitigation Measures

No mitigation measures proposed.

Residual Impact

The residual impact of the proposed MOOR development on setting of RPS/NIAH structures will be permanent, slight, and negative in effect.

12.6.5.4.5 *Impact on setting of NIAH gardens*

There are no NIAH historic gardens within 1km of the proposed MOOR development.

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Pre-Mitigation Impact

No impacts.

Proposed Mitigation Measures

No mitigation necessary

Residual Impact

No residual impacts have been predicted to occur.

12.6.6 Kildare Bridge Planning Application

12.6.6.1 Construction Phase (Direct Effects)

Direct effects refer to a physical effect on a monument or site. The construction phase of the proposed Kildare Bridge planning application consists largely of mechanical excavations such as topsoil stripping associated with road improvement works and the construction of a single span bridge over the Rye Water River~~.~~. The potential effects on the known and potential archaeological and cultural heritage of the area are outlined below with the suggested mitigation measures.

12.6.6.1.1 *Effects on Recorded Archaeology and Cultural Heritage*

As no UNESCO World Heritage Sites, National Monuments or Recorded Monuments are located within the footprint of the proposed Kildare Bridge planning application no direct effects on these aspects of the archaeological resource are identified. A Protected Structure, Carton Demesne wall (MH053-100) is located along the eastern side of the proposed Kildare Bridge works. However, no works are proposed to the wall. No NIAH structures or historic gardens are located within the footprint of the Kildare bridge application. No direct effects on these aspects of the archaeological and cultural heritage resource are identified.

12.6.6.1.2 *Effects on Unrecorded Potential Sub-Surface Sites*

While no new archaeological sites were detected during the walkover survey, it is possible that that there are potential sub-surface archaeological features present within the proposed Kildare Bridge planning application, particularly at the location of the new bridge, where previously unrecorded archaeological features may lie underwater. Development excavations may affect these features.

Pre-Mitigation Impact

Should new sites be present beneath the topsoil (currently not visible on the surface), or under water at the proposed bridge crossing, the impact is likely to be significant negative and permanent (i.e., development excavations would permanently remove the sites resulting in a significant negative impact).

Proposed Mitigation Measures

Pre-development archaeological dive survey, and test trenching under licence from National Monuments Service should take place to ascertain if sub-surface archaeological features are present at the location of the construction works for the proposed bridge. A report on the results of dive survey and test trenching shall be compiled and submitted to the relevant authorities detailing the results of the test trenching. If any sites are identified during the pre-construction test trenching, they will be

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preserved by record (archaeologically excavated) or preserved in-situ (avoidance) and therefore a full record made of same. It is not possible to carry out pre-development test trenching along the route of the rising main. Excavation works should be archaeologically monitored under licence from the National Monuments Service. A report on the results of the monitoring shall be compiled and submitted to the relevant authorities detailing the results of the monitoring. If any sites are identified during the archaeological monitoring, they will be preserved by record (archaeologically excavated) or preserved in-situ (avoidance) and therefore a full record made of same.

Residual Impact

The potential impact following implementation of the mitigation measures is considered to be slight, permanent, and negative.

12.6.6.1.3 *Effects on Cultural Heritage Items*

The proposed Kildare Bridge planning application may require the removal of all cultural heritage sites located within the development footprint. However, works proposed are located along an existing road, so it is likely that no cultural heritage assets will be affected.

Pre-Mitigation Impact

No cultural heritage sites were identified. Pre-mitigation impacts will be imperceptible, permanent and neutral.

Proposed Mitigation Measures

The development footprint of the project has been mitigated by design to avoid all cultural heritage features.

Residual Impact

When the suggested mitigation measures are implemented during construction the effects on cultural heritage items will be permanent, imperceptible, and negative.

12.6.6.2 Construction Phase (Indirect Effects)

No indirect effects will occur at the construction phase of the proposed Kildare Bridge and planning application All indirect effects are likely to occur at the operational phase of the Proposed Development (see Section 12.6.5).

12.6.6.3 Operational Phase (Direct Effects)

No direct effects will occur during the operational phase of the proposed Kildare Bridge planning application. Any likely direct effects will occur at the construction phase of the Proposed Development (see Section 12.6.2).

12.6.6.4 Operational Phase (Indirect Effects)

Indirect effects are where a feature or site of archaeological, architectural heritage merit or their setting is located in close proximity to the proposed Kildare Bridge planning application. Indirect impacts here are mainly concerned with impacts on setting.

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Impacts on setting of sites may arise when a development is proposed immediately adjacent to a recorded monument or cluster of monuments. While the proposed Kildare planning application may not physically impact on a site, it may alter the setting of a monument or group of monuments. There is no standardised industry-wide approach for assessing the degree of impact to the setting of a monument. For purposes of assessing visual impact on setting, the uniqueness of the monuments, the potential interrelationships of monuments, the inter-visibility of monuments, visual dominance and whether a setting is altered or unaltered can be used to assess impact.

Potential impact to the visual amenity of a site or area and the significance of same is dependent on a number of factors regarding the sensitivity of the location or 'receptor' and the scale or magnitude of the proposed Kildare Bridge planning application . Similarly, the extent of the development and its duration and reversibility should all be considered (*Guidelines for Landscape and Visual Impact Assessment 3rd edition* – Consultation Draft, Landscape Institute, 2013).

12.6.6.4.1 *Impact on setting of UNESCO World Heritage Sites (Tentative List)*

No monuments on the World Heritage Sites list and tentative list are located within 25km of the Proposed Development. There will therefore be no impact on UNESCO sites as a result of the Proposed Development.

12.6.6.4.2 *Impact on setting of National Monuments*

Impact on setting of National Monuments within 15km of the Proposed Development were considered for purposes of assessing potential impacts on visual setting. The assessments were based on the field survey and cartographic analysis. The National Monuments referred to in Section 12.5.1.1.2 are addressed here in terms of potential impacts on setting.

The closest National Monument to the Proposed Development is Maynooth Castle (KD005-015—), a National Monument in State Ownership (NMO 485). It is located approximately 660m km to the southwest of the proposed Kildare Bridge planning application. The other monuments vary in distance from the Proposed Development site from 4km to 13km.

Taghadoe (Round Tower & Church) KD010-014002- & KD010-014004-, is a National Monument in State Ownership in Co. Kildare (NMN 70 and 578), located approximately 4km southwest of the proposed Kildare Bridge planning application.

Rathcoffey Castle (Castle gatehouse), KD010-018001- is a National Monument in State Ownership in Co. Kildare (NMN 404), located approximately 7.9km to the southwest of the proposed Kildare Bridge planning application.

Dunshaughlin ME044-003002- is a National Monument in State Guardianship (NMN 400) in Co. Meath. It is 13.5km to the N of the proposed Kildare Bridge planning application site.

There is no inter-visibility between the monuments and the Proposed Development. The impact on the setting of the monuments is therefore deemed to be imperceptible. There will be no impact on National Monuments as a result of the proposed Kildare Bridge planning application..

12.6.6.4.3 *Impact on setting of Recorded Monuments*

There are 14 recorded monuments within 1km of the proposed Kildare Bridge planning application. However, a lesser distance was considered in this instance, as the works primarily consist of upgrade works and laying of a rising main. There are 2 Recorded Monuments within 500m of proposed Kildare Bridge planning application, and only 1 Recorded Monument within 250m of the proposed Kildare Bridge planning application) The table below presents the recorded archaeological monuments within

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250m of the proposed Kildare Bridge planning application according to their sensitivity (visual dominance, above ground trace, uniqueness, proximity to site etc.) and the likely potential pre-mitigation impact on their setting. For example, low visibility monuments such as holy wells, could be considered to have less potential to be impacted by the proposed Kildare Bridge planning application and therefore their sensitivity could be regarded as low. High visibility monuments such as castles and houses visually dominant monuments on high ground within close proximity to the site of the proposed Kildare Bridge planning application may be more at risk in terms of impact on their setting. Monuments that do not have any surface trace are not capable of having their setting impacted and these impacts are categorised as 'not significant'.

The proposed Kildare Bridge planning application will not impact on the immediate setting of the monuments as no recorded monuments are located immediately adjacent to the proposed Kildare Bridge Planning Application site. The likely pre-mitigation impacts for each monument are summarised below.

Pre-Mitigation Impact

Pre-mitigation impacts on the setting of RMP's are set out in Table 12-14 below.

Table 12-14 Pre-Mitigation Impacts on setting of RMP's within 1km of Proposed Development

RMP No.	Townland	Classification	Distance (m)	Sensitivity of Asset	Significance of Effect
KD006-013—	Carton Demesne	Holy Well	130m to SE	Low	Permanent, Imperceptible, Neutral

Proposed Mitigation Measures

No mitigations are proposed. The closest Recorded Monument is a Holy Well (KD006-013—). It is within the grounds of Carton House and is not visible from the proposed Kildare Bridge planning application, due to the presence of the Carton Demesne Wall and mature trees.

Residual Impact

The residual impact on the setting of Recorded Monuments due to the proposed Kildare Bridge planning application will be permanent, imperceptible to slight, and neutral in effect.

12.6.6.4.4 *Impact on setting of RPS/NIAH structures*

Low visibility structures are less likely to have a setting associated with them and are less likely to be visually impacted in contrast to more dominant upstanding structures such as houses which often have obvious visible remains. The sensitivity of an asset together with the distance from the proposed Kildare Bridge planning application dictates the significance of potential impacts.

The closest Protected Structure is Pebble Mill House (RPS B05-77) which is less than 10m from the proposed Kildare Bridge planning application. The Carton House demesne wall is less than 10m from proposed Kildare Bridge planning application, and the portion in County Meath (MH053-100) is 20m to the N. Two other structures listed on the Kildare RPS are within 250m of the proposed Kildare Bridge planning application. There are 44 sites listed on the NIAH within 500m of the proposed Kildare Bridge planning application, and only one site listed on the NIAH within 250m of the proposed Kildare Bridge planning application. The above-mentioned sites within 250m are listed on the table below. None of the structures listed below will be directly impacted and no significant or adverse impacts will take place.

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Pre-Mitigation Impact

Pre-mitigation impacts on the setting of RPS and NIAH structures are set out in Table 12-7 below.

Table 12-15 Pre-Mitigation Impacts on setting of NIAH/RPS structures within 250mm of Proposed Development

RPS/ NIAH Ref.	Townland	Classification	Distance (m)	Sensitivity of Asset	Significance of Effect
B05-30 NIAH 11803095	Maynooth	44 Mariaville	160m to SW	High	Imperceptible, Permanent, Neutral
B05-10 11803067	Maynooth	Butler's House Convent lane	247m to SW	High	Imperceptible, Permanent, Neutral
B05-77. Not on NIAH	Maynooth	House (Pebble Mill	375 to SW	High	Imperceptible, Permanent, Neutral

Proposed Mitigation Measures

No mitigation measures proposed.

Residual Impact

The residual impact of the proposed development on setting of RPS/NIAH structures will be permanent, slight, and negative in effect.

12.6.6.4.5 *Impact on setting of NIAH gardens*

There are no NIAH historic gardens within 1km of the Proposed Development.

Pre-Mitigation Impact

No impact.

Proposed Mitigation Measures

No mitigation necessary

Residual Impact

No residual impacts have been predicted to occur.

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12.6.7 Moyglare Bridge Planning Application

12.6.7.1 Construction Phase (Direct Effects)

Direct effects refer to a physical effect on a monument or site. The construction phase of proposed Moyglare Bridge site consists largely of mechanical excavations such as topsoil stripping. The potential effects on the known and potential archaeological and cultural heritage of the area are outlined below with the suggested mitigation measures.

12.6.7.1.1 *Effects on Recorded Archaeology and Cultural Heritage*

As no UNESCO World Heritage Sites, National Monuments or Recorded Monuments are located within the footprint of the proposed development no direct effects on these aspects of the archaeological resource are identified. Similarly, as no Protected Structures, NIAH structures or historic gardens are located within the footprint of the Moyglare Bridge development, no direct effects on these aspects of the archaeological and cultural heritage resource are identified.

12.6.7.1.2 *Effects on Unrecorded Potential Sub-Surface Sites*

No new archaeological sites were detected during the walkover survey. However there is always the possibility that previously unrecorded archaeological features may lie undetected sub-surface on the development site. Topsoil stripping and development excavations may affect these features.

Pre-Mitigation Impact

Should new sites be present beneath the topsoil (currently not visible on the surface), or under water at the proposed bridge crossing, the impact is likely to be significant negative and permanent (i.e., development excavations would permanently remove the sites resulting in a significant negative impact).

Proposed Mitigation Measures

Pre-development archaeological dive survey, and test trenching under licence from National Monuments Service should take place to ascertain if sub-surface archaeological features are present at the location of the construction works for the proposed bridge. A report on the results of dive survey and test trenching shall be compiled and submitted to the relevant authorities detailing the results of the test trenching. If any sites are identified during the pre-construction test trenching, they will be preserved by record (archaeologically excavated) or preserved in-situ (avoidance) and therefore a full record made of same.

Residual Impact

The potential impact following implementation of the mitigation measures is considered to be slight, permanent, and negative.

12.6.7.1.3 *Effects on Cultural Heritage Items*

No cultural heritage items were identified during fieldwork.

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Pre-Mitigation Impact

No pre-mitigation impacts were identified.

Proposed Mitigation Measures

No mitigation measures are proposed.

Residual Impact

When the suggested mitigation measures are implemented during construction the effects on cultural heritage items will be permanent, imperceptible, and negative.

12.6.7.2 Construction Phase (Indirect Effects)

No indirect effects will occur at the construction phase of the proposed Moyglare Bridge site. All indirect effects are likely to occur at the operational phase of proposed Moyglare Bridge site (see Section 12.6.5).

12.6.7.3 Operational Phase (Direct Effects)

No direct effects will occur during the operational phase of the proposed Moyglare Bridge site. Any likely direct effects will occur at the construction phase of the proposed Moyglare Bridge site (see Section 12.6.2).

12.6.7.4 Operational Phase (Indirect Effects)

Indirect effects are where a feature or site of archaeological, architectural heritage merit or their setting is located in close proximity to the proposed Moyglare Bridge site. Indirect impacts here are mainly concerned with impacts on setting.

Impacts on setting of sites may arise when a development is proposed immediately adjacent to a recorded monument or cluster of monuments. While the proposed Moyglare Bridge site may not physically impact on a site, it may alter the setting of a monument or group of monuments. There is no standardised industry-wide approach for assessing the degree of impact to the setting of a monument. For purposes of assessing visual impact on setting, the uniqueness of the monuments, the potential interrelationships of monuments, the inter-visibility of monuments, visual dominance and whether a setting is altered or unaltered can be used to assess impact.

Potential impact to the visual amenity of a site or area and the significance of same is dependent on a number of factors regarding the sensitivity of the location or 'receptor' and the scale or magnitude of the proposed Moyglare Bridge site. Similarly, the extent of the development and its duration and reversibility should all be considered (*Guidelines for Landscape and Visual Impact Assessment 3rd edition* – Consultation Draft, Landscape Institute, 2013).

12.6.7.4.1 *Impact on setting of UNESCO World Heritage Sites (Tentative List)*

No monuments on the World Heritage Sites list and tentative list are located within 25km of the proposed Moyglare Bridge site. There will therefore be no impact on UNESCO sites as a result of the proposed Moyglare Hall site.

12.6.7.4.2 *Impact on setting of National Monuments*

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Impact on setting of National Monuments within 15km of the proposed Moyglare Bridge site were considered for purposes of assessing potential impacts on visual setting. The assessments were based on the field survey and cartographic analysis. The National Monuments referred to in Section 12.5.1.1.2 are addressed here in terms of potential impacts on setting.

The closest National Monument to the proposed Moyglare Bridge site is Maynooth Castle (KD005-015––), a National Monument in State Ownership (NMO 485). It is located approximately 1.5 km to the southwest of the proposed Moyglare Bridge site. The other monuments vary in distance from the Proposed Development site from 5km to 13km.

Taghadoe (Round Tower & Church) KD010-014002- & KD010-014004-, is a National Monument in State Ownership in Co. Kildare (NMN 70 and 578), located approximately 5km southwest of the proposed Moyglare Bridge site.

Rathcoffey Castle (Castle gatehouse), KD010-018001- is a National Monument in State Ownership in Co. Kildare (NMN 404), located approximately 9km to the southwest of the proposed Moyglare Bridge site.

Dunshaughlin ME044-003002- is a National Monument in State Guardianship (NMN 400) in Co. Meath. It is 12.5km to the N of the proposed Moyglare Bridge site.

There is no inter-visibility between the monuments and the proposed Moyglare Bridge site. The impact on the setting of the monuments is therefore deemed to be imperceptible. There will be no impact on National Monuments as a result of the proposed Moyglare Bridge site.

12.6.7.4.3 *Impact on setting of Recorded Monuments*

There are three recorded monuments within 1km of the proposed Moyglare Bridge site. The table below presents the recorded archaeological monuments within 1km of the proposed Moyglare Bridge site according to their sensitivity (visual dominance, above ground trace, uniqueness, proximity to site etc.) and the likely potential pre-mitigation impact on their setting. For example, low visibility monuments such as holy wells, could be considered to have less potential to be impacted by the proposed Moyglare Bridge site and therefore their sensitivity could be regarded as low. High visibility monuments such as castles and houses visually dominant monuments on high ground within close proximity to the site of the proposed Moyglare Bridge site may be more at risk in terms of impact on their setting. Monuments that do not have any surface trace are not capable of having their setting impacted and these impacts are categorised as 'not significant'.

Development will not impact on the immediate setting of the monuments as no recorded monuments are located immediately adjacent to the proposed Moyglare Bridge site. The Maynooth Environs Local Area Plan 2009-2015 states that '*it is a long-term strategy to create a homogenous intact woodland in Moygaddy; achieved through a combination of measures including woodland management, the establishment of new woodland and the retention of existing trees'*. The creation of a woodland around Moygaddy Castle will further screen the site from the Proposed Development. The likely pre-mitigation impacts for each monument are summarised below.

Pre-Mitigation Impact

Pre-mitigation impacts on the setting of RMP's are set out in Table 12-16 below.

