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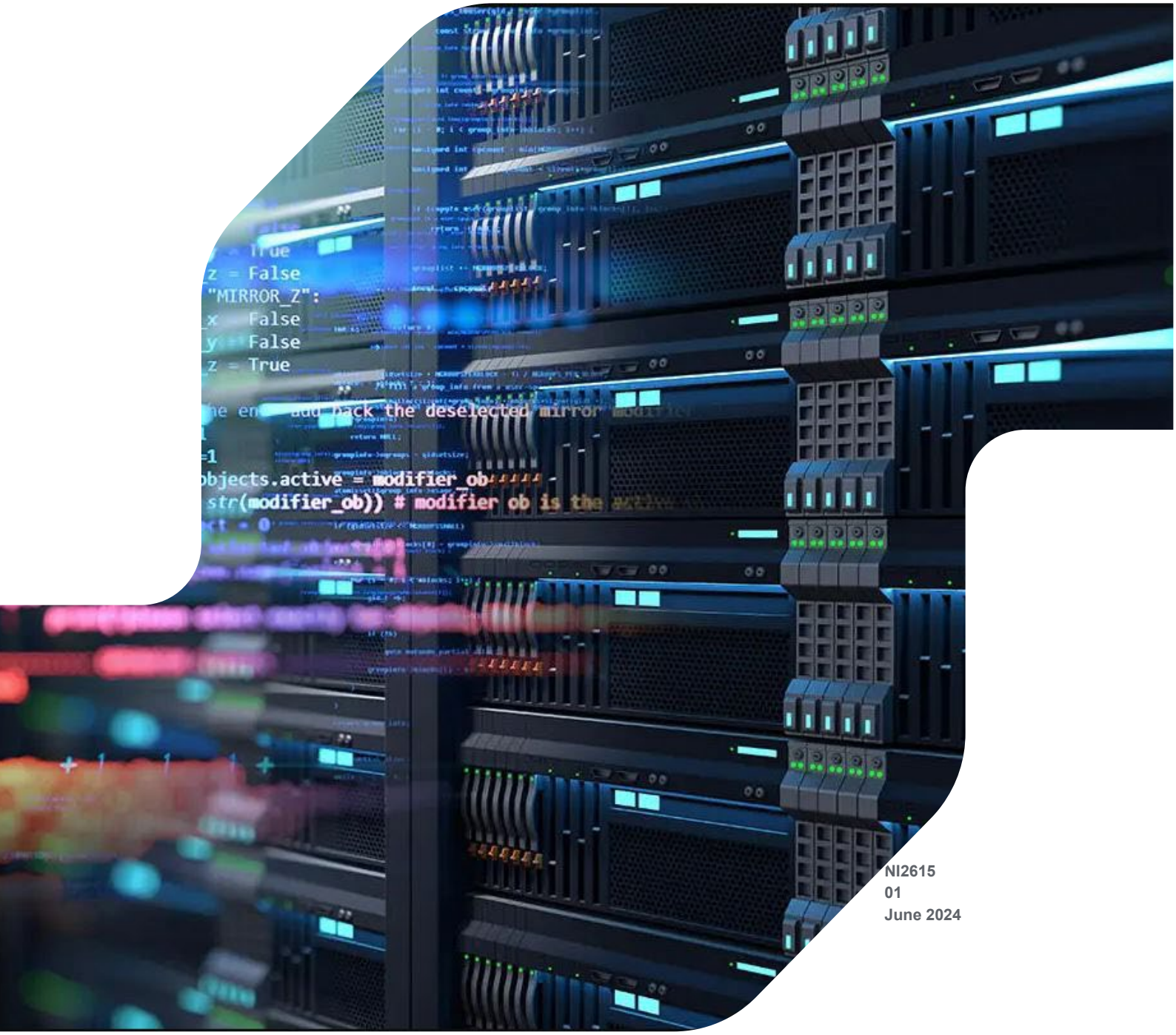
HERBATA DATA CENTRE, NAAS

EIAR
VOLUME I MAIN TEXT



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ABBREVIATIONS USED WITHIN THE EIAR

°C	Degree Celsius
AA	Appropriate Assessment
AADT	Annual Average Daily Traffic
ABP	An Bord Pleanála
AC	Ambient Concentration
ACA	Architectural Conservation Area
ADM	Air Dispersion Modelling
ADMLC	Atmospheric Dispersion Modelling Liaison Committee
ADMS	Atmospheric Dispersion Modelling System
AEP	Annual Exceedance Probability
AFA	Area for Further Assessment