Table 12-16 Pre-Mitigation Impacts on setting of RMP's within 1km of Proposed Development

RMP No.	Townland	Classification	Distance (m)	Sensitivity of Asset	Significance of Effect
ME053-001—	Moygaddy	Castle	680m E	High	Permanent, Slight,

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RMP No.	Townland	Classification	Distance (m)	Sensitivity of Asset	Significance of Effect
					Neutral
ME049A002—-	Moyglare	Church	995m to NW.	High	Permanent, Imperceptible, Neutral
ME049A002001-	Moyglare	Graveyard	995m to NW	High	Permanent, Imperceptible, Neutral

Proposed Mitigation Measures

No mitigations are proposed. The closest Recorded Monument is Moygaddy Castle, 680m to the east It is surrounded by a growth of mature trees, which lessens the visual impact of the Moyglare Bridge site.

Residual Impact

The residual impact on the setting of Recorded Monuments due to the Moyglare Bridge site will be permanent, imperceptible to slight, and neutral in effect.

12.6.7.4.4 *Impact on setting of RPS/NIAH structures*

Low visibility structures are less likely to have a setting associated with them and are less likely to be visually impacted in contrast to more dominant upstanding structures such as houses which often have obvious visible remains. The sensitivity of an asset together with the distance from the Moyglare Bridge site dictates the significance of potential impacts.

The closest Protected Structure is Moygaddy House, which is almost completely screened from the Moyglare Bridge site by mature trees along its western side. None of the structures listed below will be directly impacted and no significant or adverse impacts will take place.

Pre-Mitigation Impact

Pre-mitigation impacts on the setting of RPS and NIAH structures are set out in Table 12-7 below.

Table 12-17 Pre-Mitigation Impacts on setting of NIAH/RPS structures within 1 km of Proposed Development

RPS/ NIAH Ref.	Townland	Classification	Distance (m)	Sensitivity of Asset	Significance of Effect
MH053 102	Moygaddy	Moygaddy House, ranges and walls	690m to east.	High	Slight, Permanent, Neutral
B05-09. NIAH 11900506	Maynooth	Maria Villa	755 to S.	High	Imperceptible, Permanent, Neutral
11803092	Maynooth	House (1815 – 1835)	990 to SW	High	Imperceptible, Permanent, Neutral

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RPS/ NIAH Ref.	Townland	Classification	Distance (m)	Sensitivity of Asset	Significance of Effect
11803095	Maynooth	House 1900-1910	920 to SW	High	Imperceptible, Permanent, Neutral

Proposed Mitigation Measures

No mitigation measures proposed.

Residual Impact

The residual impact of the Moyglare Bridge site on setting of RPS/NIAH structures will be permanent, slight, and negative in effect.

12.6.7.4.5 *Impact on setting of NIAH gardens*

There are no NIAH historic gardens within 1km of the Proposed Development.

Pre-Mitigation Impact

No impacts

Proposed Mitigation Measures

No mitigation necessary

Residual Impact

No residual impacts are likely to occur

12.6.8 Cumulative Impacts – Interaction of Effects between Various Elements of the Proposed Development

The interaction of the various elements of the proposed development was considered and assessed in this EIAR with regards cultural heritage. The potential for each individual element of the proposed development on its own to result in significant effects on cultural heritage was considered in the impact assessment. The entire project including the interactions between all its elements was also considered and assessed for its potential to result in significant effects on cultural heritage in the impact assessment presented. All interactions between the various elements of the project were considered and assessed both individually and cumulatively within this chapter. Where necessary, mitigation was employed to ensure that no cumulative effects will arise as a result of the interaction of the various elements of the development with one another.

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12.6.8.1 Construction Phase (Direct Effects)

12.6.8.1.1 *Effects on Recorded Archaeology and Cultural Heritage*

There is a Recorded Monument (Moygaddy Castle CH1) on the Proposed development site and two Protected Structures (Moygaddy House CH2; Carton House Demesne wall stretch CH3). It is proposed that the castle will be surrounded by a green area with Site C and so no direct negative impacts are predicted. The Protected Structures are on the fringes of the Proposed Development Site. Moygaddy House (CH2) is immediately to the N of Site C and to the west of Site and is not predicted to be negatively impacted. The Demesne Wall stretch (CH3) bounds Site A and Site B. This wall currently runs along the main road and it is predicted that some works to its fabric may be required as part of the Proposed Development. These cumulative predicted impacts are considered slight and mitigation (recording prior to any works) will alleviate and negative impacts.

In regard to boundaries (CH4, County, Townland and field), the County and Townland boundary to the Proposed Development Site is formed by the Rye Water River (Site B and Site C and Kildare Bridge and Moyglare Bridge). No significant negative impacts are envisaged. There is a townland boundary located at the extreme western edge of Site C; this small section of boundary was found during field inspection to have been previously impacted. Suitable mitigation has been proposed for in-water and underwater survey and assessment at proposed bridge location along the Rye Water River. Field boundaries have been mitigated by design, but where this is impossible, mitigation (archaeological recording) has been proposed to alleviate any negative impacts.

12.6.8.1.2 *Effects on Unrecorded Potential Sub-Surface Sites*

A geophysical survey (CH6) has been carried out, which shows that there is a considerable amount of anomalies on the Proposed Development Site. These anomalies are located on Site A, Site B, Site C and MOOR development sites. These will be impacted upon during the construction phase. Suitable mitigation has been suggested. In the first instance, targeted test trenching will be carried out to ascertain if these geophysical anomalies are archaeological in nature. If this proves to be the case, then these will either be preserved in situ, (avoidance) or if this is not possible, then be archeologically excavated (preserved by record). The construction of the bridges (Kildare Bridge and Moyglare Bridge) as part of the development may have an impact on potential unrecorded archaeological features. Suitable mitigation has been suggested (in water wade/underwater dive survey) at pre-construction stage. Where any underwater/riverine archaeological features are discovered, these will be either preserved in situ (avoidance) or where this is not possible then excavated (preserved by record) at pre-construction stage.

12.6.8.2 Construction Phase (Indirect Effects)

No indirect effects are predicted during the cumulative construction phase of the proposed development.

12.6.8.3 Operational Phase (Direct Effects)

No direct effects are predicted during the cumulative operational phase of the proposed development. Moygaddy Castle (CH1) may require a Conservation and Management Plan so that it can be protected and maintained in a managed way within the proposed public park when operational.

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12.6.8.4 Operational Phase (Indirect Effects)

12.6.8.4.1 *Impact on setting of UNESCO World Heritage Sites (Tentative List)*

No impact on WHS predicted as distance from Proposed Development Site is sufficient.

12.6.8.4.2 *Impact on setting of National Monuments*

No impact on National Monuments predicted as distance from Proposed Development Site is sufficient.

12.6.8.4.3 *Impact on setting of Recorded Monuments*

The predicted impact on the setting of the single recorded monument Moygaddy Castle (CH1) will be positive, as it will be enclosed by a public park space and its amenity improved. A Conservation and Management Plan will set out its continued protection into the future.

12.6.8.4.4 *Impact on setting of RPS/NIAH structures*

The impact on setting of the RPS structures Moygaddy House (CH2) and Demesne Boundary Wall (CH3) is predicted to be negligible. CH2 will be screened by trees. CH3 will continue as a boundary wall.

12.6.8.4.5 *Impact on setting of NIAH gardens*

No impact as there are no recorded historic gardens within or adjacent to the Proposed Development Site.

12.6.9 Cumulative In-Combination Effects

Cumulative impact is defined as 'The addition of many small impacts to create one larger, more significant, impact' (EPA 2022).

In this regard in order to assess overall cumulative effects on archaeology and cultural heritage the proposed project is considered in the context of a number of existing, proposed and permitted developments in the area as listed in Chapter 2 of this EIAR.

The nearest permitted and proposed developments are residential and are located immediately to the west and south of the Proposed Development. The addition of the Proposed Development to this already largely altered landscape will not result in a visual impact to any nearby recorded monuments, protected structures or NIAH structures or features. No direct physical impacts are predicted for Moygaddy Castle or Moygaddy House. Visual impacts on these sites are slight, as both are screened by existing woodland and trees respectively and are at a sufficient distance from the Proposed Development.

In terms of potential cumulative direct impacts. potential direct impacts which may occur to sub-surface archaeological features within the Proposed Development site will be mitigated against as discussed in Section 12.6.2. The Proposed Development in combination with other developments, could result in potential increased negative effects to sub-surface archaeological features (i.e. cumulative impacts). Since all projects have been assessed from a cultural heritage perspective through the EIAR process, all potential negative effects of other projects are deemed to have been dealt with through the use of effective mitigation measures and planning conditions issued through the Planning Authorities. There is no potential for cumulative impacts to sub-surface archaeological features arising from the Proposed Development in combination with other projects.

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The analysis of potential direct and indirect impacts on cultural heritage concludes that the Proposed Development will result in no significant impacts. There is no potential for cumulative impacts arising from the Proposed Development in combination with other projects in the vicinity. No significant cumulative impacts on cultural heritage are anticipated during the construction or operation phases as long as mitigation measures outlined are put in place.

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13. MATERIAL ASSETS

13.1 Introduction

Material Assets are defined as *"resources that are valued and that are intrinsic to specific places"*, which can be of human or natural origin. Material Assets are also defined as *"built services and infrastructure"*. Most assets of natural origin are assessed elsewhere within this Environmental Impact Assessment Report (EIAR), including biodiversity (in Chapter 6), land & soil (Chapter 7), water quality (Chapter 8), air quality and climate (Chapter 9), and landscape (Chapter 11).

This chapter of the EIAR addresses, therefore, the likely significant effects of the Proposed Development on assets which are intrinsically of human origin:

- Traffic and Transport – Section 13.1
- Utilities and Services – Section 13.2

Another material asset of human origin, archaeology and cultural heritage, is addressed in Chapter 12.

A full description of the Proposed Development is provided in Chapter 4 of this EIAR, including construction methodology details and phasing. While the developments described in Chapter 4 will be subject to separate planning applications, it was considered prudent to consider all six applications together under one EIAR, due to the proximity, construction timelines and shared infrastructure between the developments. Site A, Site B, Site C, MOOR, Kildare Bridge and Moyglare Bridge will be collectively referred to as the 'Proposed Development' henceforth.

13.1.1 Statement of Authority

This section of the EIAR has been compiled by Niamh McHugh, David Naughton, Daire O'Shaughnessy and reviewed by Michael Watson, of MKO. Niamh is a Graduate Environmental Scientist and holds a BSc (Hons) in Environmental Science from the National University of Ireland, Galway. Since joining the company, Niamh has been involved in the preparation of chapters for a number of Environmental Impact Assessment Reports for large-scale developments. David is an Environmental Scientist with over five years of consultancy experience with MKO and has been involved in a number of EIAR applications, predominantly in renewable energy, namely onshore wind. David has worked as project manager for a number of EIAR applications, providing a pivotal link liaising between the applicant and the EIAR project team to ensure all work is carried out to a high standard. David holds a BSc (Hons) in Environmental Science. Daire O'Shaughnessy is an Environmental Scientist who holds a B.Sc (Hons) in Environmental Science with three years of consultancy experience with MKO and has been involved in a range of EIAR applications. Michael Watson is a Project Director with MKO; with over 18 years' experience in the environmental sector. His project experience includes the management and productions of Environmental Impact Assessments (EIS/EIAR), particularly within the wind energy sector.

This chapter of the EIAR takes into the account the details and findings of the following reports and assessments, which are presented in the Appendices of the EIAR:

- Volume 3a, 3b & 3c(i) - Appendix 4-1: Mobility Management Plans, prepared by O'Connor Sutton Cronin Consulting Engineers
- Volume 3a, 3b & 3c(i) Appendix 4-3 and Volume 3d, 3e, 3f – Appendix 4-2: Construction and Environmental Management Plans (including Construction Traffic), prepared by O'Connor Sutton Cronin Consulting Engineers
- Volume 3a, 3b & 3c(i) - Appendix 4-9: Engineering Services Reports, prepared by O'Connor Sutton Cronin Consulting Engineers

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- Volumes 3a, 3b, 3c(i) & 3d Appendix 13-1: Traffic Impact Assessments, prepared by O'Connor Sutton Cronin Consulting Engineers
- Volume 3a, 3b & 3c - Appendix 13-2: Road Safety Audits, prepared by Bruton Consulting Engineers.

13.1.2 Policy Context, Guidance and Legislation

This chapter of the EIAR has been prepared in accordance with the guidance and legislation set out in Section 1.4 of Chapter 1. The relevant policy context for the Proposed Development is set out in Sections 2.4 to 2.7 of Chapter 2 of the EIAR, including reference to national, regional and local policy.

The Traffic Impact Assessments set out in Appendix 13-1 of this EIAR, which have informed the preparation of the Traffic and Transport section of this chapter, were prepared in accordance with the following:

- *Traffic & Transport Assessment Guidelines (2014)* as published by the former National Roads Authority (NRA) now Transport Infrastructure Ireland (TII);
- *Guidelines for Traffic Impact Assessment (1997)* as published by the Chartered Institute of Highways & Transportation.

13.2 Traffic and Transport

13.2.1 Introduction

The purpose of this Traffic and Transport EIAR Section is to assess the traffic impact of the Proposed Developments on the surrounding network. The effect of travel demands and movement generated by the Proposed Development are described throughout this Section, which also sets out the proposed measures to mitigate these effects where necessary.

This section of the EIAR is written as a concise summary of the Traffic Impact Assessments (TIA) and Mobility Management Plans (MMP), included in Appendices 13-1 and 4-1 in Volumes 3a, 3b 3c(i) & 3c(ii) and the Traffic Impact Assessment (TIA), included as Appendix 13-1 in Volume 3d for the MOOR of this EIAR. It also refers to the Road Safety Audits presented in Volumes 3a & 3b Appendix 13-2 of the EIAR. Rather than repeat the detailed information and traffic assessments carried out within these reports, they are referred to throughout this Section, with the impact assessment findings presented below.

The TIAs and MMPs for the Proposed Development have been prepared by Wian Marais of O'Connor Sutton Cronin & Associates (OCSC). Wian is a professional engineer under the Engineering Council of South Africa and the Institute of Municipal Engineering of Southern Africa. Wian has extensive knowledge in traffic engineering, traffic modelling/ simulation, geometric design and transportation planning. And has experience in traffic & transport assessment and traffic redistribution within mixed-use developments.

13.2.2 Scoping and Consultation

The scope for this assessment has been informed by consultation with statutory consultees, bodies with environmental responsibility and other interested parties as described in Chapter 2 of the EIAR. The relevant consultee responses are summarised below. Full copies of all scoping responses are provided in Appendices 2-1 of this EIAR.

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Department of Transport

The Department of Transport responded to the Scoping Document on 1st September 2021, stating the following:

> *"Given the proximity of the Moygaddy sites to the Royal Canal Greenway and NTA plans for additional cycling and pedestrian facilities within Maynooth, it will be vital that the masterplan being developed includes significant provision for cycling and pedestrian access from the sites to Maynooth train station, the University and the Royal Canal Greenway and also significant provision for cycle parking within the sites."*

The Proposed Development includes for the provision of additional cycling and pedestrian facilities within Moygaddy, including provision of parking/storage for bicycles and road upgrade works to facilitate cycling and pedestrian access along the R157, L22143 and Kildare Bridge. Further details on these works are presented in the detailed development description in Chapter 4 of this EIAR and in the Mobility Management Plans in Volumes 3a, 3b & 3c(i) in Appendix 4-1.

Transport Infrastructure Ireland

Transport Infrastructure Ireland (TII) responded to the Scoping Document on 23rd September 2021. Their response provided recommendations to be followed when preparing the EIAR, which can be seen in full under Appendices 2-1 of this EIAR. All relevant TII guidelines and policies, primarily in relation to the environment and planning, have been taken into account in the preparation of this assessment.

13.2.3 Assessment Methodology

The Traffic Impact Assessments in Volumes 3a, 3b, 3c(i) & 3d - Appendix 13-1 of this EIAR, which have informed the preparation of this Section, were carried out in line with the Transport Infrastructure Ireland's (TII) Traffic and Transport Assessments Guidelines as follows:

- **Baseline Transportation Review:** Undertaking of a desktop review of current planning policies and objectives, existing public transport services, walking and cycling network and existing and roads infrastructure. This also included a review of relevant committed developments adjacent the proposed development site.
- **Baseline Traffic Flow Review:** Undertake site visits to review current traffic conditions and to make observations on same. Identify key junctions where traffic count survey information is required.
- **Future Transport Infrastructure Review**: Undertake review of current transport policies, plans and strategy to identify future short, medium and long terms transport proposals which may have a material impact on the travel behaviour associated with the proposed development.
- **Development Proposals Review:** Review the proposed development in terms of provision for access by walking, cycling, public transport and car.
- **Transport Characteristics Review**: Undertake an assessment of the likely modal share, trip generation, assignment and distribution having regard to existing and potential future traffic patterns on the local road network.
- **Identification of Local Road Network Proposals:** Identify proposed junction works on the local road network in terms of new junctions, improvements for pedestrians, cyclists and traffic at existing junctions.
- **Assessment of Road Traffic Impact:** Undertake an assessment of the key junctions during the base year, opening year, opening year plus five and opening year plus fifteen assessment years for both 'without development' and 'with development' scenarios in order to determine future operation and any necessary mitigation measures required

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13.2.4 Receiving Environment

Chapter 4 of this EIAR on Description of the Proposed Development sets out a detailed description of the Proposed Development site, including reference to existing site access routes and proposed updates to same. A summary of the relevant study areas, as per the TIAs is provided as follows:

13.2.4.1 Strategic Employment Zone (Site A)

The subject site is located on the southernmost extent of County Meath, aligning with the county boundary to Co. Kildare. It is approximately 2km north of the town of Maynooth, Co. Kildare, which forms part of a larger strategic landbank on zoned lands known as Maynooth Environs. The site is immediately bound by:

- R157 Maynooth – Dunboyne Regional Road, to the east;
- Agricultural lands to the north and south; and
- Moygaddy Stream to the west.

13.2.4.2 Healthcare Facilities (Site B)

The subject site is located on the southernmost extent of County Meath, aligning with the county boundary to Co. Kildare. It is approximately 1.5km north of the town of Maynooth, Co. Kildare, which forms part of a larger strategic landbank on zoned lands known as Maynooth Environs. The site is immediately bound by:

- R157 Maynooth – Dunboyne Regional Road, to the east;
- Agricultural lands to the north and west; and
- River Rye Water, to the south.

13.2.4.3 Strategic Housing Development (SHD, Site C)

The subject site is located on the southernmost extent of County Meath, aligning with the county boundary to Co. Kildare, and is approximately 1.5km north of the town of Maynooth, Co. Kildare, and is immediately bound by:

- Agricultural lands to the east, north and west;
- River Rye Water to the south.

13.2.4.4 Maynooth Outer Orbital Road (MOOR)

The planning application for the MOOR includes for the construction of c1.7km of new distributor road linking the existing R157 Regional Road, located to the east of Site B, to the Moyglare Hall road in Mariavilla, located southwest of the SHD (Site C) site. The distributor road will comprise of 7.0m carriageway with turning lanes where required, footpaths, cycle tracks and grass verges. Road upgrade works will also be required to facilitate the delivery of the MOOR, including approximately 750m section of proposed road upgrade works along the existing R157 Regional Road from the existing Kildare Bridge up to the new proposed signalised junction with the MOOR.

Access to the proposed MOOR will be via the R157 Regional Road to the south and east, with access also being provided from the L2214 and L6219 Local Roads to the north and west of the site. Access will also be provided to the MOOR via the proposed Moyglare Bridge to the south.

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13.2.4.5 Kildare Bridge

The road network associated with the Kildare Bridge planning application can be broken-up in two distinct elements, mainly:

1. *Approximately 115m section of proposed road upgrade works along the existing R157 Regional Road between the existing Kildare Bridge and the Dunboyne Roundabout in County Kildare; and*
2. *Installation of new standalone pedestrian and cycle link adjacent to the Kildare Bridge.*

The main access to the Kildare Bridge site will be via the R157 Regional Road (Dunboyne Road).

13.2.4.6 Moyglare Bridge

The road network associated with the Moyglare Bridge planning application can be broken-up in two distinct elements, mainly:

1. *Installation of 2 no. new single span bridge over the River Rye and Blackhall Little Stream to facilitate the delivery of the MOOR; and*
2. *Construction of approximately 160m section of new access road linking the existing Moyglare Hall Road to the south of the site to the proposed single span bridge crossing the River Rye.*

The main access to the Moyglare Bridge Planning Application site will be via the existing Moyglare Hall Road to the south of the site.

13.2.5 Likely and Significant Effects and Associated Mitigation Measures

The findings of this section are based on the Traffic Impact Assessments prepared by O'Connor Sutton Cronin Consulting Engineers, presented in Volumes 3a, 3b, 3c & 3d - Appendix 13-1 of this EIAR. It also refers to the Construction and Environmental Management Plans (CEMPs, including Construction Traffic), also prepared by O'Connor Sutton Cronin Consulting Engineers, and the Road Safety Audits prepared by Bruton Consulting Engineers, presented in Volume 3a, 3b & 3c as Appendix 13-2.

The impact classification is based on the Environmental Protection Agency (EPA) terminology presented in Table 1-1 in Chapter 1 of this EIAR.

13.2.5.1 'Do-Nothing' Scenario

If the proposed development does not proceed, there will be no additional traffic generated or accommodation works carried out on the local road network and therefore no direct or indirect effects on roads and traffic. This includes no positive impacts resulting from the junction and road upgrades, additional capacity or improved pedestrian and cycling infrastructure to be provided by the proposed development.

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13.2.5.2 Construction Phase

13.2.5.2.1 *Strategic Employment Zone (Site A)*

Pre-Mitigation Impact

The Traffic Impact Assessment in Volume 3a, Appendix 13-1 estimates that there will be a maximum of twelve HGVs serving the site during any given daytime hour. The two-way HGV traffic is unlikely to be higher than 24 vehicles per hour at any point of the day. Based on an 8-hour day and a 22 working day month, 24 vehicles per hour equates to 4,224 vehicles per month.

In the absence of mitigation measures, the additional traffic would give rise to a short-term, moderate negative impact on the surrounding transport network.

Proposed Mitigation Measures

- Excavated soil will be re-used within the site where possible, for fill or landscaping purposes, to reduce the amount of material to be transported off-site.
- The contractor will maximise the use of precast materials or prefabricated materials wherever possible and economically viable.
- Adequate storage space will be provided on site for the storage of materials and a site strategy will be put in place to manage the timing of deliveries to the site.
- Trips by construction workers will be limited by the provision of car-sharing and Travel to Work Scheme benefits. Construction workers will be encouraged to use public transport to the maximum possible extent.
- The appointed contractor will put in place measures to keep public roads free of detritus and debris. This will include undertaking regular road sweeping by a mechanical sweeper and the provision of wheel wash facilities on the site.
- A design stage Construction and Environmental Management Plan (CEMP) is presented in Volume 3a Appendix 4-3 of this EIAR. The CEMP includes traffic management measures for the proposed development site, which will be finalised upon agreement with the relevant Local Authority in advance of the commencement of construction.

Residual Impact

Following the application of traffic control measures throughout the construction phase, the overall short-term impact on the receiving network will be slight.

Significance of Effects

The construction phase of the proposed development will have a short-term slight negative effect on the surrounding transport network. There will be no significant effects on the network.

13.2.5.2.2 *Healthcare Facilities (Site B)*

Pre-Mitigation Impact

The Traffic Impact Assessment in Volume 3b Appendix 13-1 estimates that there will be a maximum of twelve HGVs serving the site during any given daytime hour. The two-way HGV traffic is unlikely to be higher than 24 vehicles per hour at any point of the day. Based on an 8-hour day and a 22 working day month, 24 vehicles per hour equates to 4,224 vehicles per month.

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In the absence of mitigation measures, the additional traffic would give rise to a short-term, moderate negative impact on the surrounding transport network.

Proposed Mitigation Measures

- Excavated soil will be re-used within the site where possible, for fill or landscaping purposes, to reduce the amount of material to be transported off-site.
- The contractor will maximise the use of precast materials or prefabricated materials wherever possible and economically viable.
- Adequate storage space will be provided on site for the storage of materials and a site strategy will be put in place to manage the timing of deliveries to the site.
- Trips by construction workers will be limited by the provision of car-sharing and Travel to Work Scheme benefits. Construction workers will be encouraged to use public transport to the maximum possible extent.
- The appointed contractor will put in place measures to keep public roads free of detritus and debris. This will include undertaking regular road sweeping by a mechanical sweeper and the provision of wheel wash facilities on the site.
- A design stage Construction and Environmental Management Plan (CEMP) is presented in Volume 3b Appendix 4-3 of this EIAR. The CEMP includes traffic management measures for the proposed development site, which will be finalised upon agreement with the relevant Local Authority in advance of the commencement of construction.

Residual Impact

Following the application of traffic control measures throughout the construction phase, the overall short-term impact on the receiving network will be slight.

Significance of Effects

The construction phase of the proposed development will have a short-term slight negative effect on the surrounding transport network. There will be no significant effects on the network.

13.2.5.2.3 *Strategic Housing Development (SHD, Site C)*

Pre-Mitigation Impact

The Traffic Impact Assessment in Volume 3c(ii) Appendix 13-1 estimates that there will be a maximum of twelve HGVs serving the site during any given daytime hour. The two-way HGV traffic is unlikely to be higher than 24 vehicles per hour at any point of the day. Based on an 8-hour day and a 22 working day month, 24 vehicles per hour equates to 4,224 vehicles per month.

In the absence of mitigation measures, the additional traffic would give rise to a short-term, moderate negative impact on the surrounding transport network.

Proposed Mitigation Measures

- Excavated soil will be re-used within the site where possible, for fill or landscaping purposes, to reduce the amount of material to be transported off-site.
- The contractor will maximise the use of precast materials or prefabricated materials wherever possible and economically viable.
- Adequate storage space will be provided on site for the storage of materials and a site strategy will be put in place to manage the timing of deliveries to the site.

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- Trips by construction workers will be limited by the provision of car-sharing and Travel to Work Scheme benefits. Construction workers will be encouraged to use public transport to the maximum possible extent.
- The appointed contractor will put in place measures to keep public roads free of detritus and debris. This will include undertaking regular road sweeping by a mechanical sweeper and the provision of wheel wash facilities on the site.
- A design stage Construction and Environmental Management Plan (CEMP) is presented in Volume 3c(i) Appendix 4-3 of this EIAR. The CEMP includes traffic management measures for the proposed development site, which will be finalised upon agreement with the relevant Local Authority in advance of the commencement of construction.

Residual Impact

Following the application of traffic control measures throughout the construction phase, the overall short-term impact on the receiving network will be slight.

Significance of Effects

The construction phase of the proposed development will have a short-term slight negative effect on the surrounding transport network. There will be no significant effects on the network.

13.2.5.2.4 *Maynooth Outer Orbital Road (MOOR)*

Pre-Mitigation Impact

The Traffic Impact Assessment in Volume 3d Appendix 13-1 estimates that there will be a maximum of twelve HGVs serving the site during any given daytime hour. The two-way HGV traffic is unlikely to be higher than 24 vehicles per hour at any point of the day. Based on an 8-hour day and a 22 working day month, 24 vehicles per hour equates to 4,224 vehicles per month.

In the absence of mitigation measures, the additional traffic would give rise to a short-term, moderate negative impact on the surrounding transport network.

Proposed Mitigation Measures

- Excavated soil will be re-used within the site where possible, for fill or landscaping purposes, to reduce the amount of material to be transported off-site.
- The contractor will maximise the use of precast materials or prefabricated materials wherever possible and economically viable.
- Adequate storage space will be provided on site for the storage of materials and a site strategy will be put in place to manage the timing of deliveries to the site.
- Trips by construction workers will be limited by the provision of car-sharing and Travel to Work Scheme benefits. Construction workers will be encouraged to use public transport to the maximum possible extent.
- The appointed contractor will put in place measures to keep public roads free of detritus and debris. This will include undertaking regular road sweeping by a mechanical sweeper and the provision of wheel wash facilities on the site.
- A design stage Construction and Environmental Management Plan (CEMP) is presented in Volume 3e Appendix 4-2 of this EIAR. The CEMP includes traffic management measures for the proposed development site, which will be finalised upon agreement with the relevant Local Authority in advance of the commencement of construction.

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Residual Impact

Following the application of traffic control measures throughout the construction phase, the overall short-term impact on the receiving network will be slight.

Significance of Effects

The construction phase of the proposed development will have a short-term slight negative effect on the surrounding transport network. There will be no significant effects on the network.

13.2.5.2.5 *Kildare Bridge*

Pre-Mitigation Impact

The traffic impact assessment of the proposed Kildare Bridge works has been considered as part of the above proposed works. If the proposed Kildare Bridge works were to be carried out as a stand-alone project, there would be a temporary slight negative impact on the receiving network, in the absence of any mitigation or control measures.

Proposed Mitigation Measures

- Excavated soil will be re-used within the site where possible, for fill or landscaping purposes, to reduce the amount of material to be transported off-site.
- The contractor will maximise the use of precast materials or prefabricated materials wherever possible and economically viable.
- Adequate storage space will be provided on site for the storage of materials and a site strategy will be put in place to manage the timing of deliveries to the site.
- Trips by construction workers will be limited by the provision of car-sharing and Travel to Work Scheme benefits. Construction workers will be encouraged to use public transport to the maximum possible extent.
- The appointed contractor will put in place measures to keep public roads free of detritus and debris. This will include undertaking regular road sweeping by a mechanical sweeper and the provision of wheel wash facilities on the site.
- Traffic management measures will be finalised upon agreement with the relevant Local Authority in advance of the commencement of construction.

Residual Impact

The proposed works will have a temporary imperceptible negative impact on the receiving network.

Significance of Effects

There will be no significant effect on the receiving network during the construction phase.

13.2.5.2.6 *Moyglare Bridge*

Pre-Mitigation Impact

The traffic impact assessment of the proposed Moyglare Bridge works has been considered as part of the above proposed works. If the proposed Moyglare Bridge works were to be carried out as a stand-alone project, there would be a temporary slight negative impact on the receiving network, in the absence of any mitigation or control measures.

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Proposed Mitigation Measures

- Excavated soil will be re-used within the site where possible, for fill or landscaping purposes, to reduce the amount of material to be transported off-site.
- The contractor will maximise the use of precast materials or prefabricated materials wherever possible and economically viable.
- Adequate storage space will be provided on site for the storage of materials and a site strategy will be put in place to manage the timing of deliveries to the site.
- Trips by construction workers will be limited by the provision of car-sharing and Travel to Work Scheme benefits. Construction workers will be encouraged to use public transport to the maximum possible extent.
- The appointed contractor will put in place measures to keep public roads free of detritus and debris. This will include undertaking regular road sweeping by a mechanical sweeper and the provision of wheel wash facilities on the site.
- Traffic management measures will be finalised upon agreement with the relevant Local Authority in advance of the commencement of construction.

Residual Impact

The proposed works will have a temporary imperceptible negative impact on the receiving network.

Significance of Effects

There will be no significant effect on the receiving network during the construction phase.

13.2.5.3 Operational Phase

13.2.5.3.1 *Strategic Employment Zone (Site A)*

Pre-Mitigation Impact

Traffic modelling for the operational phase of the proposed development has been completed as part of the Traffic Impact Assessment in Volume 3a Appendix 13-1 of this EIAR.

The traffic modelling compares the 'Do-Nothing' scenario to the 'Do-Something' (i.e. the proposed development proceeds) and 'Do Maximum' (i.e. the proposed development plus other developments which form part of the Moygaddy masterplan proceed) scenarios.

The traffic modelling results include the following key findings:

- Potential trip redistribution through Kilcloon / L2214 local road is negligible.
- Upgrade of the L6219 and R157 road junction will allow for redistribution of traffic away from Moynooth town.
- All key junctions within the study area have been modelled and found to have adequate capacity for the proposed development without any significant delays. Where some congestion or delays were identified during morning or afternoon peaks, this will be addressed by way of the measures set out below.

In the absence of any control or mitigation measures the operational phase of the proposed development could have a long-term moderate negative impact on the receiving traffic and transport network.

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Proposed Mitigation Measures

Where any potential negative impacts were identified as part of traffic modelling, these will be addressed by way of the junction upgrades and additional road capacity to be provided as part of the proposed development. Upgrades will include new signalised junctions, road improvements, and provision of extensive new pedestrian and cycling facilities. Operation of the proposed development will be carried out in a phased manner initially.

Residual Impact

The operational phase of the proposed development will have a long-term moderate positive impact on the receiving traffic and transport network.

Significance of Effects

The operational phase of the proposed development will have a long-term moderate positive effect on the receiving traffic and transport network.

13.2.5.3.2 *Healthcare Facilities (Site B)*

Pre-Mitigation Impact

Traffic modelling for the operational phase of the proposed development has been completed as part of the Traffic Impact Assessment in Volume 3b Appendix 13-1 of this EIAR.

The traffic modelling compares the 'Do-Nothing' scenario to the 'Do-Something' (i.e. the proposed development proceeds) and 'Do Maximum' (i.e. the proposed development plus other developments which form part of the proposed Moygaddy masterplan proceed) scenarios.

The traffic modelling results include the following key findings:

- Potential trip redistribution through Kilcloon / L2214 local road is negligible.
- Upgrade of the L6219 and R157 road junction will allow for redistribution of traffic away from Moynooth town.
- All key junctions within the study area have been modelled and found to have adequate capacity for the proposed development without any significant delays. Where some congestion or delays were identified during morning or afternoon peaks, this will be addressed by way of the measures set out below.

In the absence of any control or mitigation measures the operational phase of the proposed development could have a long-term moderate negative impact on the receiving traffic and transport network.

Proposed Mitigation Measures

Where any potential negative impacts were identified as part of traffic modelling, these will be addressed by way of the junction upgrades and additional road capacity to be provided as part of the proposed development. Upgrades will include new signalised junctions, road improvements, and provision of extensive new pedestrian and cycling facilities. Operation of the proposed development will be carried out in a phased manner initially.

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Residual Impact

The operational phase of the proposed development will have a long-term moderate positive impact on the receiving traffic and transport network.

Significance of Effects

The operational phase of the proposed development will have a long-term moderate positive effect on the receiving traffic and transport network.

13.2.5.3.3 *Strategic Housing Development (SHD, Site C)*

Pre-Mitigation Impact

Traffic modelling for the operational phase of the proposed development has been completed as part of the Traffic Impact Assessment in Volume 3c(ii) Appendix 13-1 of this EIAR.

The traffic modelling compares the 'Do-Nothing' scenario to the 'Do-Something' (i.e. the proposed development proceeds) and 'Do Maximum' (i.e. the proposed development plus other developments which form part of the proposed Moygaddy masterplan proceed) scenarios.

The traffic modelling results include the following key findings:

- Potential trip redistribution through Kilcloon / L2214 local road is negligible.
- Upgrade of the L6219 and R157 road junction will allow for redistribution of traffic away from Moynooth town.
- All key junctions within the study area have been modelled and found to have adequate capacity for the proposed development without any significant delays. Where some congestion or delays were identified during morning or afternoon peaks, this will be addressed by way of the measures set out below.

In the absence of any control or mitigation measures the operational phase of the proposed development could have a long-term moderate negative impact on the receiving traffic and transport network.

Proposed Mitigation Measures

Where any potential negative impacts were identified as part of traffic modelling, these will be addressed by way of the junction upgrades and additional road capacity to be provided as part of the proposed development. Upgrades will include new signalised junctions, road improvements, and provision of extensive new pedestrian and cycling facilities. Operation of the proposed development will be carried out in a phased manner initially.

Residual Impact

The operational phase of the proposed development will have a long-term moderate positive impact on the receiving traffic and transport network.

Significance of Effects

The operational phase of the proposed development will have a long-term moderate positive effect on the receiving traffic and transport network.

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13.2.5.3.4 *Maynooth Outer Orbital Road (MOOR)*

Pre-Mitigation Impact

Traffic modelling for the operational phase of the proposed development has been completed as part of the Traffic Impact Assessment in Volume 3d Appendix 13-1 of this EIAR.

The traffic modelling compares the 'Do-Nothing' scenario to the 'Do-Something' (i.e. the proposed development proceeds) and 'Do Maximum' (i.e. the proposed development plus other developments which form part of the proposed Moygaddy masterplan proceed) scenarios.

The traffic modelling results include the following key findings:

- Potential trip redistribution through Kilcloon / L2214 local road is negligible.
- Upgrade of the L6219 and R157 road junction will allow for redistribution of traffic away from Moynooth town.
- All key junctions within the study area have been modelled and found to have adequate capacity for the proposed development without any significant delays. Where some congestion or delays were identified during morning or afternoon peaks, this will be addressed by way of the measures set out below.

In the absence of any control or mitigation measures the operational phase of the proposed development could have a long-term moderate negative impact on the receiving traffic and transport network.