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AGI	Above Ground Installation
AHU	Air Handling Unit
AIS	Air Insulated Switchgear
AONB	Areas of Outstanding Natural Beauty
AQAL	Air Quality Assessment Level
AQS	Air Quality Standard
ASI	Archaeological Survey of Ireland
ASSI	Area of Special Scientific Interest
ATC	Automatic Traffic Counter
BAP	Biodiversity Action Plan
BCT	Bat Conservation Trust
BEES	Battery Energy Storage System
BOD	Biochemical Oxygen Demand
BS	British Standard
CAFE	Clean Air for Europe
CAP	Climate Action Plan
CBiol	Chartered Biologist
CCTV	Closed-circuit television
CDP	County Development Plan
CDS	Connection and Developer Services
CDW	Construction and Demolition Waste
CEMP	Construction Environmental Management Plan
CEnv	Chartered Environmentalist
CERC	Cambridge Environmental Research Consultants
CFRAM	Catchment-based Flood Risk Assessment and Management
CGI	Computer Generated Imagery
CIEEM	Chartered Institute of Ecology and Environmental Management
CIHT	Chartered Institute of Highways and Transportation
CIRIA	Construction Industry Research and Information Association
CLVIA	Cumulative Landscape and Visual Impact Assessment
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalents
CPPA	Corporate Power Purchase Agreement
CRTN	Calculation of Road Traffic Noise
cSACs	Candidate Special Areas of Conservation
CSO	Central Statistics Office
CTG	Combustion Turbine Generator
CTMP	Construction Traffic Management Plan
CTVIA	Cumulative Townscape and Visual Impact Assessment

dB	Decibel
DC	Data Centre
DESNZ	The Department for Energy Security and Net Zero
DH	District Heating
DHPLG	Department of Housing, Local Government and Heritage
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
DMURS	Design Manual for Urban Roads & Streets
DOEHLG	Department of the Environment, Health & Local Government
EA	Environment Agency
EAL	Environmental Assessment Level
EC	European Commission
EcIA	Ecological Impact Assessment
ECJ	European Court of Justice
ECoW	Ecological Clerk of Works
EEA	The European Environment Agency
EEC	European Economic Community
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
ELVs	Emission Limit Values
EM	Environmental Manager
EPA	Environmental Protection Agency
EPUK	Environmental Protection UK
EQS	Environmental Quality Standards
ES	Environmental Statement
ESB	Electricity Supply Board
ESR	Effort Sharing Regulation
ETS	Emissions Trading System
EU	European Union
EV	Electric Vehicle
EWC	European Waste Catalogue
FCS	Favourable Conservation Status
FSC	Forest Stewardship Council
FRA	Flood Risk Assessment
GDPR	General Data Protection Regulations
GDSDS	Greater Dublin Strategic Drainage Study
GFA	Gross Floor Area
GHG	Greenhouse Gas
GI	Ground investigation
GIA	Gross Internal Area

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GII	Ground investigation Ireland
GIS	Gas Insulated Switchgear
GLVIA3	Guidelines for Landscape and Visual Impact Assessment, Third Edition
GNI	Gas Networks Ireland
GPP	Guidance for Pollution Prevention series
GPS	Global Positioning System
GPR	Ground Penetrating Radar
GSI	Geological Survey of Ireland
GWh	Gigawatt Hours
GWP	Global Warming Potential
ha	Hectare
HDV	Heavy Duty Vehicle
HGV	Heavy Goods Vehicle
HAS	Health and Safety Authority
HDR	Human Development Report
HSE	Health Service Executive
HVAC	Heating, Ventilation And Air Conditioning
HVO	Hydrotreated Vegetable Oil
Hz	Hertz
IAQM	Institute of Air Quality Management
IEMA	Institute of Environmental Management and Assessment
ICOMOS	International Council on Monuments and Sites
ICT	Information and Communication Technology
IFSC	Ireland's International Financial Services Centre
IFI	Inland Fisheries Ireland
IGI	Institute for Geologists Ireland
ILP	The Institution of Lighting Professionals
ISMP	Invasive Species Management Plan
ISO	International Organization for Standardization
I.T	Information technology
IUCN	International Union for the Conservation of Nature
JC&A	John Cronin & Associates
KCC	Kildare County Council
KCDP	Kildare County Development Plan
Kg CO_2e/m^2	Kilograms of Carbon Dioxide Equivalent Per Square Meter
KIC	Kildare Innovation Campus
KLCA	Kildare Landscape Character Area
kph	Kilometers per Hour
kV	Kilovolt
kVA	Volt-amps