Proposed Mitigation Measures

Where any potential negative impacts were identified as part of traffic modelling, these will be addressed by way of the junction upgrades and additional road capacity to be provided as part of the proposed development. Upgrades will include new signalised junctions, road improvements, and provision of extensive new pedestrian and cycling facilities. Operation of the proposed development will be carried out in a phased manner initially.

Residual Impact

The following benefits to the Maynooth Transport Strategy are expected as part of this development:

- Improvements to the connectivity in the area of the development;
- Increase in capacity of roads and junctions in the immediate vicinity;
- Provision of dedicated pedestrian and cycle infrastructure, enabling a strong modal shift towards sustainable transport;
- The proposed development will also allow the BusConnects proposal to take account of the new infrastructure and further service the Maynooth area.

In summary, the infrastructural upgrades proposed as part of the Moygaddy development will have an overall long-term significant positive impact on Maynooth and its environs.

Significance of Effects

The operational phase of the proposed development will have a long-term significant positive effect on the receiving traffic and transport network.

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13.2.5.3.5 *Kildare Bridge*

Pre-Mitigation Impact

The traffic impact assessment of the proposed Kildare Bridge works has been considered as part of the above proposed works. The operation phase of this development will provide upgrades to a section of existing road and additional new pedestrian and cycling facilities, thereby having a long-term moderate positive impact on the receiving environment.

Residual Impact

The proposed development will have a long-term moderate positive impact in terms of traffic and transport.

Significance of Effects

The proposed development will have a long-term moderate positive effect in terms of traffic and transport.

13.2.5.3.6 *Moyglare Bridge*

Pre-Mitigation Impact

The traffic impact assessment of the proposed Kildare Bridge works has been considered as part of the above proposed works. The operation phase of this development will provide upgrades to a section of existing road and additional new pedestrian and cycling facilities, thereby having a long-term moderate positive impact on the receiving environment.

Residual Impact

The proposed development will have a long-term moderate positive impact in terms of traffic and transport.

Significance of Effects

The proposed development will have a long-term moderate positive effect in terms of traffic and transport.

13.2.5.4 Cumulative Effects Resulting from Interactions between Various Elements of the Proposed Development

The proposed development has been subject to traffic impact modelling, including the assessment of cumulative effects between the various elements of the proposed development. This assessment has found that due to the nature of the works associated with the proposals, including the upgrade of the existing network and the provision of new routes, including enhanced pedestrian and cycling infrastructure, the network is capable of accommodating the increased traffic associated with the project. The proposed development is predicted to have a long-term positive cumulative effect with regard to traffic and transport.

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13.2.5.5 Cumulative In-Combination Effects

The proposed development has been subject to traffic impact modelling, including the assessment of cumulative effects with the potential future traffic volumes associated with key junctions in the study area. This assessment has found that due to the nature of the works associated with the proposals, including the upgrade of the existing network and the provision of new routes, including enhanced pedestrian and cycling infrastructure, the network can accommodate the increased traffic associated with the project.

13.3 Utilities and Services

13.3.1 Introduction

This section of the EIAR sets out the impact assessment of the proposed development with regard to utilities and services, including electricity, telecommunications, gas, water supply, sewage, land-use and waste management. This section uses details and information provided in the following:

- Chapter 4 of this EIAR: Description of the Proposed Development, including Section 4.4 Construction Methodologies;
- Volumes 3a, 3b & 3c(i), Appendix 4-4 and Volumes 3d, 3e & 3f, Appendix 4-3: Construction and Demolition Waste Management Plans, prepared by O'Connor Sutton Cronin Consulting Engineers;
- Volumes 3a, 3b, & 3c(i) Appendix 4-5: Operational Waste Management Plans, prepared by Byrne Environmental;
- Volumes 3a, 3b & 3c(i), Appendix 4-9: Engineering Services Reports, prepared by O'Connor Sutton Cronin Consulting Engineers.

13.3.2 Scoping and Consultation

The relevant national and regional authorities and bodies listed in Chapter 2 of this EIAR were consulted as part of this assessment. The responses of the consultees were taken into account during preparation of this assessment, as summarised below. Copies of all scoping responses are provided in Appendices 2-1 of the EIAR.

Health Service Executive

The Health Service Executive (HSE) set out a number of recommendations in their scoping response, including that the EIAR should assess the impacts of the proposed development with regard to construction works, including waste management, pest control management, dust, noise and emissions to surface and groundwater.

13.3.3 Receiving Environment

The proposed development site is a greenfield site, currently being used for agricultural purposes, so the possible presence of underground infrastructure is limited in extent. A development of this nature has the potential to impact the following types of utilities and services:

- Electricity Network
- Telecommunications Network (including phone and broadband)
- Gas Distribution Network
- Water Supply Network
- Wastewater Drainage (Sewage Network)

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- Land Use
- Waste Management.

The construction methodology detailed in Chapter 4: Section 4.4 of this EIAR describes the manner in which the Proposed Development will be constructed, including any excavations and installations of services. Prior to works, the area where excavations are planned will be surveyed and all existing services will be identified. All relevant bodies i.e., ESB, Bord Gáis, EirGrid, Irish Water, Meath County Council, Kildare County Council, etc. will be contacted and all drawings contacted and drawings for all existing services sought.

Any underground services encountered during the works will be surveyed for level and where possible will be left in place. If there is a requirement to move the service, then the appropriate body (ESB, Gas Networks Ireland, Irish Water, etc.) will be contacted, and the appropriate procedure put in place. Back fill around any utility services will be with dead sand/pea shingle where appropriate. All works will be in compliance with required specifications. Further details are provided in Section 4.4 of this EIAR and in the Engineering Services Reports in Appendix 4-9. A summary is provided below with regard to each type of service.

13.3.3.1 Electricity

All proposed works for the project have been designed to avoid these services as much as possible, but where any moving of electricity lines are required, this will be carried out in consultation with ESBN.

13.3.3.2 Telecommunications

All proposed works for the project have been designed to avoid any underground telecommunications services as much as possible, but where any moving of lines are required, this will be carried out in consultation with the relevant operator.

13.3.3.3 Gas

There are no major Gas lines on the site of the Proposed Development. All proposed works for the project have been designed to avoid these services as much as possible.

13.3.3.4 Water Supply

The potable water supply is addressed in the Engineering Services Report, provided in Volumes 3a, 3b & 3c(i) Appendix 4-9 of this EIAR, prepared by O'Connor Sutton Cronin Consulting Engineers.

The project has received a confirmation of feasibility for connection to Irish Water assets.

13.3.3.5 Wastewater Drainage

Wastewater drainage is addressed in the Engineering Services Report, provided in Volumes 3a, 3b & 3c(i) Appendix 4-9 of this EIAR, prepared by O'Connor Sutton Cronin Consulting Engineers.

There is currently no existing wastewater infrastructure in the immediate vicinity of the site. The nearest public wastewater infrastructure is Maynooth's public Wastewater Pumping Station (WWPS).

13.3.3.6 Land Use

The site of the Proposed Development is currently a greenfield site, used currently for agricultural purposes and is subject to moderate pastural livestock grazing.

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The Proposed Development site is bounded by the River Rye Water along the southern boundary and agricultural fields to the north and west, while Carton House Demesne (Demense Wall - RPS Ref: 91556) is located directly adjacent to the east. The Dunboyne Road (R157) and local road L2214-3/ /L6219 (included as part of the proposed Maynooth Outer Orbital Road (MOOR)) roads are located to the south-east and north/ north-west respectively. Access to the site is currently from the Dunboyne Road (R157) and the local road L2214-3/L6219.

13.3.3.7 Waste Management

The site is currently used for agricultural purposes and therefore not subject to a waste management service at present. Waste management plans for the proposed development are presented in Volumes 3a, 3b, 3c(i) Appendices 4-4 and Volumes 3d, 3e, 3f, Appendix 4-3 (Construction and Demolition Stage) and Volumes 3a, 3b, 3c(i) Appendix 4-5 (Operational Phase) of this EIAR.

13.3.4 Likely and Significant Effects and Associated Mitigation Measures

13.3.4.1 'Do-Nothing' Scenario

The site currently comprises greenfield agricultural lands which are used for pastoral grazing. Should the Proposed Development not proceed, the current state of the site would not change materially and there would be no impacts in terms of services or utilities.

13.3.4.2 Construction Phase

13.3.4.2.1 *Strategic Employment Zone (Site A)*

Pre-Mitigation Impact

The potential construction phase impacts of the proposed development with regard to utilities and services include the following:

- Potential disturbance or damage to underground services;
- The generation of construction phase waste, including wastewater;
- Changes to land-use.

In the absence of any control or mitigation measures, the construction phase could give rise to a short-term moderate negative impact on utilities or services.

Proposed Mitigation Measures

The below measures have been incorporated into the design of the proposed development and will be used to avoid any negative impacts on utilities or services during the construction phase of the proposed development:

- The area where excavations are planned will be surveyed and all existing services will be identified. All relevant bodies i.e., ESB, Bord Gáis, Irish Water, Eircom, Meath County Council, Kildare County Council etc. will be contacted prior to construction works and all drawings for all existing services sought. All plant operators and general operatives will be inducted and informed as to the location of any services.
- Design stage Construction and Environmental Management Plans (Volume 3a, Appendix 4-3) and Waste Management Plans (Volume 3a, Appendix 4-4) have been prepared and will be updated prior to the commencement of construction works to take account of all requirements

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of the Planning Authority. The waste hierarchy will always be employed to ensure that the least possible amount of waste is produced during the construction phase, through reuse, recovering and recycling.

- Water will be supplied on site by water tankers for general use. Unless a temporary water supply is secured from Irish Water, potable water will be provided in the form of bottled water for staff use during the construction phase (prior to connections to the municipal water supply).
- Portable toilets will be provided for those working on the construction sites throughout the Proposed Development. Wastewater arising on-site from these toilets is stored in a sealed tank located within the portable toilets, and these will be emptied periodically (as required) by permitted waste contractors and transported to municipal wastewater treatment plants for treatment.

Residual Impact

There will be a short-term neutral imperceptible impact on services and utilities during the construction phase.

Significance of Effects

Based on the assessment above there will be no significant effects on services and utilities during the construction phase.

13.3.4.2.2 *Healthcare Facilities (Site B)*

Pre-Mitigation Impact

The potential impacts of the proposed development with regard to utilities and services include the following:

- Potential disturbance or damage to underground services;
- The generation of construction phase waste, including wastewater;
- Changes to land-use.

In the absence of any control or mitigation measures, the construction phase could give rise to a short-term moderate negative impact on utilities or services.

Proposed Mitigation Measures

The below measures have been incorporated into the design of the proposed development and will be used to avoid any negative impacts on utilities or services during the construction phase of the proposed development:

- The area where excavations are planned will be surveyed and all existing services will be identified. All relevant bodies i.e., ESB, Bord Gáis, Irish Water, Eircom, Meath County Council, Kildare County Council etc. will be contacted prior to construction works and all drawings for all existing services sought. All plant operators and general operatives will be inducted and informed as to the location of any services.
- Design stage Construction and Environmental Management Plans (Volume 3b, Appendix 4-3) and Waste Management Plans (Volume 3b, Appendix 4-4) have been prepared and will be updated prior to the commencement of construction works to take account of all requirements of the Planning Authority. The waste hierarchy will always be employed to ensure that the least possible amount of waste is produced during the construction phase, through reuse, recovering and recycling.

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- Water will be supplied on site by water tankers for general use. Unless a temporary water supply is secured from Irish Water, potable water will be provided in the form of bottled water for staff use during the construction phase (prior to connections to the municipal water supply).
- Portable toilets will be provided for those working on the construction sites throughout the Proposed Development. Wastewater arising on-site from these toilets is stored in a sealed tank located within the portable toilets, and these will be emptied periodically (as required) by permitted waste contractors and transported to municipal wastewater treatment plants for treatment.

Residual Impact

There will be a short-term neutral imperceptible impact on services and utilities during the construction phase.

Significance of Effects

Based on the assessment above there will be no significant effects on services and utilities during the construction phase.

13.3.4.2.3 *Strategic Housing Development (SHD, Site C)*

Pre-Mitigation Impact

The potential impacts of the proposed development with regard to utilities and services include the following:

- Potential disturbance or damage to underground services;
- The generation of construction phase waste, including wastewater;
- Changes to land-use.

In the absence of any control or mitigation measures, the construction phase could give rise to a short-term moderate negative impact on utilities or services.

Proposed Mitigation Measures

The below measures have been incorporated into the design of the proposed development and will be used to avoid any negative impacts on utilities or services during the construction phase of the proposed development:

- The area where excavations are planned will be surveyed and all existing services will be identified. All relevant bodies i.e., ESB, Bord Gáis, Irish Water, Eircom, Meath County Council, Kildare County Council etc. will be contacted prior to construction works and all drawings for all existing services sought. All plant operators and general operatives will be inducted and informed as to the location of any services.
- Design stage Construction and Environmental Management Plans (Volume 3c(i) Appendix 4-3) and Waste Management Plans (Volume 3c(i) Appendix 4-4) have been prepared and will be updated prior to the commencement of construction works to take account of all requirements of the Planning Authority. The waste hierarchy will always be employed to ensure that the least possible amount of waste is produced during the construction phase, through reuse, recovering and recycling.
- Water will be supplied on site by water tankers for general use. Unless a temporary water supply is secured from Irish Water, potable water will be provided in the form of bottled water for staff use during the construction phase (prior to connections to the municipal water supply).

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- Portable toilets will be provided for those working on the construction sites throughout the Proposed Development. Wastewater arising on-site from these toilets is stored in a sealed tank located within the portable toilets, and these will be emptied periodically (as required) by permitted waste contractors and transported to municipal wastewater treatment plants for treatment.

Residual Impact

There will be a short-term neutral imperceptible impact on services and utilities during the construction phase.

Significance of Effects

Based on the assessment above there will be no significant effects on services and utilities during the construction phase.

13.3.4.2.4 *Maynooth Outer Orbital Road (MOOR)*

Pre-Mitigation Impact

The potential impacts of the proposed development with regard to utilities and services include the following:

- Potential disturbance or damage to underground services;
- The generation of construction phase waste, including wastewater;
- Changes to land-use.

In the absence of any control or mitigation measures, the construction phase could give rise to a short-term moderate negative impact on utilities or services.

Proposed Mitigation Measures

The below measures have been incorporated into the design of the proposed development and will be used to avoid any negative impacts on utilities or services during the construction phase of the proposed development:

- The area where excavations are planned will be surveyed and all existing services will be identified. All relevant bodies i.e., ESB, Bord Gáis, Irish Water, Eircom, Meath County Council, Kildare County Council etc. will be contacted prior to construction works and all drawings for all existing services sought. All plant operators and general operatives will be inducted and informed as to the location of any services.
- Design stage Construction and Environmental Management Plans (Volume 3d Appendix 4-2) and Waste Management Plans (Volume 3d Appendix 4-3) have been prepared and will be updated prior to the commencement of construction works to take account of all requirements of the Planning Authority. The waste hierarchy will always be employed to ensure that the least possible amount of waste is produced during the construction phase, through reuse, recovering and recycling.
- Water will be supplied on site by water tankers for general use. Unless a temporary water supply is secured from Irish Water, potable water will be provided in the form of bottled water for staff use during the construction phase (prior to connections to the municipal water supply).
- Portable toilets will be provided for those working on the construction sites throughout the Proposed Development. Wastewater arising on-site from these toilets is stored in a sealed tank located within the portable toilets, and these will be emptied periodically (as required) by

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permitted waste contractors and transported to municipal wastewater treatment plants for treatment.

Residual Impact

There will be a short-term neutral imperceptible impact on services and utilities during the construction phase.

Significance of Effects

Based on the assessment above there will be no significant effects on services and utilities during the construction phase.

13.3.4.2.5 *Kildare Bridge*

Pre-Mitigation Impact

The potential impacts of the proposed development with regard to utilities and services include the following:

- Potential disturbance or damage to underground services;
- The generation of construction phase waste, including wastewater;
- Changes to land-use.

In the absence of any control or mitigation measures, the construction phase could give rise to a short-term moderate negative impact on utilities or services.

Proposed Mitigation Measures

The below measures have been incorporated into the design of the proposed development and will be used to avoid any negative impacts on utilities or services during the construction phase of the proposed development:

- The area where excavations are planned will be surveyed and all existing services will be identified. All relevant bodies i.e., ESB, Bord Gáis, Irish Water, Eircom, Meath County Council, Kildare County Council etc. will be contacted prior to construction works and all drawings for all existing services sought. All plant operators and general operatives will be inducted and informed as to the location of any services.
- Design stage Construction and Environmental Management Plans (Volume 3e Appendix 4-2) and Waste Management Plans (Volume 3e Appendix 4-3) have been prepared and will be updated prior to the commencement of construction works to take account of all requirements of the Planning Authority. The waste hierarchy will always be employed to ensure that the least possible amount of waste is produced during the construction phase, through reuse, recovering and recycling.
- Water will be supplied on site by water tankers for general use. Unless a temporary water supply is secured from Irish Water, potable water will be provided in the form of bottled water for staff use during the construction phase (prior to connections to the municipal water supply).
- Portable toilets will be provided for those working on the construction sites throughout the Proposed Development. Wastewater arising on-site from these toilets is stored in a sealed tank located within the portable toilets, and these will be emptied periodically (as required) by permitted waste contractors and transported to municipal wastewater treatment plants for treatment.

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Residual Impact

There will be a short-term neutral imperceptible impact on services and utilities during the construction phase.

Significance of Effects

Based on the assessment above there will be no significant effects on services and utilities during the construction phase.

13.3.4.2.6 *Moyglare Bridge*

Pre-Mitigation Impact

The potential impacts of the proposed development with regard to utilities and services include the following:

- Potential disturbance or damage to underground services;
- The generation of construction phase waste, including wastewater;
- Changes to land-use.

In the absence of any control or mitigation measures, the construction phase could give rise to a short-term moderate negative impact on utilities or services.

Proposed Mitigation Measures

The below measures have been incorporated into the design of the proposed development and will be used to avoid any negative impacts on utilities or services during the construction phase of the proposed development:

- The area where excavations are planned will be surveyed and all existing services will be identified. All relevant bodies i.e., ESB, Bord Gáis, Irish Water, Eircom, Meath County Council, Kildare County Council etc. will be contacted prior to construction works and all drawings for all existing services sought. All plant operators and general operatives will be inducted and informed as to the location of any services.
- Design stage Construction and Environmental Management Plans (Volume 3f Appendix 4-2) and Waste Management Plans (Volume 3f Appendix 4-3) have been prepared and will be updated prior to the commencement of construction works to take account of all requirements of the Planning Authority. The waste hierarchy will always be employed to ensure that the least possible amount of waste is produced during the construction phase, through reuse, recovering and recycling.
- Water will be supplied on site by water tankers for general use. Unless a temporary water supply is secured from Irish Water, potable water will be provided in the form of bottled water for staff use during the construction phase (prior to connections to the municipal water supply).
- Portable toilets will be provided for those working on the construction sites throughout the Proposed Development. Wastewater arising on-site from these toilets is stored in a sealed tank located within the portable toilets, and these will be emptied periodically (as required) by permitted waste contractors and transported to municipal wastewater treatment plants for treatment.

Residual Impact

There will be a short-term neutral imperceptible impact on services and utilities during the construction phase.

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Significance of Effects

Based on the assessment above there will be no significant effects on services and utilities during the construction phase.

13.3.4.3 Operational Phase

13.3.4.3.1 *Strategic Employment Zone (Site A)*

Pre-Mitigation Impact

The potential operational phase impacts of the proposed development with regard to utilities and services include the following:

- Provision of new underground services;
- Requirement for additional resources, including electricity and potable water.
- The generation of operational phase waste, including wastewater;
- Changes to land-use.

In the absence of any control or mitigation measures, the generation of waste and the use of additional resources could give rise to a long-term moderate negative impact in terms of services and utilities.

The creation of new underground services and the change in land-use, in compliance with the relevant zoning for the subject lands, will give rise to a long-term moderate positive impact in terms of services and utilities.

Proposed Mitigation Measures

The below measures have been incorporated into the design of the proposed development and will be used to avoid any negative impacts on utilities or services during the operational phase of the proposed development:

- An operational phase Waste Management Plan has been prepared (Volume 3a Appendix 4-5) and will be updated prior to operation to take account of all requirements of the Planning Authority.
- The Engineering Services Reports in Volume 3a Appendix 4-9 of this EIAR present the proposals for the proposed development with regard to Surface Water Drainage, Wastewater Drainage and Potable Water Supply. These elements have been taken into consideration throughout the design of the proposed development and will be implemented in line with all required legislation and relevant best-practice guidelines.
- Solar PV panels have been incorporated into building design throughout the development where appropriate, to facilitate the supply of renewable electricity for the energy demands of the buildings.

Residual Impact

There will be a long-term neutral imperceptible impact on services and utilities during the operational phase.

Significance of Effects

The change in land-use, in compliance with the relevant zoning for the subject lands, will give rise to a long-term moderate positive effect in terms of services and utilities.

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13.3.4.3.2 *Healthcare Facilities (Site B)*

Pre-Mitigation Impact

The potential operational phase impacts of the proposed development with regard to utilities and services include the following:

- Provision of new underground services;
- Requirement for additional resources, including electricity and potable water.
- The generation of operational phase waste, including wastewater;
- Changes to land-use.

In the absence of any control or mitigation measures, the generation of waste and the use of additional resources could give rise to a long-term moderate negative impact in terms of services and utilities.

The creation of new underground services and the change in land-use, in compliance with the relevant zoning for the subject lands, will give rise to a long-term moderate positive impact in terms of services and utilities.

Proposed Mitigation Measures

The below measures have been incorporated into the design of the proposed development and will be used to avoid any negative impacts on utilities or services during the operational phase of the proposed development:

- An operational phase Waste Management Plan has been prepared (Volume 3b Appendix 4-5) and will be updated prior to operation to take account of all requirements of the Planning Authority.
- The Engineering Services Reports in Volume 3b Appendix 4-9 of this EIAR present the proposals for the proposed development with regard to Surface Water Drainage, Wastewater Drainage and Potable Water Supply. These elements have been taken into consideration throughout the design of the proposed development and will be implemented in line with all required legislation and relevant best-practice guidelines.
- Solar PV panels have been incorporated into building design throughout the development where appropriate, to facilitate the supply of renewable electricity for the energy demands of the buildings.

Residual Impact

There will be a long-term neutral imperceptible impact on services and utilities during the operational phase.

Significance of Effects

The change in land-use, in compliance with the relevant zoning for the subject lands, will give rise to a long-term moderate positive effect in terms of services and utilities.

13.3.4.3.3 *Strategic Housing Development (SHD, Site C)*

Pre-Mitigation Impact

The potential operational phase impacts of the proposed development with regard to utilities and services include the following:

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- Provision of new underground services;
- Requirement for additional resources, including electricity and potable water.
- The generation of operational phase waste, including wastewater;
- Changes to land-use.

In the absence of any control or mitigation measures, the generation of waste and the use of additional resources could give rise to a long-term moderate negative impact in terms of services and utilities.

The creation of new underground services and the change in land-use, in compliance with the relevant zoning for the subject lands, will give rise to a long-term moderate positive impact in terms of services and utilities.

Proposed Mitigation Measures

The below measures have been incorporated into the design of the proposed development and will be used to avoid any negative impacts on utilities or services during the operational phase of the proposed development:

- An operational phase Waste Management Plan has been prepared (Volume 3c(i) Appendix 4-5) and will be updated prior to operation to take account of all requirements of the Planning Authority.
- The Engineering Services Reports in Volume 3c(i) Appendix 4-9 of this EIAR present the proposals for the proposed development with regard to Surface Water Drainage, Wastewater Drainage and Potable Water Supply. These elements have been taken into consideration throughout the design of the proposed development and will be implemented in line with all required legislation and relevant best-practice guidelines.
- Solar PV panels have been incorporated into building design throughout the development where appropriate, to facilitate the supply of renewable electricity for the energy demands of the buildings.

Residual Impact

There will be a long-term neutral imperceptible impact on services and utilities during the operational phase.

Significance of Effects

The change in land-use, in compliance with the relevant zoning for the subject lands, will give rise to a long-term significant positive effect in terms of services and utilities.

13.3.4.3.4 *Maynooth Outer Orbital Road (MOOR)*

Pre-Mitigation Impact

The operational stage of the proposed development will have a long-term moderate positive impact with regard to the change in land-use. The proposed development will assist in improving transport links in the area, including enhanced networks for pedestrians and cyclists.

Residual Impact

The proposed development will have a long-term moderate positive impact.

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Significance of Effects

The proposed development will have a long-term moderate positive effect.

13.3.4.3.5 *Kildare Bridge*

Pre-Mitigation Impact

The operational stage of the proposed development will have a long-term moderate positive impact with regard to the change in land-use. The proposed development will assist in improving transport links in the area, including enhanced networks for pedestrians and cyclists.

Residual Impact

The proposed development will have a long-term moderate positive impact.

Significance of Effects

The proposed development will have a long-term moderate positive effect.

13.3.4.3.6 *Moyglare Bridge*

Pre-Mitigation Impact

The operational stage of the proposed development will have a long-term moderate positive impact with regard to the change in land-use. The proposed development will assist in improving transport links in the area, including enhanced networks for pedestrians and cyclists.

Residual Impact

The proposed development will have a long-term moderate positive impact.

Significance of Effects

The proposed development will have a long-term moderate positive effect.

13.3.4.4 Decommissioning Phase

The proposed development will become a permanent part of the local infrastructure, and therefore the requirement for decommissioning is not foreseen. There is therefore considered to be no potential for decommissioning phase impacts on non-traffic material assets.

13.3.4.5 Cumulative Effects Resulting from Interactions between Various Elements of the Proposed Development

The elements of the proposed development have been considered as stand-alone and cumulative works as part of this impact assessment. Following the application of the design, control and mitigation measures described in this section of the EIAR and the supporting engineering documents, it is considered that the proposed development will have a long-term slight neutral impact with regard to services and utilities. The proposal will have a long-term positive effect with regard to the change in land use.

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13.3.4.6 Cumulative In-Combination Effects

The potential cumulative impacts and associated effects between the proposed development and the projects described in Section 2.10 of this EIAR, hereafter referred to as the other projects, have been considered in terms of utilities and services.

The measures outlined above, and in the Construction and Environmental Management Plan (CEMP), included as Appendix 4-3 in Volumes 3a, 3b & 3c(i) and Appendix 4-2 in Volumes 3d, 3e & 3f of this EIAR, will eliminate the potential for cumulative effects in relation to electricity, gas, water, sewage and telecommunications networks during the construction phases of the proposed development with other projects.

There will be no cumulative operational phase effects in relation to electricity, gas, water, sewage and telecommunications networks. There will be a positive cumulative effect on land use in the area when the proposed development is considered with the projects listed in Section 2.10 of this EIAR.

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14. INTERACTION OF EFFECTS

14.1 Introduction

The preceding chapters 5 – 13 of this EIAR identify the potential significant environmental effects that may occur in terms of Population and Human Heath, Biodiversity (Flora and Fauna), Land, Soils and Geology, Water (Hydrology and Hydrogeology), Air and Climate, Noise and Vibration, Landscape and Visual, Cultural Heritage (Archaeological, Architectural and Cultural Heritage) and Material Assets (Roads and Traffic, and Built Services), as a result of the Proposed Development as described in Chapter 4 of this EIAR. However, for any development with the potential for significant environmental effects there is also the potential for interaction between these potential significant effects. The result for interactive effects may exacerbate the magnitude of the effects or improve them, or have a neutral effect.

The 'Proposed Development' considered for the purposes of this EIAR consists of six separate components of the proposed Masterplan development of the Applicant's landholding in Moygaddy Co. Meath which forms part of a larger project, the first phase of which will require six separate planning applications.

- Site A – A Strategic Employment Zone
- Site B – Healthcare Facilities
- Site C – Strategic Housing Development
- The Maynooth Outer Orbital Road (MOOR)
- Kildare Bridge Planning Application
- Moyglare Bridge Planning Application

While these developments will be subject to separate planning applications, it was considered prudent to consider all six applications together under one EIAR, due to the proximity, construction timelines and shared infrastructure between the developments, therefore the interaction matrix presented in Table 13-1 considered the potential for interacting impacts in relation to the Proposed Development.

A matrix is presented as Table 13-1 below to identify the potential interaction of impacts between the various aspects of the environment assessed throughout this EIAR. The matrix highlights the potential for the occurrence of positive, neutral or negative effects during both the construction (C) and operational (O) phases. The matrix is symmetric, with each environmental component addressed in the chapters of this EIAR being placed on both axes of a matrix, and therefore each potential interaction is identified twice.

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Table 14-1 Interaction Matrix: Potential for Interacting Impacts

	Phase	Population and Human Health	Biodiversity, Flora and Fauna	Land, Soils and Geology	Water	Air and Climate	Noise and Vibration	Landscape and Visual	Cultural Heritage	Material Assets
Population and Human Health	C									
	O									
Biodiversity, Flora and Fauna	C									
	O									
Land, Soils and Geology	C									
	O									
Water	C									
	O									
Air and Climate	C									
	O									
Noise and Vibration	C									
	O									
Landscape and Visual	C									
	O									
Cultural Heritage	C									
	O									
Material Assets	C									
	O									

Legend: No Interacting Effect: Positive Effect: Neutral Effect: Negative Effect:

The potential for interaction of impacts has been assessed, throughout this EIAR, as part of the Impact Assessment process. While the work on all parts of the Environmental Impact Assessment Report (EIAR) was not carried out by MKO, the entire project and work of all sub-consultants was managed and coordinated by the company. This EIAR was edited and collated by MKO as an integrated report of findings from the impact assessment process, by all relevant experts, and impacts that potentially

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interact have been assessed in detail in the individual chapters of the EIAR above and summarised in Section 14.2 below.

Where any potential negative impacts have been identified during the assessment process, these impacts have been avoided or reduced by design and the proposed mitigation measures, as presented throughout the EIAR and highlighted in Section 14.2 below.

14.1.1 Statement of Authority

This section of the EIAR was written by Niamh McHugh and Daire O'Shaughnessy and reviewed by Michael Watson, of MKO. Niamh is an Environmental Scientist who has been working with MKO since 2021. Niamh holds a BSc (Env) in Environmental Science from the National University of Ireland, Galway. Niamh has been involved in the preparation of a number of Environmental Impact Assessment Reports across several sectors. Daire is a Project Environmental Scientist who holds a B.Sc (Hons) in Environmental Science with three years of consultancy experience with MKO and has been involved in a range of EIAR applications. Michael Watson is a Project Director with MKO; with over 18 years' experience in the environmental sector. His project experience includes the management and productions of Environmental Impact Assessments (EIS/EIAR), particularly within the wind energy sector.

14.2 Impact Interactions

14.2.1 Population and Human Health

Population & Human Health and Hydrology & Hydrogeology

Any impacts associated with any development on water has the potential to impact on human health, in particular where water abstraction sources are present. The Proposed Development has limited potential to give rise to water pollution as a result of a site activities due to the construction methodologies being used. Also, there are no water abstraction points in the vicinity of the site.

The construction works on both the Kildare Bridge and Moyglare bridge applications have the potential to impact on human health due to a decline in water quality. However, mitigation measures have been presented in Chapter 8 to minimise the risk of any such issues.

Population & Human Health and Air & Climate

The Proposed Development has the potential to create dust and other less noticeable air pollutants, which could give rise to nuisance for occupants of nearby sensitive receptors. Mitigation measures are presented in Chapter 9 to minimise the risk of any such issues.

Population & Human health and Noise & Vibration

The Proposed Development has the potential to create noise and some vibration during the construction phase, which could give rise to nuisance for occupants of nearby sensitive receptors. Mitigation measures are presented in Chapter 10 to minimise the risk of any such issues.

Population & Human Health and Landscape

The construction of the Proposed Development will lead to the removal of areas of mature native hedgerows. The potential landscape and visual effects on the local population will result as the site changes from an area of agricultural land to a construction site of considerable size. However the operational phase of the Proposed Development will bring mitigation, remedial and avoidance

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measures to ensure no further impacts on the landscape to nearby sensitive receptors. It is proposed that native trees and hedgerows be planted throughout the proposed development, enhancing the landscape of the surrounding area.

14.2.2 Biodiversity

Biodiversity, Flora & Fauna and Land, Soils & Geology

The disturbance of soils and potentially bedrock within the Proposed Development area will result in habitat loss and some disturbance of fauna in the areas surrounding the works area. Where possible, the excavated soil will be used for reinstatement and landscaping works around the site.

Biodiversity, Flora & Fauna and Hydrology & Hydrogeology

Site activities have the potential to give rise to some water pollution (although this is limited), and consequential impacts on flora and fauna that rely on or use that water within the same catchment. These potential impacts have been assessed, and the relevant measures will be in place to avoid any water pollution and subsequent effect on flora and fauna. The mitigation presented throughout this EIAR will minimise any potential effects.

Biodiversity, Flora & Fauna and Noise & Vibration

Site activity during the construction of the Proposed Development has the potential to give rise to noise and some vibration that could disturb fauna. This will occur only during the construction phases which will be temporary and the site is located within an urbanised area so potential effects are limited.

14.2.3 Land, Soils and Geology

Land, Soils & Geology and Hydrology & Hydrogeology

The movement and/or removal of soils, overburden and rock as part of the construction activity has the potential to have secondary impacts on water quality in the absence of mitigation. Mitigation measures are presented in Chapter 7.

14.2.4 Air and Climate

Air & Climate and Material Assets

The movement of construction vehicles both within and to and from the site has the potential to give rise to dust nuisance effects during the construction phase. This is assessed further in Chapter 9 of this EIAR, and mitigation measures are presented to minimise any potential effects.

14.3 Mitigation and Residual Impacts

Where any potential interactive negative impacts have been identified in the above, a full suite of appropriate mitigation measures have been included in the relevant sections (Chapters 5-13) of the EIAR. The implementation of these mitigation measures will reduce or remove the potential for these effects. Information on potential residual impacts and the significance of effects, is also presented in each relevant chapter.

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15. SCHEDULE OF MITIGATION

15.1 Introduction

All mitigation measures relating to the pre-commencement, construction and operational phases of the proposed development are set out in the relevant chapters of the EIAR and associated documents submitted as part of this planning application.

All mitigation measures proposed for the project are outlined in Table 16-1 below. The mitigation measures have been grouped together according to their environmental field/topic and are presented under the following headings:

- Construction Management
- Drainage and Water Quality
- Biodiversity
- Subsoils
- Air Quality and Dust Control
- Noise and Vibration
- Material Assets including Traffic and Utilities
- Landscape and Visual
- Cultural Heritage
- Environmental Management

The mitigation proposals in the below format provides an easy to audit list that can be reviewed and reported on during the future phases of the project. The proposal for site inspections and environmental audits are set out in the Construction and Environmental Management Plans (CEMPs) which are included as Appendix 4-3 in Volumes 3a, 3b & 3c(i) and as Appendix 4-2 in Volumes 3d, 3e & 3f of this EIAR. The mitigation and monitoring proposals are set out in separate tables in the CEMP (Appendix 4-2) for clarity and tracking of the pre-commencement survey requirements. Where particular monitoring proposed is considered to be a measure of mitigation, it has been included in the consolidated table for all mitigation measures proposed (Table 16-1).

It is intended that the CEMP will be updated where required, prior to the commencement of the development, to include all mitigations measures, conditions and or alterations to the EIAR and application documents should they emerge during the course of the planning process and would be submitted to the Planning Authority for written approval.