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L	Locally Important
LAQM	Local Air Quality Management
LAP	Local Area Plan
L_{A10}	This is the A-weighted sound level that is exceeded for noise for 10% of the sample period
L_{A90}	This is the A-weighted sound level that is exceeded for 90% of the sample period
L_{Aeq}	The continuous equivalent A-weighted sound pressure level. This is an 'average' of the sound pressure level
L_{Amax}	This is the maximum A-weighed sound level measured during the sample period
L_{Amin}	This is the minimum A-weighted sound level measured during the sample period
LCA	Landscape Character Area
LCAs	Life Cycle Assessments
LCRM	Land Contamination Risk Management
LCT	Landscape Character Types
LECP	Local Economic & Community Plan
LED	Light Emitting Diode
LiDAR	Light Detection and Ranging
LUTS	Land Use and Transport Planning Strategy
LVIA	Landscape and Visual Impact Assessment
MCP	Medium Combustion Plant
MDs	Municipal Districts
M&E	Mechanical and Electrical
MF	Maintenance Factor
MIAI	Institute of Archaeologists of Ireland
MMP	Mobility Management Plan
MMR	Marine Nature Reserve
MS	Method Statement
$MtCO_2e$	Metric Tons of Carbon Dioxide Equivalent
MW	Medium Voltage
MWA	Megavolt-Amperes
NAF	National Adaptation Framework
NBDC	National Biodiversity Data Centre
nBAP	National Biodiversity Action Plan
NDC	Nationally Determined Contribution
NERT	National Exposure Reduction Target
NHA	Natural Heritage Areas
NIAH	National Inventory of Architectural Heritage
NIS	Natura Impact Statement
NMLs	Noise Monitoring Locations

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NMP	Noise Management Plan
NMS	National Monuments Service
NNR	National Nature Reserves
N	Nitrogen
NO_x	Oxides of Nitrogen
NO_2	Nitrogen Dioxide
NO_3	Nitrate
NPF	National Planning Framework
NPWS	National Parks & Wildlife Service
NPWSGIS	National Parks & Wildlife Service Geographic Information System
NRA	National Roads Authority
NREL	National Renewable Energy Laboratory
NRMM	Non-Road Mobile Machinery
NSP	National Sports Policy
NSR	Noise Sensitive Receptor
NSS	National Spatial Strategy
NTA	National Transport Authority
NTS	Non-Technical Summary
NWRA	North West Research Associates
NWCPO	National Waste Collection Permit Office
NVA	Night Vision Aids
NVIA	Noise and Vibration Impact Assessment
O_2	Oxygen
O_3	Ozone
O.D	Optical Density
OHL	Overhead Line
oISMP	Outline Invasive Species Management Plan
OPW	Office of Public Works
OSB	Oriented Strand Board
OS	Ordnance Survey
OSI	Ordnance Survey Ireland
P	Phosphate
PACC	Pre-Application Community Consultation
PAHs	Polycyclic Aromatic Hydrocarbon
Pb	Lead
PC	Process Contributions
PCUs	Passenger Car Units
PEAB	Preliminary Ecological Appraisal for Bats
PEC	Predicted Environmental Concentrations
PEFC	Programme for the Endorsement of Forest Certification

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pH	Potential of Hydrogen
PIP	Pollutant Impact Potential
PM_{10}	Particulate Matter
$PM_{2.5}$	Particulate Matter
pNHA	Proposed Natural Heritage Areas
POM	Programme of Measure
PPGs	Pollution prevention guidelines
PPV	Peak Particle Velocity
PRA	Preliminary Risk Assessment
PRFs	Preliminary Roost Features
PSD	Particle Size Distribution
PSFRM	The Planning System and Flood Risk Management
PV	Photovoltaic
Q-value	Quality Rating System
R	Regionally Important
RBMP	River Basin Management Plan
RICS	Royal Institute of Chartered Surveyors
ROI	Republic of Ireland
RHM	Register of Historic Monuments
RMP	Record of Monuments and Places
RPS	Record of Protected Structures
RSA	Road Safety Authority
RWMP	Resource and Waste Management Plan
SAC	Special Area of Conservation
SEAI	Sustainable Energy Authority of Ireland
SID	Strategic Infrastructure Development
SLR	Single-lens Reflex
SME	Small and Medium-Sized Enterprise
SMR	Sites and Monuments Record
SNH	Scottish Natural Heritage
SO_2	Sulphur Dioxide
SPA	Special Protected Areas
SUDS	Sustainable Urban Drainage Systems
SW	Surface Water
SWMP	Site Waste Management Plan
TA	Transport Assessment
TAN	Technical Advice Note
TCA	Townscape Character Areas
tCO_2e	Tonnes of Carbon Dioxide Equivalent
TII	Transport Infrastructure Ireland