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15.2 Mitigation Measures

Table 15-1 Mitigation Measures

Ref. No.	Mitigation Measure	Audit Result	Action Required
	Construction Phase		
Land, Soils and Geology			
MM1	Excavated (existing) overburden and/or bedrock material will be reused on site, where possible; Excavated materials will be used at adjacent sites subject to Article 17 authorisations or other regulatory consents in order to minimise environmental effects. A minimal volume of topsoil and subsoil will be removed to allow for infrastructural work to take place due to optimisation of the layout by mitigation by design; and, Construction of service trenching, and surface water attenuation features will generate excess material, and excess material will be used locally within the site for achieving building formation levels and landscaping. Any spoil generated which will be removed offsite will be done so in accordance with the relevant regulations and best practice including waste management legislation if the material is considered a by-product or waste.		
MM2	All plant and machinery will be serviced before being mobilised to site;		
MM4	Refuelling will be completed in a controlled manner using drip trays at all times;		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
MM5	Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water;		
MM6	Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores;		
MM7	Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored		
MM8	Ancillary equipment such as hoses and pipes will be contained within the bund;		
MM9	Taps, nozzles or valves will be fitted with a lock system;		
MM10	Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage;		
MM11	Drip-trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills		
MM12	Only designated trained operators will be authorised to refuel plant on site;		
MM13	Procedures and contingency plans will be set up to deal with emergency accidents or spills;		
MM14	An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment		
MM15	Highest standards of site management will be maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A suitably qualified individual will be given the task of overseeing the pollution		

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	prevention measures agreed for the site to ensure that they are operating safely and effectively as well as having responsibility for the implementation of Emergency Procedures for spill control measures.		
MM16	The underlying in-situ soils and subsoils will be subject to a certain amount of compaction, but this will be unavoidable		
MM17	Any infill material/landscaping that is required will be placed and levelled in appropriate lift thicknesses to ensure the material is not over compacted thereby retaining drainage properties. This will be relevant within the proposed landscaped and green areas of the site		
Material Assets			
MM18	The area where excavations are planned will be surveyed and all existing services will be identified. All relevant bodies i.e., ESB, Bord Gáis, Irish Water, Eircom, Meath County Council, Kildare County Council etc. will be contacted prior to construction works and all drawings for all existing services sought. All plant operators and general operatives will be inducted and informed as to the location of any services.		
MM19	Design stage Construction and Environmental Management Plans and Waste Management Plans have been prepared and will be updated prior to the commencement of construction works to take account of all requirements of the Planning Authority. The waste hierarchy will always be employed to ensure that the least possible amount of waste is produced during the construction phase, through reuse, recovering and recycling.		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
MM20	Water will be supplied on site by water tankers for general use. Unless a temporary water supply is secured from Irish Water, potable water will be provided in the form of bottled water for staff use during the construction phase (prior to connections to the municipal water supply).		
MM21	Portable toilets will be provided for those working on the construction sites throughout the Proposed Development. Wastewater arising on-site from these toilets is stored in a sealed tank located within the portable toilets, and these will be emptied periodically (as required) by permitted waste contractors and transported to municipal wastewater treatment plants for treatment.		
Air & Climate			
MM22	**Dust Emissions** All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.		
MM23	Overburden will be progressively removed from the working area in advance of construction.		
MM24	Dampening down the dust at the source by the use of barriers such as debris netting on scaffolding around the buildings to block dust escaping where the building is within 10m of the site boundary where residential properties or public roads exist.		
MM25	Site roadways will be maintained in a stoned hard-core condition not allowing soil to accumulate which when dry can create dust.		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
MM26	Wheel wash equipment will be set up at the site exit gates for all construction vehicles to pass through prior to leaving the site thus ensuring that no dirt etc. is transported outside the site onto the roadways		
MM27	The roads adjacent the site will continue to be regularly inspected by the Site Manager for cleanliness and cleaned as necessary		
MM28	If necessary, sporadic wetting of loose stone and soil surface will be carried out during the construction phase to minimise movement of dust particles to the air		
MM29	Any hardstanding areas/site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions		
MM30	The transport of material, which has significant potential to cause dust, will be undertaken in tarpaulin-covered vehicles		
MM31	Dust levels will be monitored visually, on a daily basis by the project Environmental Officer. If dust levels become an issue, then all dust generating activities on site will cease until such time as weather conditions improve (e.g., wind levels drop or rain falls) or mitigation measures such as damping down of the ground are completed.		
MM32	Plant and equipment that have the potential to create volumes of dust will have appropriate attachments to allow water source to dampen dust to not allow it to get airborne.		
MM33	Road Sweepers may be deployed as required on public roadways in the unlikely event that mud or dust be transported from the site.		
MM34	A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase. A CEMP is included with this application and includes further details of the above dust suppression measures and dust monitoring measures		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
MM35	All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.		
MM36	All machinery will be switched off when not in use.		
MM37	Users of the site will be required to ensure that all plant and vehicles are suitably maintained to ensure that emissions of engine generated pollutants are kept to a minimum.		
MM38	The methods of working will comply with all relevant legislation and best practice guidelines in reducing the environmental impacts of the works. A detailed CEMP will be prepared and submitted to Meath County Council and Kildare County Council for approval in advance of the works.		
MM39	Aggregate materials for the construction of the proposed developments will be obtained from local quarries and batching facilities where needed. This will significantly reduce the distance that delivery vehicles will need to travel to access the site.		
Noise			
MM40	Construction operations will in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 0800-1600 h.		
MM41	Where it is proposed to operate plant during the period 0700-0800 h at locations within 100 m of offsite receptors, standard 'beeper' reversing alarms will be replaced with flat spectrum alarms		
MM42	Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoiding hooting at all times		
MM43	Plant used onsite during the construction phase will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers will be immediately replaced		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
MM44	Queuing of trucks near offsite receptors will be prohibited		
MM45	Machinery not in active use will be shut down.		
MM46	A site representative will be appointed as a liaison officer with the local community.		
MM47	Where evening or night-time operations are required, local residents will be notified through the liaison officer		
MM48	All complaints of noise received during the construction phase will be logged in a register and investigated immediately. Details of follow-up action will be included in the register		
MM49	Where it is proposed to import potentially noisy plant to the site, the potential impact of noise emissions will be assessed in advance.		
MM50	Where generators or compressors are required within 100 m of offsite receptors, or previously completed receptors onsite, these will be fitted with manufacturers' acoustic enclosures, or alternatively will be screened by a local acoustic screen or subsoil stockpile.		
MM51	Guidance set out in British Standard BS 5228-1:2009+A1:2014 with respect to noise control will be applied throughout the construction phase		
Landscape and Visual			
MM52	The mitigation measures proposed include the implementation of appropriate site management procedures – such as the control of site lighting, storage of materials, placement of compounds, delivery of materials and appropriate car parking.		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
MM53	Visual impact during the construction phase will be mitigated somewhat through appropriate site management measures, work practices and a waste management plan to ensure the site is kept tidy, dust is kept to a minimum and that public areas are kept free from building material and site rubbish.		
Cultural Heritage			
MM54	Pre-development targeted archaeological test trenching under licence from the National Monuments Service should take place to ascertain if the sub-surface features identified in the geophysical survey are archaeological in nature. Test trenching should also take place in areas of the site not covered by the geophysical survey, if development is proposed in these areas. A report on the results of targeted test trenching and a detailed archaeological impact assessment shall be compiled and submitted to the relevant authorities. If any archaeological sites or features are identified during the pre-construction test trenching, they will be preserved by record (archaeologically excavated) or preserved in-situ (avoidance) and therefore a full record made of same.		
MM55	The development footprint of the project has been mitigated by design to avoid removal of townland and field boundaries wherever possible. Where it is not possible to maintain by design, an archaeological record (written and photographic) will be made of them prior to their removal.		
Flora & Fauna			
MM56	**Site A** **Assessment of the potential effects on the loss of Hedgerow (WL1) and Treeline (WL2) habitat** Hedgerow habitat along the northern boundary will be retained, ensuring ecological connectivity to the wider landscape is maintained.		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
MM57	157 semi mature trees will be planted within the development site. New treeline habitat will be created along the western and southern boundaries		
MM58	An additional 165 whip trees are proposed		
MM59	Native species to be used for planting include Alder (Alnus glutinosa), Pedunculate oak (Quercus robur), Scots Pine (Pinus sylvestris), Silver Birch (betula pendula) and Rowan (Sorbus aucuparia).		
MM60	The plan includes for the planting of a new native hedgerow along the eastern boundary of Site A, mainly along the R157. The planting of new native hedgerows will ameliorate any hedgerow loss and to maintain connectivity to the wider area.		
MM61	Native hedgerow species to be planted include such as Hawthorn (Crataegus monogyna), Blackthorn (Prunus spinosa) and Holly (Ilex aquifolium)		
MM62	Large sections of grasslands throughout the site will be management as Wildflower meadows and planted with native wildflowers, including Common knapweed (Centaura nigra), Ribwort Plantain (Plantago lanceolata), Red clover (Trifolium pratense) and Birds foot trefoil (Lotus comiculatus).		
MM63	The creation of swales will also add new wetland habitat to the landscape, provide new habitat for various invertebrates and amphibians.		
MM64	The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site.		
MM65	A tree protection plan is included in this application. This will ensure that any trees or tree lines that are to be retained within the site are fully protected in accordance with the British Standard BS 5837: Trees in Relation to Construction		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
MM66	**Assessment of potential effects on water quality and aquatic faunal species and habitats during construction** Silt fencing will be constructed around the construction footprint, where there is a surface water receptor, in order to create a defined perimeter for the proposed works, leaving a natural vegetation buffer between the construction footprint (other than operational surface water outfall installations which are described below) and surface water receptors and associated riparian habitats		
MM67	A silt fence will also be attached to solid boundary fencing where it is in place and where there is a surface water receptor. This will protect the stream from any potential sediment laden surface water run-off generated during construction activities.		
MM68	The silt fence will comprise a geotextile membrane that will buried beneath the ground to filter any run-off that may occur as a result of the proposed works. The silt fence will be monitored throughout the proposed works and will remain in place after the works are completed and until the exposed earth has re-vegetated		
MM69	As construction advances there may be a requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground;		
MM70	Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing		
MM71	A suitably sized detention basin or settlement area will be installed at the lowest point before discharge to ground where excess run- off must leave the site. Silt curtains or earth berms will be used to channel run-off to locations where it can be controlled. These may take the form of an open detention area or, where the need arises, a portable skip/s, or similar, where inflow passes through straw bales, gravel etc		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
MM72	Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present.		
MM73	Daily monitoring and inspections of site drainage during construction will be completed.		
MM74	Prior to the outset of these works, small defined works areas will be fenced off at the location of the storm water outfall (between the main construction site and both water courses). Silt fences will be attached to these fences. The silt fence will provide a solid barrier between the proposed pipelaying works and the Rye Water River		
MM75	The necessary pipelaying works will be undertaken within this defined area		
MM76	Following the installation of the pipework and reinstatement of the ground, the small section of the silt fence that protects the Rye Water River will be removed to facilitate the construction of the outfall		
MM77	No instream works will take place outside the period July 1st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters		
MM78	Cofferdams will be constructed using one tonne sandbags at the edge of the Rye Water River at the outfall point to create dry working areas.		
MM79	A submersible pump will be used to dewater inside the coffer dammed area and will discharge any waters to land at a location of over 30m from the rivers. The pumped waters will discharge through a silt bag		
MM80	The bankside will be excavated and a small pre-cast concrete headwall installed (with outfall pipe included).		

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MM81	The banks and channel bed will be reinstated to avoid erosion or run off of silt. Following this the dams will be removed		
MM82	The surface water discharge point is likely to take less than one day to install.		
MM83	Sondes will be put in place in the Rye Water River upstream and downstream of the works area. These will continuously measure turbidity throughout the construction period. If there is a 10% or greater difference between upstream and downstream turbidity, an alarm will sound and a message will be sent to the site foreman and the ECoW. Works will be ceased until the cause of the difference is identified and (if it is associated with the works) rectified		
MM84	Biotic and abiotic baseline data will be gathered on the Rye Water River both close to the development site and at a distance away from the site. Gathering this data will allow for a comparison between the current situation and that which may develop during the construction or operational phase		
MM85	**Fauna- Disturbance/Habitat loss** All works will be completed during daylight hours and there will be no requirement for artificial lighting at any stage of the proposed construction works. This will avoid any potential impacts on crespular or nocturnal species, including bat species		
MM86	Hoarding will be placed around the construction site. This will screen the site and minimise any disturbance impacts on fauna in the wider surroundings.		
MM87	All plant and equipment for use will comply with Statutory Instrument No 359 of 1996 “European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1996”.		
MM88	Plant machinery will be turned off when not in use		
MM89	Operating machinery will be restricted to the proposed works site area.		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
MM90	**Assessment on the potential impacts on bats during construction** Habitat Loss: Following the precautionary principle, a pre-construction survey will be undertaken on the two ash trees in the east of the site with 'Low to Moderate' suitability for bats to be felled, by a qualified ecologist prior to any works, to ensure there are no roosting bats. The requirement for a pre-construction survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of this survey will be to assess any changes in baseline environment since the time of undertaking the bat survey in July 2021.If bats are found to be roosting in any of the trees, a bat derogation licence must be obtained, and further mitigation prescribed by a licenced ecologist. Tree felling will follow guidelines set out in National Roads Authority, Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes. 2006.Tree felling will follow guidelines set out in National Roads Authority, Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes. 2006		
MM91	Tree felling will follow guidelines set out in National Roads Authority, Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes. 2006.		
MM92	**Disturbance** The majority of works, during the construction phase, will occur during daylight hours. Therefore, there will be no requirement for exterior lighting within the site. Where lighting is unavoidable (i.e. health and safety), low-intensity lighting and motion sensors will be used to limit illumination. Exterior lighting, during construction, shall be designed to minimize light spillage, thus reducing the effect on areas outside the proposed development, and consequently on bats i.e. Lighting will be directed away from mature trees/hedgerows/treelines around the periphery of the site boundary to minimize disturbance to bats		
MM93	**Assessment on the potential impacts on birds during construction**		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
	Disturbance: Where possible, all cutting of trees, scrub and tall vegetation will be undertaken outside the bird nesting season which runs from the 1st March to the 31st August. Any cutting of vegetation that may be required outside the season described above will be supervised by a suitably qualified ecologist to ensure that no birds nests are present. Should nesting birds be encountered, the trees will be left until nesting activity has concluded.		
MM94	**Site B** **Assessment of the potential effects on the loss of Hedgerow (WL1) and Treeline (WL2) habitat** The landscaping plan has also been designed to retain the mature treeline along the southern boundary of the site and hedgerow habitat at the northern boundary		
MM95	100 new trees will be planted within the application site		
MM96	This will significantly increase the tree coverage throughout the entire site, improving connectivity to the wider landscape and providing new nesting, foraging and commuting habitat for local biodiversity.		
MM97	Native species to be used for planting include Alder (Alnus glutinosa), Pedunculate oak (Quercus robur), Scots Pine (Pinus sylvestris), Silver Birch (betula pendula) and Rowan (Sorbus aucuparia).		
MM98	The plan includes for the additional planting of new native hedgerow throughout the site. This will be located along the eastern boundary where the existing hedgerow will be removed. Additional hedgerow s will also be planting throughout the centre of the development. The planting of new native hedgerows will greatly increase the hedgerow habitat coverage within the area and increase ecological connectivity to the wider landscape		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
MM99	Native hedgerows will be planting with Hawthorn (Crataegus monogyna), Blackthorn (Prunus spinosa) and Holly (Ilex aquifolium).		
MM100	Native hedgerows will be maintained and managed for wildlife, this includes allowing hedgerows to grow wide and dense at the base, with a wide, uncultivated grassy margin. Hedgerows should be allowed to mature before the first cut and future cutting should happen on a 3/5-year rotation. Hedgerows should be kept as dark spaces to allow commuting and foraging habitat for local wildlife.		
MM101	The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site.		
MM102	A tree protection plan is included in this application. This will ensure that any trees or tree lines that are to be retained within the site are fully protected in accordance with the British Standard BS 5837: Trees in Relation to Construction.		
MM103	Assessment of potential effects on water quality and aquatic faunal species and habitats during construction Mitigation measures outlined to protect water quality during the construction of the main development areas have been outlined in section 8.6.3.5 of Chapter 8 of this EIAR and are fully described in the CEMP located in Volume 3.b, Appendix 4-3. The mitigation measures are the same as Site A The measures are the same as Site A, please see above.		
MM104	Fauna- Disturbance/Habitat loss Same as Site A.		
MM105	Assessment on the potential impacts on bats during construction		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
	See Mitigation for Assessment of the potential effects on the loss of Hedgerow (WL1) and Treeline (WL2) habitat for Site B.		
MM106	**Assessment on the potential impacts on birds during construction** See Mitigation for Assessment of the potential effects on the loss of Hedgerow (WL1) and Treeline (WL2) habitat for Site B.		
MM107	**Disturbance** Where possible, all cutting of trees, scrub and tall vegetation will be undertaken outside the bird nesting season which runs from the 1st March to the 31st August. Any cutting of vegetation that may be required outside the season described above will be supervised by a suitably qualified ecologist to ensure that no birds nests are present. Should nesting birds be encountered, the trees will be left until nesting activity has concluded.		
MM108	**Site C** **Assessment of the potential effects on the loss of Treeline (WL2) and Hedgerow (WL1) habitat** The development has been designed to retain approximately 590m of mature treeline habitat along the southern boundary of the project area and hedgerow habitat along the eastern boundary, maintaining connectivity to wider environment. Approx. 888m of hedgerow will be retained within the site.		
MM109	A landscaping plan has been prepared for the proposed development and is available in Appendix 4-7. The tree survey report accompanying this application outlined the removal of 29 trees at the site, many of which have been highlighted for removal due to poor condition. A total of 125 trees will be retained at the site		

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MM110	In addition to this, 591 new trees will be planted within the site		
MM111	This will significantly increase the tree coverage throughout the entire site, improving connectivity to the wider landscape and providing new nesting, foraging and commuting habitat for local biodiversity		
MM112	The plan includes for the planting of a new native treeline along the southern boundary of the site. To ameliorate any tree loss and to maintain connectivity to the wider area.		
MM113	Approximately 364m^2 of native hedgerow is proposed for planting along the northern and western boundaries. This will ensure habitat connectivity is maintained to the wider landscape		
MM114	Native tree species to be used for planting include Alder (*Alnus glutinosa*), Pedunculate oak (*Quercus robur),* Scots Pine (Pinus sylvestris), Silver Birch (*18pprox pendula*) and Rowan (Sorbus aucuparia).		
MM115	Native hedgerows will be planting with Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) and Holly (*Ilex aquifolium*).		
MM116	In addition to native hedgerow and tree planting, approximately 11,492m^2 of shrub planting is proposed throughout the development site. Pollinator friendly species such as *Lavandula angustifolia* and *Hypericum Hidcote* will provide a large increase in food source availability in the proposed shrub planting areas.		
MM117	Large sections of grasslands throughout the site will be management as Wildflower meadows and planted with native wildflowers, including Common knapweed (*Centaura nigra*), Ribwort Plantain (*Plantago lanceolata*), Red clover (*Trifolium pratense*) and Birds foot trefoil (*Lotus comiculatus*).		
MM118	The creation of swales will also add new wetland habitat to the landscape, provide new habitat for various invertebrates and amphibians.		

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	The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site		
MM119	A tree protection plan is included in this application This will ensure that any trees or tree lines that are to be retained within the site are fully protected in accordance with the British Standard BS 5837: Trees in Relation to Construction.		
MM120	**Assessment of the potential effects on the loss of Mixed Broadleaved Woodland (WD4)** The development has been designed to retain the vast majority of the woodland within the site boundary, with only a very small section (4.5%) of the woodland being lost to the development. Whilst no significant loss of woodland will occur, a landscaping plan has been prepared for the proposed development which provides for the replanting of native woodland habitat within the development site to ameliorate any tree loss and to maintain connectivity with the wider. For Mitigation measures please see above		
MM121	**Assessment of the potential impacts on water quality and aquatic faunal species and habitats during construction** Mitigation measures outlined to protect water quality during the construction of the main development areas have been outlined in section 8.6.3.6 of Chapter 8 of this EIAR and are fully described in the CEMP located in Volume 3.c, Appendix 4-3. The mitigation measures are summarised in Site A. Exception is The following best practice construction measures will be followed to ensure that there are no significant effects on the Rye Water River or the Blackhall Little River as a result of the in-stream construction works related to the outfall pipes .		
MM122	Aquatic species-White Clawed Crayfish The following section described the mitigation measures that will ensure there is no significant effect on white clawed crayfish as a result of the in-stream construction works proposed.		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
MM123	Prior to any construction works carried out within the Rye Water River or Blackhall Little River, a pre-commencement white clawed crayfish survey will be undertaken to ensure no crayfish occur within the works areas.		
MM124	The survey will be carried out by a qualified professional under licence from the National Parks and Wildlife Services (NPWS).		
MM125	All works within this area will be subject to strict biosecurity protocols to prevent the spread of the crayfish plague which is caused by the fungal-like organism, Aphanomyces astaci.		
MM126	The following best practice construction measures will be followed to ensure that there are no significant effects on the Blackhall Little River as a result of the construction of the two pedestrian and cycle bridges.		
MM127	The proposed design for water course crossings and culverts, which minimises interactions with water courses, ensures that there will be no perceptible effects on the morphology of those watercourses.		
MM128	Prior to the outset of these works, small defined works areas will be fenced off at the location of the storm water outfall (between the main construction site and both water courses). Silt fences will be attached to these fences. The silt fence will provide a solid barrier between the proposed pipelaying works and the Blackhall Little Stream		
MM129	The necessary pipelaying works will be undertaken within this defined area.		
MM130	Following the installation of the pipework and reinstatement of the ground, the small section of the silt fence that protects the Blackhall Little Stream will be removed to facilitate the construction of the outfall.		
MM131	No instream works will take place outside the period July 31st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
MM132	Cofferdams will be constructed using one tonne sandbags at the edge of the Blackhall Little Stream at the outfall point to create dry working areas.		
MM133	A submersible pump will be used to dewater inside the cofferdammed area and will discharge any waters to land at a location of over 30m from the rivers. The pumped waters will discharge through a silt bag.		
MM134	The bankside will be excavated and a small pre-cast concrete headwall installed (with outfall pipe included).		
MM135	The banks and channel bed will be reinstated to avoid erosion or run off of silt. Following this the dams will be removed.		
MM136	The surface water discharge point is likely to take less than one day to install. During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas		
MM137	The Kildare Bridge upgrade works will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent, where considered necessary by the designer. Prior to entering the works area, all machinery and personnel entering the works area will be thoroughly disinfected.		
	Fauna- Disturbance/habitat loss		
MM138	Assessment on the potential impacts on bats during construction		

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	Following the precautionary principle, a pre-construction survey will be undertaken on two trees to be felled in the east of the site, by a qualified ecologist prior to any works, to ensure there are no roosting bats. The requirement for a pre-construction survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of this survey will be to assess any changes in baseline environment since the time of undertaking the surveys in July and August 2021. If bats are found to be roosting in any of the structures, a bat derogation licence must be obtained, and further mitigation prescribed by a licenced ecologist		
MM139	**Disturbance** The majority of works, during the construction phase, will occur during daylight hours. Therefore, there will be no requirement for exterior lighting within the site. Where lighting is unavoidable (i.e. health and safety), low-intensity lighting and motion sensors will be used to limit illumination. Exterior lighting, during construction, shall be designed to minimize light spillage, thus reducing the effect on areas outside the proposed development, and consequently on bats i.e. Lighting will be directed away from mature trees/hedgerows/treelines around the periphery of the site boundary to minimize disturbance to bats		
MM140	**Assessment of the potential impacts on birds during construction** **Habitat Loss** In order to mitigate for the loss of a small area of woodland, trees and hedgerow it is proposed to plant and maintain additional areas of native woodland and trees within the site boundary.		
MM141	**Disturbance** Where possible, all cutting of trees, scrub and tall vegetation will be undertaken outside the bird nesting season which runs from the 1st March to the 31st August. Any cutting of vegetation that may be required outside the season described above will be supervised by a suitably qualified ecologist to ensure that no		

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	birds nests are present. Should nesting birds be encountered, the trees will be left until nesting activity has concluded.		
MM142	Although no barn owls were recorded during the dedicated barn owl survey carried out in 2021, a pre-construction Survey will be undertaken on Moygaddy castle to ensure no barns owls are nesting there. The requirement for a pre-construction survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of this survey will be to assess any changes in baseline environment since the time of undertaking the barn owl survey in July 2021.		
MM143	**Assessment of the potential impact on badgers during construction** **Habitat loss/Fragmentation:** The retention of the hedgerow, woodland habitat and grassland within the southern section of the site will ensure that badger foraging habitat remains available. Areas seeded with wildflower meadow mix will establish a species rich grassland which is likely to provide higher quality foraging habitat locally than the existing improved agricultural grassland habitat		
MM144	**Disturbance** A section of footpath is proposed within 22 metres of the identified badger sett along the Blackhall Little River. As such, the following mitigation is prescribed during the construction phase to avoid impacts on badgers:		
MM145	**Mitigation** Badger sett tunnel systems can extend up to c. 20m from sett entrances. Therefore, no heavy machinery will be used within 30m of badger setts (unless carried out under licence); lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances		

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MM146	During the breeding season (December to June inclusive), none of the above works should be undertaken within 50m of active setts nor blasting or pile driving within 150m of active setts.		
MM147	If construction works are required closer to the active sett during the breeding season, consultation with the NPWS will be carried out and appropriate mitigation measures will be put in place, e.g. sett screening, restricted working hours, etc.		
MM148	Although no badger activity was recorded at the outlier sett along the hedgerow within the site, taking a precautionary approach, the following mitigation is prescribed during the construction phase to avoid impacts on badgers.		
MM149	Mitigation It is recommended that a pre-construction badger survey be carried out in order to assess activity levels at the outlier sett and to identify any additional sett entrances that may have been excavated in the intervening period. All badger survey work will be undertaken in line with current NRA best practice guidance.		
MM150	Should this sett found to be in use by badgers during the pre-construction badger monitoring, it will be necessary to apply to NPWS for a licence for the temporary closure of the sett during the construction phase only.		
MM151	Construction activities within the vicinity of affected setts may commence once these setts have been evacuated and destroyed under licence from the NPWS.		
MM152	Where survey indicates that suitable alternative natural setts are not present, a badger expert may recommend the construction of an artificial sett to replace the sett that will be affected		
MM153	Assessment on the potential impacts on Otter during construction		

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	Prior to the commencement of construction works associated with the installation of the new pedestrian bridge and outfall, the following measures will be undertaken for the avoidance of disturbance/displacement and direct mortality and to ensure that no otter holts/breeding sites have been established since the original surveys undertaken (TII, 2007).		
MM154	From a precautionary basis, a pre-commencement otter survey will be undertaken in accordance with standard best practice guidance prior to the commencement of the construction of the proposed bridge construction and the construction of the outfall. In the unlikely event that an otter holt is identified within or immediately adjacent to the proposed development footprint, consultation will be undertaken with the National Parks and Wildlife Service and a derogation licence applied for. All conditions of a derogation licence will be implemented in full. No works should be undertaken within 150m of any holts at which breeding females or cubs are present. No wheeled or tracked vehicles (of any kind) should be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance should also not take place within 15m of such holts, except under licence (TII, 2006).		
MM155	All of the above works will be undertaken or supervised by an appropriately qualified ecologist.		
MM156	The MOOR Assessment of the potential effects on the loss of Hedgerow (WL1) and Treeline (WL2) habitat In order to mitigate for the significant loss of hedgerow habitat associated with the MOOR, approximately 6,208m of new hedgerow will be planting along the extend off the MOOR boundary		
MM157	Native hedgerow species such as Hawthorn (Crataegus monogyna), Blackthorn (Prunus spinosa) and Holly (Ilex aquifolium) will in the replanting schedule		
MM158	In addition to the 6,208m of new hedgerow proposed, 373 semi mature new trees will also be planted along the extent of the MOOR		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
MM159	Native species to be used for planting include Alder (Alnus glutinosa), Pedunculate oak (Quercus robur), Scots Pine (Pinus sylvestris), Silver Birch (betula pendula) and Rowan (Sorbus aucuparia).		
MM160	The planting of 6,208m of hedgerow habitat and 373 semi mature trees will increase the coverage of linear habitat on the overall proposed development site.		
MM161	This will significantly increase the nesting, foraging and commuting habitat for wildlife while maintaining ecological connectivity to the wider landscape		
MM162	The construction area within the site will be fenced off at the outset of construction. There will be no construction activities, access or storage of materials in the area outside the defined construction site		
MM163	A tree protection plan is included in this application. This will ensure that any trees or tree lines that are to be retained within the site are fully protected in accordance with the British Standard BS 5837: Trees in Relation to Construction		
MM164	Assessment of potential effects on water quality and aquatic faunal species and habitats during construction Silt fencing will be constructed around the construction footprint, where there is a surface water receptor, in order to create a defined perimeter for the proposed works, leaving a natural vegetation buffer between the construction footprint (other than operational surface water outfall installations which are described below) and surface water receptors and associated riparian habitats		
MM165	A silt fence will also be attached to solid boundary fencing where it is in place and where there is a surface water receptor. This will protect the stream from any potential sediment laden surface water run-off generated during construction activities		
MM166	The silt fence will comprise a geotextile membrane that will buried beneath the ground to filter any run-off that may occur as a result of the proposed works. The silt fence will be monitored throughout the		

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	proposed works and will remain in place after the works are completed and until the exposed earth has re-vegetated.		
MM167	As construction advances there may be a requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground.		
MM168	Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing		
MM169	A suitably sized detention basin or settlement area will be installed at the lowest point before discharge to ground where excess run- off must leave the site. Silt curtains or earth berms will be used to channel run-off to locations where it can be controlled. These may take the form of an open detention area or, where the need arises, a portable skip/s, or similar, where inflow passes through straw bales, gravel etc		
MM169	Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present;		
MM170	Daily monitoring and inspections of site drainage during construction will be completed;		
MM171	No instream works will take place outside the period July 1st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters		
MM172	All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland is incorporated into the design of the proposed Kildare Bridge pedestrian/cycle structure upgrade works, the Blackhall Little Bridge and the Moyglare Bridge.		
MM173	Surface water outfalls will be constructed in accordance with the measures described in 8.6.3.4.4 and subject to agreement with IFI		

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MM174	Good construction practices such wheel washers and dust suppression on site roads, and regular plant maintenance, which will be implemented, will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRlA, 2001), which provides information on these issues. This will ensure that surface water arising during the course of construction activities will contain minimum sediment		
MM175	During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas		
MM176	The MOOR stream crossing upgrade works, the Moyglare Bridge and the Kildare Bridge Works will all require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent, where considered necessary by the designer		
MM177	Preventative measures during construction have been incorporated into the Construction and Environmental Management Plan, which will be updated upon grant of permission and to provide any additional measures required pursuant to planning conditions and agreements with the planning authority		
MM178	The following best practice construction measures will be followed to ensure that there are no significant effects on the Rye Water River as a result of the construction of the two pedestrian and cycle bridges: The proposed design for water course crossings and culverts, which minimises interactions with water courses, ensures that there will be no perceptible effects on the morphology of those watercourses		
MM179	Prior to the outset of these works, small defined works areas will be fenced off at the location of the storm water outfall (between the main construction site and both water courses). Silt fences will be		

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	attached to these fences. The silt fence will provide a solid barrier between the proposed pipelaying works and the Rye Water River		
MM180	The necessary pipelaying works will be undertaken within this defined area.		
MM181	Following the installation of the pipework and reinstatement of the ground, the small section of the silt fence that protects the Rye Water River will be removed to facilitate the construction of the outfall		
MM182	No instream works will take place outside the period July 31st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters		
MM183	Cofferdams will be constructed using one tonne sandbags at the edge of the Rye Water River at the outfall point to create dry working areas.		
MM184	A submersible pump will be used to dewater inside the cofferdammed area and will discharge any waters to land at a location of over 30m from the rivers. The pumped waters will discharge through a silt bag		
MM185	The bankside will be excavated and a small pre-cast concrete headwall installed (with outfall pipe included).		
MM186	The banks and channel bed will be reinstated to avoid erosion or run off of silt. Following this the dams will be removed.		
MM187	The surface water discharge point is likely to take less than one day to install		
MM188	The bridge works will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent, where considered necessary by the designer		

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MM189	Prior to entering the works area, all machinery and personnel entering the works area will be thoroughly disinfected.		
MM190	As part of the application process, Inland Fisheries Ireland were consulted regarding the proximity of the works to the Blackhall Little and the River Rye Water.		
MM191	**Fauna- Disturbance/Habitat loss** › Same as Site A		
MM192	**Assessment on the potential impacts on bats during construction** **Habitat Loss** › Following the precautionary principle, a pre-construction survey will be undertaken on the individual tree adjacent to the Blackhall Little stream with 'Low to Moderate' suitability for bats to be felled, by a qualified ecologist prior to any works, to ensure there are no roosting bats. The requirement for a pre-construction survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice. The function of this survey will be to assess any changes in baseline environment since the time of undertaking the bat survey in July 2021		
MM193	› If bats are found to be roosting in any of the trees, a bat derogation licence must be obtained, and further mitigation prescribed by a licenced ecologist.		
MM194	› Tree felling will follow guidelines set out in National Roads Authority, Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes. 2006.		
MM195	**Fragmentation**		

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	› See mitigation measures in Assessment of the potential effects on the loss of Hedgerow (WL1) and Treeline (WL2) habitat for the MOOR.		
MM196	**Disturbance** › The majority of works, during the construction phase, will occur during daylight hours. Therefore, there will be no requirement for exterior lighting within the site. Where lighting is unavoidable (i.e. health and safety), low-intensity lighting and motion sensors will be used to limit illumination. Exterior lighting, during construction, shall be designed to minimize light spillage, thus reducing the effect on areas outside the proposed development, and consequently on bats i.e. Lighting will be directed away from mature trees/hedgerows/treelines around the periphery of the site boundary to minimize disturbance to bats		
MM197	**Assessment on the potential impacts on birds during construction** See Mitigation measures for Assessment of the potential effects on the loss of Hedgerow (WL1) and Treeline (WL2) habitat for the MOOR **Disturbance** Where possible, all cutting of trees, scrub and tall vegetation will be undertaken outside the bird nesting season which runs from the 1st March to the 31st August. Any cutting of vegetation that may be required outside the season described above will be supervised by a suitably qualified ecologist to ensure that no birds nests are present. Should nesting birds be encountered, the trees will be left until nesting activity has concluded.		
Human Beings			

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MM198	**Site A, B, C , the MOOR, Kildare and Moyglare Bridges** will be constructed and operated in accordance with all relevant Health and Safety Legislation, including: Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005); Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. No. 299 of 2007), as amended; Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. 291 of 2013), as amended; and Safety, Health and Welfare at Work (Work at Height) Regulations 2006 (S.I. No. 318 of 2006).		
MM199	During construction of **Site A, B, C, the MOOR, Kildare and Moyglare Bridges**, all staff will be made aware of and adhere to the Health & Safety Authority's '*Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2006'*. This will encompass the use of all necessary Personal Protective Equipment, Risk Assessment and Method Statements and adherence to the site Health and Safety Plan		
MM200	Fencing will be erected in areas of the site where uncontrolled access is not permitted. Appropriate health and safety signage will also be erected on this fencing and at locations around the site. Only appropriately qualified and trained personnel will be permitted to operate machinery onsite. **Site A, B, C , the MOOR, Kildare and Moyglare Bridges** will not be accessible to members of the public during the construction phase. A Construction and Environmental Management Plan (CEMP) has been prepared for each site and submitted with the relevant planning applications, and if planning permission is granted, it is envisaged that the Developer will engage with the local authority to agree an appropriate Traffic Management plan for the purposes of the Construction phase so as to minimise the impact of the construction works on the local road network		
MM201	A Traffic Management Plan and the CEMP will be developed and implemented to ensure any impact is short term in duration and slight in significance during the construction of Site A, B, C, the MOOR, the		

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	Kildare and Moyglare Bridge. Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be made clear. Local access to properties will also be maintained throughout any construction works and local residents will also be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum. The construction and environmental management plans (CEMP) include mitigation measures related to noise, dust and landscaping which will be in place to protect residential amenity. Construction operations will also in general be confined to the period Monday-Friday 0700-1900 h, and Saturday 0800-1600 h, reducing noise emissions in the local area during social hours.		
Hydrology & Hydrogeology			
MM202	Management of surface water runoff and subsequent treatment prior to release off-site will be undertaken during construction work as follows: Silt fencing will be constructed around the construction footprint, where there is a surface water receptor, in order to create a defined perimeter for the proposed works, leaving a natural vegetation buffer between the construction footprint (other than operational surface water outfall installations which are described below) and surface water receptors and associated riparian habitats.		
MM203	A silt fence will also be attached to solid boundary fencing where it is in place and where there is a surface water receptor. This will protect the stream from any potential sediment laden surface water run-off generated during construction activities.		
MM204	The silt fence will comprise a geotextile membrane that will buried beneath the ground to filter any run-off that may occur as a result of the proposed works. The silt fence will be monitored throughout the proposed works and will remain in place after the works are completed and until the exposed earth has re-vegetated		
MM205	As construction advances there may be a requirement to collect and treat surface water within the site. This will be completed using perimeter swales at low points around the construction areas, and if		