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TNMP	Traffic & Navigation Management Plan
TRL	Transport Research Laboratory
TSO	Transmission System Operator
TTA	Traffic and Transportation Assessment
TVIA	Townscape and Visual Impact Assessment
UE	Uisce Eireann
µg	Microns
UK	United Kingdom
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
VLC	Visible Light Communication
VP	Viewpoint
VOCs	Volatile Organic Compounds
VRU	Vulnerable Road Users
WAC	Waste Acceptance Criteria
WBCSD	World Business Council for Sustainable Development
WEEE	Waste Electrical and Electronic Equipment
WFD	Water Framework Directive
WFP	Waste Facility Permit
WMP	Waste Management Plan
WRI	World Resources Institute
WTP	Water Treatment Plant
WwTP	Waste Water Treatment Plant
WwTW	Waste Water Treatment Work
WHO	World Health Organisation
ZoI	Zone of Influence

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EIAR
VOLUME I MAIN TEXT – CHAPTER 1 INTRODUCTION AND NEED FOR EIAR

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1 INTRODUCTION AND NEED FOR EIAR

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1.1 The Project - Overview

The Environmental Impact Assessment Report (EIAR) is provided in support of the proposed Herbata Data Centre Campus which is subject of both a full planning application to Kildare County Council (KCC) and a Strategic Infrastructure Development (SID) application to An Bord Pleanála; the applicant for both applications is Herbata Limited.

The overall Data Centre development includes two main elements, namely:

(a) The Data Centre, comprising 6 no. two storey Data Centre buildings, an administration/management building, car parking, landscaping, energy infrastructure and other associated works. These elements are the subject of the planning application submitted to KCC, and that application is referred to hereafter as “the Data Centre Application”.

(b) The substation, comprising a grid substation and 110kV transmission connection. These elements are subject of the SID application to An Bord Pleanála, and that application is referred to hereafter as “the Substation Application”.

There is a separate statutory development consent process for each of these elements, with which Herbata must comply. The Data Centre element requires planning permission pursuant to section 34 of the Planning and Development Act 2000 (as amended) (the “2000 Act”), while the substation element is “Strategic Infrastructure Development” within the meaning of the 2000 Act and requires approval from An Bord Pleanála under section 182A of the 2000 Act (instead of a regular planning permission under section 34 of the 2000 Act). A copy of the An Bord Pleanála Section 182A Determination is included in Volume II, Appendix 1.1.

It is therefore necessary for Herbata Limited to make two distinct applications, one to Kildare County Council in respect of the Data Centre (i.e. the Data Centre Application) and one to the Board in respect of the substation (i.e. the Substation Application). This is not at all unusual and is in compliance with legislation.

The Data Centre Application and the Substation Application together constitute the “Project” for the purposes of Environmental Impact Assessment and Appropriate Assessment, and references to the “Project” in this EIAR should be read as references to those two applications taken together as one project. Figure 1.1 below illustrates the extent of both planning application boundaries and the relevant project layout as subject of assessment within the EIAR.

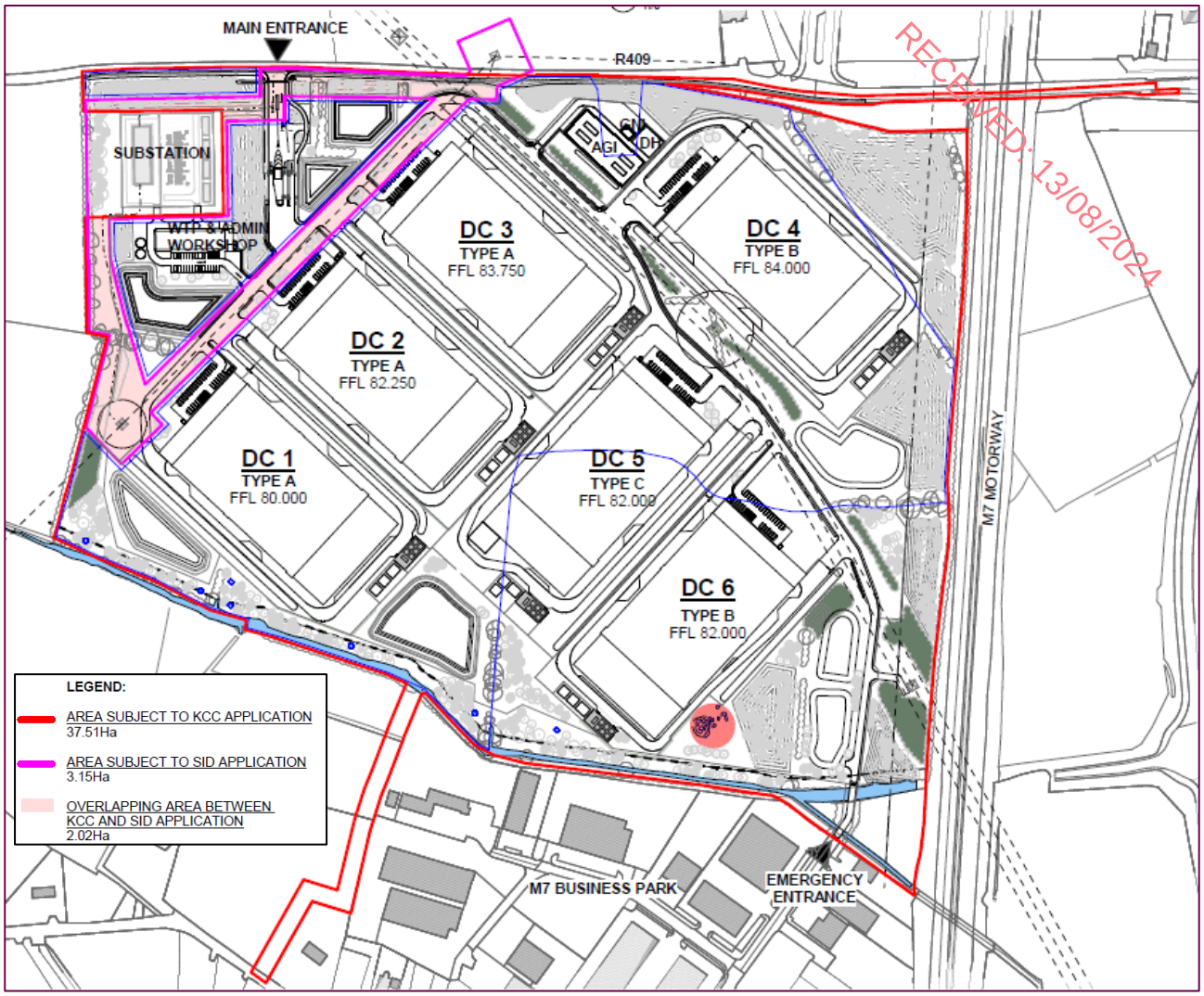

Figure 1.1: Proposed Site Context Plan Indicating both KCC (the Data Centre) Application and SID (the Substation) Application Planning Boundaries

For clarity, Figures 1.2 and 1.3 below illustrate the planning boundaries as they relate only to the KCC (the Data Centre) and SID (the Substation) applications respectively.