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	required water will be pumped from the swales into sediment bags prior to overland discharge allowing water to percolate naturally to ground;		
MM206	Discharge onto ground will be via a silt bag which will filter any remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of double silt fencing		
MM207	A suitably sized detention basin or settlement area will be installed at the lowest point before discharge to ground where excess run- off must leave the site. Silt curtains or earth berms will be used to channel run-off to locations where it can be controlled. These may take the form of an open detention area or, where the need arises, a portable skip/s, or similar, where inflow passes through straw bales, gravel etc		
MM208	Any proposed discharge area will avoid potential surface water ponding areas, and will only be located where suitable subsoils are present		
MM209	Daily monitoring and inspections of site drainage during construction will be completed		
MM210	No instream works will take place outside the period July 1st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters		
MM211	All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland is incorporated into the design of the proposed works		
MM212	All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland is incorporated into the design of the proposed Kildare Bridge pedestrian/cycle structure upgrade works, the Blackhall Little Bridge and the Moyglare Bridge		
MM213	Surface water outfalls will be constructed in accordance with the measures described in Chapter 6 and 8.6.3.4.4 and subject to agreement with IFI		

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MM214	Good construction practices such wheel washers and dust suppression on site roads, and regular plant maintenance, which will be implemented, will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRlA, 2001), which provides information on these issues. This will ensure that surface water arising during the course of construction activities will contain minimum sediment		
MM215	During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas		
MM216	The MOOR stream crossing upgrade works, the Moyglare Bridge and the Kildare Bridge Works will all require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent, where considered necessary by the designer		
MM217	Preventative measures during construction have been incorporated into the Construction and Environmental Management Plan, which will be updated upon grant of permission and to provide any additional measures required pursuant to planning conditions and agreements with the planning authority		
MM218	For directional drilling the area around the bentonite batching, pumping and recycling plant will be bunded using terram (as it will clog) and sandbags in order to contain any spillages.		
MM219	Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area		
MM220	Spills of drilling fluid will be clean up immediately and stored in an adequately sized skip before been taken off-site		

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MM221	The drilling fluid/bentonite will be non-toxic and naturally biodegradable (i.e., Clear Bore Drilling Fluid or similar will be used		
MM222	The drilling process / pressure will be constantly monitored to detect any possible leaks or breakouts into the surrounding geology or local watercourse		
MM223	This will be gauged by observation and by monitoring the pumping rates and pressures. If any signs of breakout occur then drilling will be immediately stopped		
MM224	Any frac-out material will be contained and removed off-site		
MM225	Management of groundwater seepages and subsequent treatment prior to discharge into the drainage network will be undertaken as follows: Silt fencing measures as described above will be installed		
MM226	Appropriate temporary interceptor drainage, to prevent upslope surface runoff from entering excavations will be put in place, as required		
MM227	If required, pumping of excavation inflows will prevent build-up of water in the excavation		
MM228	The pumped water volumes will be discharged to ground within the site through a silt bag at a distance of over 30m from nearby watercourses (Rye Water River and Blackhall Little Stream)		
MM229	There will be no direct discharge to any water body, and therefore no risk of hydraulic loading or contamination will occur		
MM230	Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows: All plant and machinery will be serviced before being mobilised to site		

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MM231	No plant maintenance will be completed on site, any broken down plant will be removed from site to be fixed		
MM232	Refuelling will be completed in a controlled manner using drip trays at all times		
MM233	Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water		
MM234	Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores		
MM235	Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored		
MM236	Ancillary equipment such as hoses and pipes will be contained within the bund		
MM237	Taps, nozzles or valves will be fitted with a lock system		
MM238	Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage		
MM239	Drip-trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills		
MM240	Only designated trained operators will be authorised to refuel plant on site		
MM241	Procedures and contingency plans will be set up to deal with emergency accidents or spills		
MM242	An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
MM243	Mitigation measures proposed for wastewater disposal: A self-contained port-a-loo with an integrated waste holding tank will be used at the site compounds, maintained by the providing contractor, and removed from site on completion of the construction works		
M244	No wastewater will be discharged on-site during either the construction or operational phase		
MM245	Mitigation measures proposed for cement based products: No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place		
MM246	No washing out of any plant used in concrete transport or concreting operations will be allowed on-site		
MM247	Where possible pre-cast elements for culverts and concrete works will be used		
MM248	Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be undertaken at lined cement washout ponds		
MM249	Weather forecasting will be used to plan dry days for pouring concrete		
MM250	The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event		
MM251	Morphological Changes to Surface Water Courses & Drainage Patterns & Water Quality: The proposed design for water course crossings and culverts, which minimises interactions with water courses, ensures that there will be no perceptible effects on the morphology of those watercourses		

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MM252	Prior to the outset of these works, small defined works areas will be fenced off at the location of the storm water outfall (between the main construction site and both water courses). Silt fences will be attached to these fences. The silt fence will provide a solid barrier between the proposed pipelaying works and the Rye Water River.		
MM253	The necessary pipelaying works will be undertaken within this defined area		
MM254	Following the installation of the pipework and reinstatement of the ground, the small section of the silt fence that protects the Rye Water River will be removed to facilitate the construction of the outfall		
MM255	No instream works will take place outside the period July 31st – September 31st in line with Inland Fisheries Ireland (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters		
MM256	Cofferdams will be constructed using one tonne sandbags at the edge of the Rye Water River at the outfall point to create dry working areas.		
MM257	A submersible pump will be used to dewater inside the cofferdammed area and will discharge any waters to land at a location of over 30m from the rivers. The pumped waters will discharge through a silt bag		
MM258	The bankside will be excavated and a small pre-cast concrete headwall installed (with outfall pipe included).		
MM259	The banks and channel bed will be reinstated to avoid erosion or run off of silt. Following this the dams will be removed		
MM260	The surface water discharge point is likely to take less than one day to install		

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MM261	Subject to agreement with IFI, short sections of the Rye Water River may be temporarily dammed with sandbags at times of low water. One dam will be constructed immediately downstream of the outfall point and the other, immediately upstream		
MM262	Machinery will not enter the water, the construction of the outfall will only occur after the dry working area is created		
MM263	Biosecurity measures will be strictly adhered to throughout the proposed works. Measures will be in accordance with IFI (2010) Biosecurity Protocol for Field Survey Work. Where staff are working instream, staff footwear and PPE will be inspected on daily completion of the works and vegetation or debris removed. Footwear will be dipped in or scrubbed with a disinfectant solution (e.g. 1% solution of Virkron Aquatic or another proprietary disinfection product) and thoroughly dried afterwards. Sand bags placed instream will not be re-used in other watercourses		
MM264	All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland will be incorporated into the proposed works		
MM265	As a further precaution, near stream construction work, will only be carried out during the period permitted by Inland Fisheries Ireland for in-stream works according to the Eastern Regional Fisheries Board (2004) guidance document "Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites", i.e., May to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI		
MM366	During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
MM267	The Kildare Bridge and Moyglare Bridge upgrade works will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent, where considered necessary by the designer.		
MM268	Potential Water Impacts on Designated Sites and Habitats; The proposed mitigation measures for protection of surface water and groundwater quality which will include on site drainage control measures (i.e., silt fences, silt bags etc.) will ensure that the quality of runoff from Site A, B, C, the MOOR, the Kildare Bridge areas will be good. All mitigation measures outlined throughout Section 8.6.3.1, 8.6.3.4 (the MOOR), 8.6.3.5 (the Kildare Bridge and Moyglare Bridge) above provides controls which will be put in place to manage risks associated with sediment, hydrocarbons/chemicals and cement-based products used during construction phase.		
MM269	The standard drainage design controls will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by Sites A, B, C, the MOOR, the Kildare Bridge and Moyglare Bridge		
Operational Phase			
Flora and Fauna			
MM270	**Assessment of potential impacts on bats during the operational phase associated with site A, B, C** **Mitigation**		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
	› The lighting plan for the operational phase of the proposed development, has been designed with consideration of the following guidelines: Bat Conservation Ireland (Bats and Lighting: Guidance Notes for Planners, Engineers, Architects and Developers, BCI, 2010) and the Bat Conservation Trust (Guidance Note 08/18 Bats and Artificial Lighting in the UK (BCT, 2018), Dark Sky Ireland, to minimise light spillage, thus reducing any potential disturbance to bats.		
MM271	› The lighting plan has been designed to maintain a dark corridor along the hedgerow on the northern boundary of the site. This will ensure commuting and foraging habitat is maintained to habitats west of the site		
MM272	› All luminaires are fitted with photocells which automatically switch luminaires on during night time and off during daytime. Additionally, all luminaires are to automatically dim by 75% 00:00 – 06:00 (U14 profile). If required and with agreement of the local authority additional dimming is available		
MM273	› The proposed lighting design uses warmest available LEDs for chosen luminaires (colour temperature set by worst case luminaires, all luminaires same colour temperature for consistency), the peak wave length is 600nm		
MM274	› For Site A and C: The proposed lamps have limited backward light properties thus assisting in reducing backward light spill. Lamps have also been specified with 0 Degree tilt (where possible) to ensure limited unwanted light spill		
MM275	› For Site B and C: Bat surveys carried out in 2021 indicate the Treeline along the southern boundary of the site is the most important commuting habitat for bats. This linear feature will remain in darkness and not have any artificial lighting		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
MM276	› For Site C: No lighting is proposed in proximity to the Moygaddy castle and surrounding woodland habitat		
MM277	› For Site C: Pedestrian footpaths which are located in close proximity to the Blackhall Little Stream and River Rye Water have been specified to a colour temperature of 2200k		
MM278	**Assessment of the potential impact on bats during the operational phase the MOOR** Bat surveys carried out in identified the treeline along the southern boundary of the MOOR to be the most important commuting habitat for bats across both sites. This habitat is being retained and will not be subject to artificial lighting. A lighting plan has been prepared as part of the MOOR application. › The lighting plan for the operational phase of the proposed development, has been designed with consideration of the following guidelines: Bat Conservation Ireland (Bats and Lighting: Guidance Notes for Planners, Engineers, Architects and Developers, BCI, 2010) and the Bat Conservation Trust (Guidance Note 08/18 Bats and Artificial Lighting in the UK (BCT, 2018), Dark Sky Ireland, to minimise light spillage, thus reducing any potential disturbance to bats.		
MM279	› The proposed lamps have limited backward light properties thus assisting in reducing backward light spill. Lamps have also been specified with 0 Degree tilt (where possible) to ensure limited unwanted light spill		
MM280	› Bat survey results from 2021 indicate the most important commuting habitat for bats within the proposed development site is the treeline along the southern boundary with high levels of activity also recorded at Moygaddy castle. These areas will not be subject to artificial lighting and will remain in darkness		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
MM281	› All luminaires are fitted with photocells which automatically switch luminaires on during night time and off during daytime. Additionally, all luminaires are to automatically dim by 75% 00:00 – 06:00 (U14 profile). If required and with agreement of the local authority additional dimming is available		
MM282	› The proposed lighting design uses warmest available LEDs for chosen luminaires (colour temperature set by worst case luminaires, all luminaires same colour temperature for consistency), the peak wavelength is 600nm		
MM283	**Impacts on water quality during the operational phase for Site A and B** › The risk of uncontrolled emissions is minimized by the collection, treatment and discharge of storm water to the Rye Water River via, attenuation tanks, filter drains and petrol/oil interceptors. It is also proposed to retain the existing riparian zone which will act as a buffer between the development and the Rye Water River		
MM284	› Wastewater from the Proposed Development will be directed to an EPA regulated wastewater treatment plant via a proposed onsite pumping station		
MM285	**Impacts on water quality during the operational phase for Site C** › The risk of uncontrolled emissions is minimized by the collection, treatment and discharge of storm water to the Rye Water River and the Blackhall Little Stream via, attenuation tanks, filter drains and petrol/oil interceptors. It is also proposed to retain the existing riparian zone which will act as a buffer between the development and the two watercourses.		
MM286	› Wastewater from the Proposed Development will be directed to an EPA regulated wastewater treatment plant via a proposed onsite pumping station		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
MM287	**Impacts on water quality during the operational phase for the MOOR** › The risk of uncontrolled emissions is minimized by the collection, treatment and discharge of storm water to the Rye Water River and Blackhall Little via, attenuation tanks, filter drains and petrol/oil interceptors. It is also proposed to retain the existing riparian zone which will act as a buffer between the development and that stream.		
MM288	**Potential Impacts on Rye Water Valley/Carton SAC for Site A, B, C, the MOOR** › The proposed mitigation measures for protection of surface water and groundwater quality which will include on site drainage control measures (i.e., silt fences, silt bags etc.) will ensure that the quality of runoff from Proposed Development areas will be good. All mitigation measures outlined throughout Section 8.6.3 of Chapter 8 provides controls which will be put in place to manage risks associated with sediment, hydrocarbons/chemicals and cement-based products used during construction phase		
MM289	› The standard drainage design controls will ensure the development will not give rise to any significant surface water or groundwater impacts at or downstream of the site or in the SAC. The majority of runoff from the existing site discharges to the river and stream via shallow subsurface flows as shown by the results of the SI investigations and the ground water level data. The drainage design ensures that these discharges will continue at the existing greenfield rates and therefore the hydrological regime locally and regionally will not be affected by the Proposed Development		
Material Assets			
MM290	**Site A, B, C**		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
	The below measures have been incorporated into the design of the proposed development and will be used to avoid any negative impacts on utilities or services during the operational phase of the proposed development: › An operational phase Waste Management Plan has been prepared (Appendix 4-5) and will be updated prior to operation to take account of all requirements of the Planning Authority.		
MM291	› The Engineering Services Reports in Appendix 4-9 of this EIAR present the proposals for the proposed development with regard to Surface Water Drainage, Wastewater Drainage and Potable Water Supply. These elements have been taken into consideration throughout the design of the proposed development and will be implemented in line with all required legislation and relevant best-practice guidelines.		
MM292	› Solar PV panels have been incorporated into building design throughout the development where appropriate, to facilitate the supply of renewable electricity for the energy demands of the buildings.		
Hydrology & Hydrogeology			
MM293	**Site A, B, C, Moyglare Bridge:** › The risk of pluvial and or fluvial flooding is minimised by the incorporation of a properly designed surface drainage and gravity sewer network, and by using underground attenuation tanks and flow restrictors for drainage management which will control discharge to the Rye Water River at pre-development greenfield rates. Water quality risks are mitigated by the use of hydrocarbon interceptors and silt traps.		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
MM294	› The risk of uncontrolled emissions is minimized by the collection, treatment and discharge of storm water to the Rye Water River via, attenuation tanks, filter drain and petrol/oil interceptors as described above. For Sites A, B & C it is also proposed to retain the existing riparian zone which will act as a buffer between the development and that stream. Wastewater from Site A, B & C will be directed to an EPA regulated wastewater treatment plant via a proposed onsite pumping station		
MM295	› During the operational phase all surface water arising on site will drain to attenuation tanks, hydrocarbon interceptor and filter drain before discharge to Rye Water River at controlled greenfield rates. Groundwater quality risks are reduced during the operational phase by use of hydrocarbon interceptors and silt traps prior to discharge to the watercourse.		
MM296	**The MOOR:** › The risk of pluvial and or fluvial flooding is minimised by the incorporation of a properly designed surface drainage network, and by using attenuation areas and flow restrictors for drainage management which will control discharge to pre-development greenfield rates. Water quality risks are mitigated by the use of hydrocarbon interceptors and silt traps as described in Chapter 4		
MM297	› The risk of uncontrolled emissions is minimized by the collection, treatment and discharge of storm water via, attenuation systems, filter drains and petrol/oil interceptors as described above		
MM298	**Kildare Bridge:** › The risk of pluvial and or fluvial flooding is minimised by the incorporation of a properly designed surface drainage proposals and the nature of the proposed works in this area..		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
Noise			
MM299	› No mitigation measures are required in relation to the completed Site C, apart from those relating to inward noise impacts as discussed in Section 10.4.4.		
Landscape and Visual			
MM300	› The designated landscape plan also includes planting of trees, shrubs and other vegetation. The planting will naturally mitigate the effects of the Proposed Development through replacement of green spaces and biodiversity which will be lost during the construction phase, as well as providing some additional visual screening of the Proposed Development from visual receptors. It is noted that this mitigation will improve over time as vegetation establishes following the commencement of the operational phase		
Cultural Heritage			
MM301	**Site A, B, C** › Pre-development targeted archaeological test trenching under licence from the National Monuments Service will take place to ascertain if the sub-surface features identified in the geophysical survey are archaeological in nature. Test trenching should also take place in areas of the site not covered by the geophysical survey, if development is proposed in these areas. A report on the results of targeted test trenching and a detailed archaeological impact assessment shall be compiled and submitted to the relevant authorities. If any archaeological sites or features are identified during the pre-construction test trenching, they will be preserved by record (archaeologically excavated) or preserved in-situ (avoidance) and therefore a full record made of same.		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
MM302	› The development footprint of the project has been mitigated by design to avoid removal of field boundaries wherever possible. Where it is not possible to maintain by design, an archaeological record (written and photographic) will be made of them prior to their removal.		
MM303	**The MOOR** › Pre-development targeted archaeological test trenching under licence from the National Monuments Service should take place to ascertain if the sub-surface features identified in the geophysical survey are archaeological in nature. Test trenching should also take place in areas of the site not covered by the geophysical survey, if development is proposed in these areas. A dive survey, undertaken under licence from the National Monuments Service should be undertaken at the location of the proposed bridge (s). A report on the results of test trenching shall be compiled and submitted to the relevant authorities detailing the results of the test trenching. If any sites are identified during the pre-construction test trenching, they will be preserved by record (archaeologically excavated) or preserved in-situ (avoidance) and therefore a full record made of same		
MM304	› The development footprint of the project has been mitigated by design to avoid removal of field boundaries wherever possible. Where it is not possible to maintain by design, an archaeological record (written and photographic) will be made of them prior to their removal		
MM305	› No mitigations are proposed. The closest Recorded Monument is Moygaddy Castle. It is partially surrounded by a growth of mature trees, which lessens the visual impact of the proposed MOOR development		
MM306	**Kildare and Moyglare Bridge**		

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Ref. No.	Mitigation Measure	Audit Result	Action Required
	› Pre-development archaeological dive survey, and test trenching under license from National Monuments Service will take place to ascertain if sub-surface archaeological features are present at the location of the construction works for the proposed bridge. A report on the results of dive survey and test trenching shall be compiled and submitted to the relevant authorities detailing the results of the test trenching. If any sites are identified during the pre-construction test trenching, they will be preserved by record (archaeologically excavated) or preserved in-situ (avoidance) and therefore a full record made of same. It is not possible to carry out pre-development test trenching along the route of the rising main. Excavation works should be archaeologically monitored under licence from the National Monuments Service. A report on the results of the monitoring shall be compiled and submitted to the relevant authorities detailing the results of the monitoring. If any sites are identified during the archaeological monitoring, they will be preserved by record (archaeologically excavated) or preserved in-situ (avoidance) and therefore a full record made of same.		

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