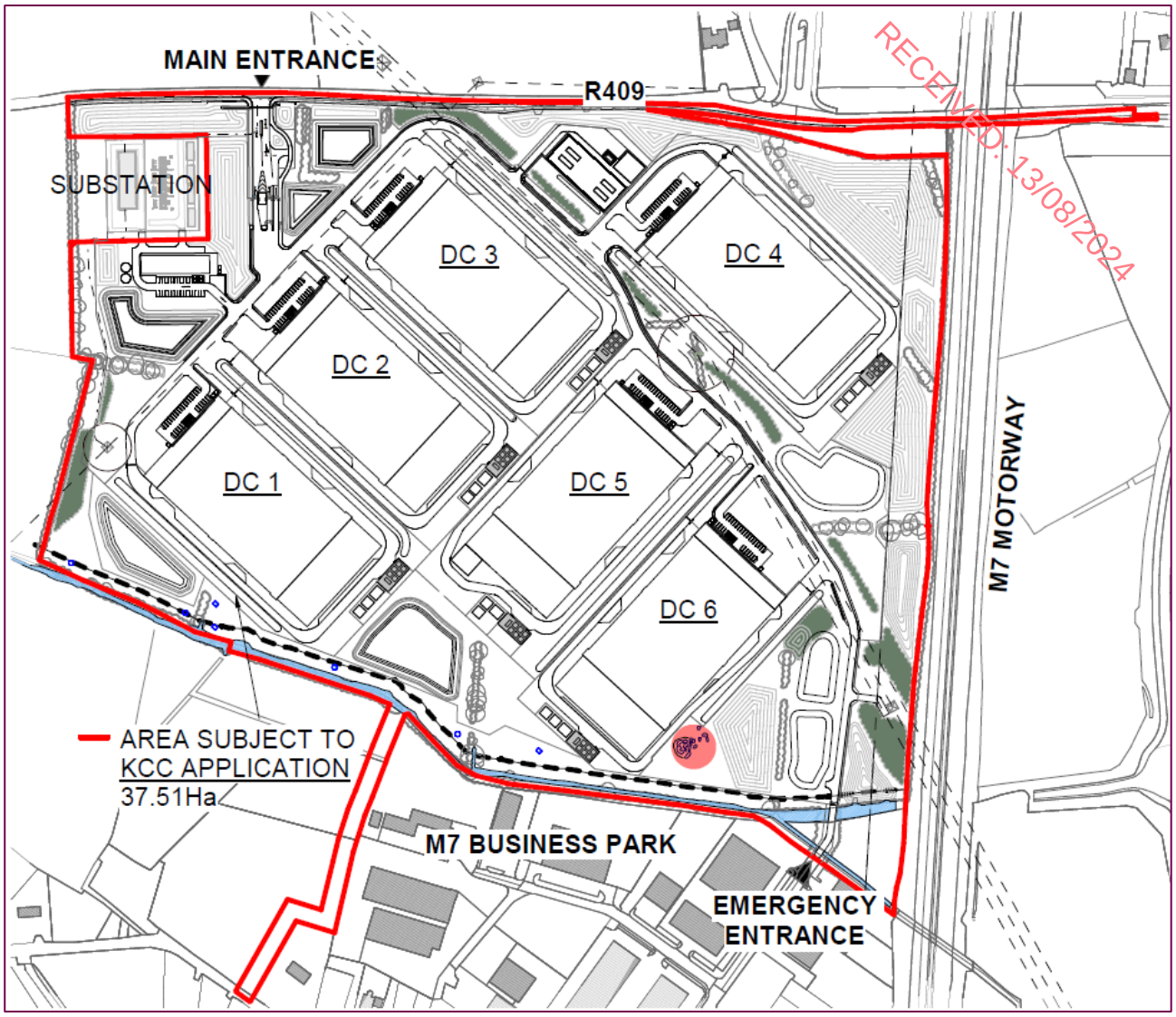

Figure 1.2: The Data Centre Application Planning Boundary

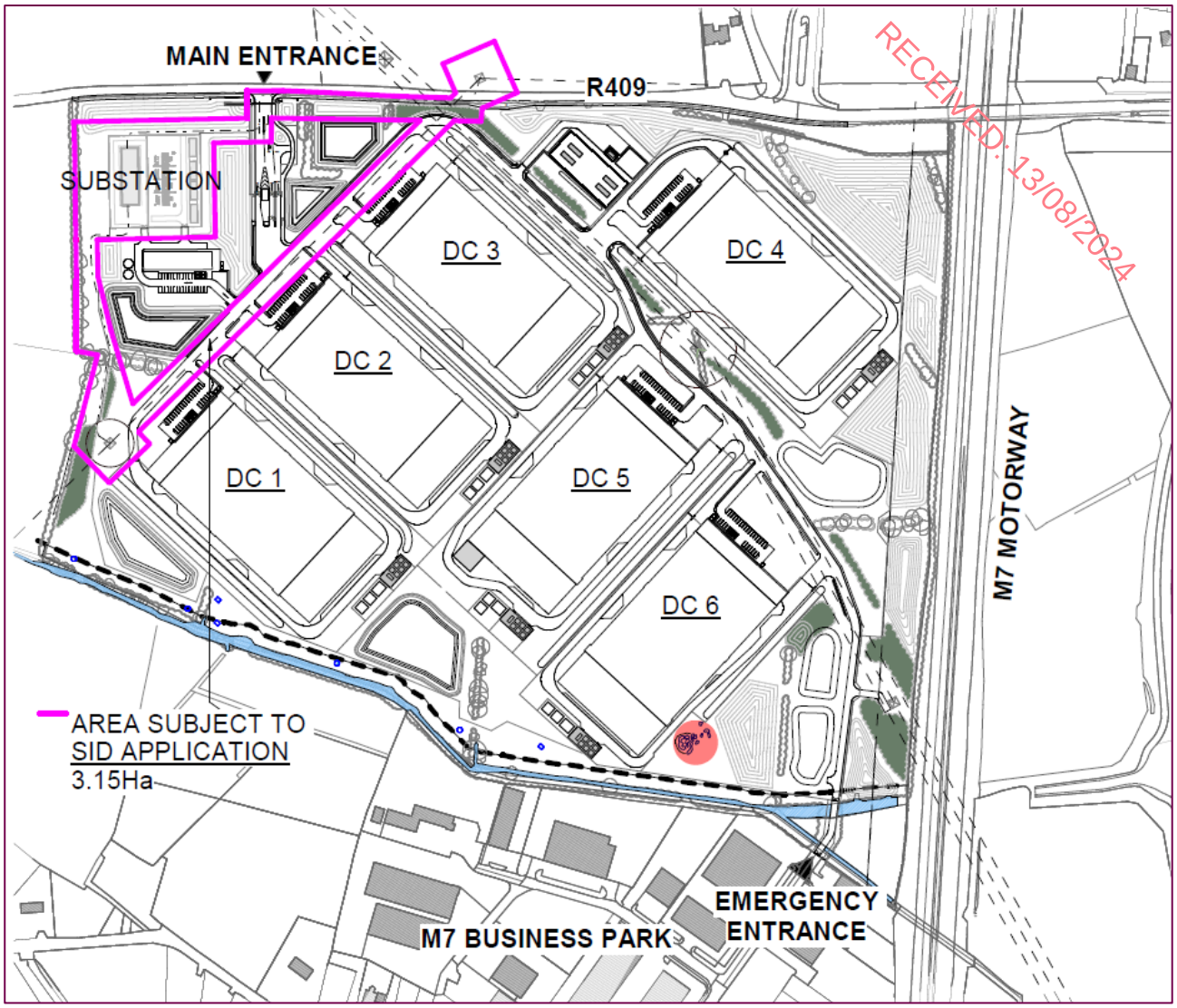

Figure 1.3: The Substation Application Planning Boundary

Figure 1.4 below illustrates the extent of the overlapping area (2.02ha) between the Data Centre and the SID applications.

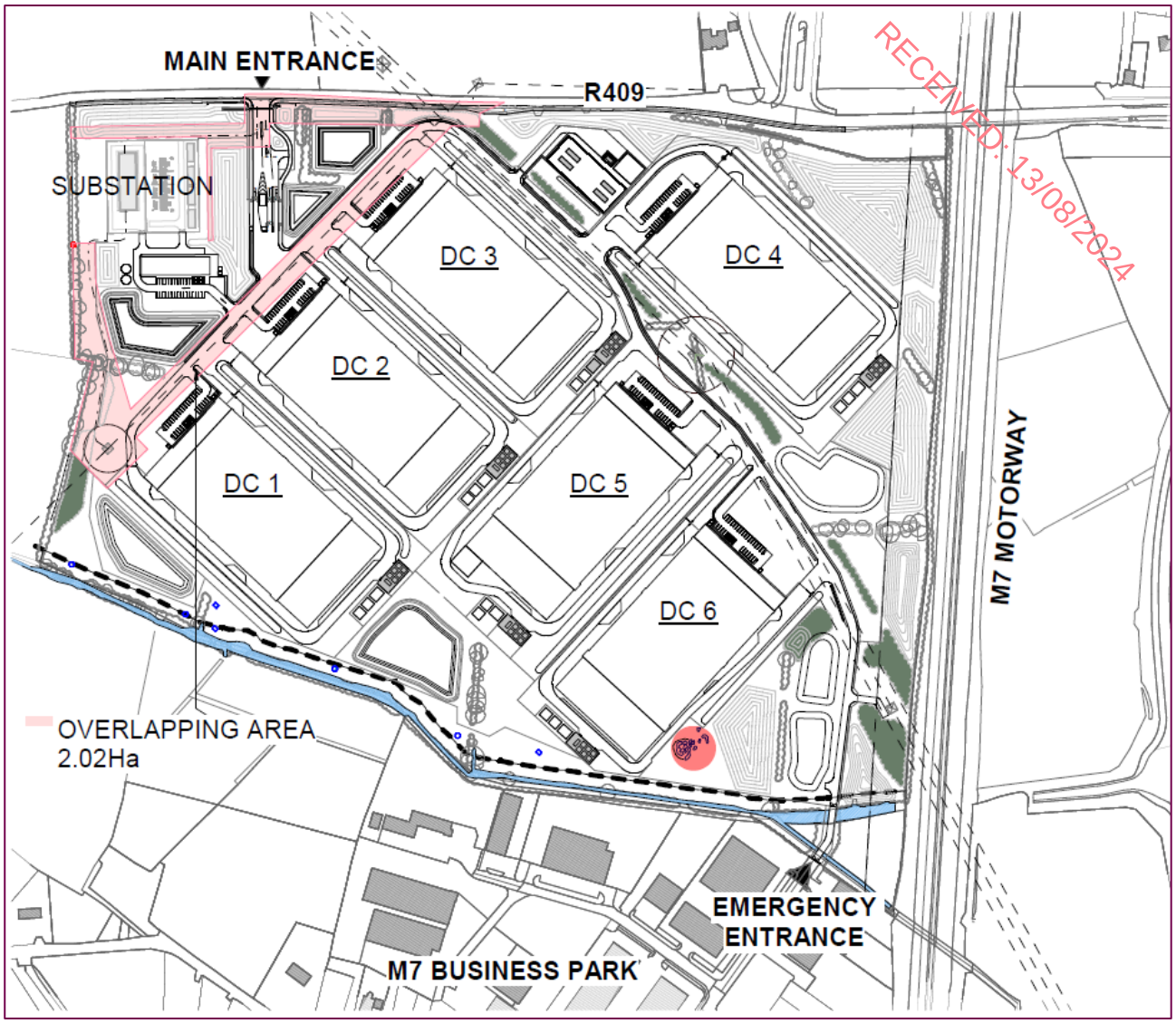

Figure 1.4: Overlapping Area Between KCC (the Data Centre) Application and SID (the Substation) Application Planning Boundaries

As illustrated in Figure 1.4, the Data Centre and the Substation application boundaries, have a partial overlap – this is due primarily to the alignment of the proposed underground 110kV connection because the existing overhead 110kV line (to be removed and replaced with an underground connection) runs above part of the area the subject of the Data Centre Application, and the proposed underground 110kV connection is to be provided in the substratum beneath part of the area the subject of the Data Centre Application

Figures 1.1 – 1.4 are illustrated in Volume III of the EIAR, Drawing Number 22217-RKD-ZZ-ZZ-SK-A-0012 Proposed Site Context Plan - KCC and SID Boundary Comparison. Volume III of the EIAR comprises of further selected design drawings of the Project.

A detailed description of the Project is provided in Chapter 4 of the EIAR.

The EIAR should be read in conjunction with the planning application submission including all documentation, supporting materials and full drawing pack.

1.2 Need for Environmental Impact Assessment

The requirement for Environmental Impact Assess arises under 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 (as amended by Directive 2014/52/EU) (the “EIA Directive”) with all Member States to bring the Directive into force by 16th May 2017.

The requirements of the EIA Directive, following its amendment in 2014, were transposed into Irish law with the enactment of a number of implementing legislative measures, including in particular the EU European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (SI 296 of 2018), which came into effect on the 1st September 2018 and gave effect to Directive 201 1/92/EU as amended by the EIA Amendment Directive.

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Projects listed in Annex I of the EIA Directive as transposed in Part 1 of Schedule 5 to the Planning and Development Regulations 2001 (as amended) (the "2001 Regulations"), and projects listed in Annex II of the EIA Directive (as transposed in Part 2 of Schedule 5 to the 2001 Regulations) that equal or exceed the thresholds set out in Part 2 of Schedule 5 to the 2001 Regulations, require a mandatory EIA.

Projects listed in Annex II, that do not equal or exceed the thresholds set out in Part 2 of Schedule 5 to the 2001 Regulations, require screening to determine whether an EIA is required.

Data Centres are not in themselves identified as a standalone class of development in either Annex I or Annex II to the EIA Directive, or in Schedule 5 to the 2001 Regulations for the purposes of EIA. However, the Project constitutes "urban development" and therefore falls within Class 10 (b)(iv) of Part 2 of Schedule 5 to the 2001 Regulations, which is:

'Urban development which would involve an area greater than 2 hectares in the case of a business district, 10 hectares in the case of other parts of a built up urban area and 20 hectares elsewhere.'

The relevant threshold for the purposes of the Project is 20 hectares. As the Project has a site area of 38.64 hectares, the relevant threshold set out in Part 2 of Schedule 5 to the 2001 Regulations is exceeded, and the Project requires a mandatory Environmental Impact Assessment as such the Project is considered to be EIA development.

1.3 Structure of the EIAR

1.3.1 Proposed Structure

This section sets out the proposed structure of the EIAR and the various environmental topics to be considered are set out in this section.

The EIAR is comprised of the following elements:

- Volume I Main Report;
- Volume II Technical Appendices;
- Volume III Design Drawings & Figures; and
- Non-Technical Summary (NTS).

Table 1.1 sets out the chapters contained within Volume I of the EIAR.

Table 1.1: EIAR Structure

Document	Heading/Description
EIAR Volume I – Main Report	
Chapter 1	Introduction and Need for EIAR
Chapter 2	Alternatives
Chapter 3	Project Scoping and Consultation
Chapter 4	Description of the Project and Project Need
Chapter 5	Biodiversity
Chapter 6	Lands and Soils
Chapter 7	Water and Hydrology
Chapter 8	Air Quality
Chapter 9	Noise and Vibration
Chapter 10	Cultural Heritage
Chapter 11	Landscape and Visual
Chapter 12	Traffic and Transportation

Chapter 13	Material Assets – Built Services
Chapter 14	Population
Chapter 15	Human Health
Chapter 16	Climate Change
Chapter 17	Cumulative Effects and Interactions
Chapter 18	Summary of Mitigation
EIAR Volume II – Technical Appendices	
Technical Appendices	Relevant technical appendices supporting the planning applications and EIAR are contained in Volume II.
EIAR Volume III –Design Drawings & Figures	
Drawings, graphics and figures	Contains selected design drawings and figures (which are not included in the body of the relevant EIAR chapters).
Non-Technical Summary	
Non-Technical Summary (NTS)	The NTS contains an overview of the Project and summarises the most salient points and findings of the EIAR in a non-technical language.

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1.3.2 Annex IV EIA Directive and Schedule 6 Planning and Development Regulations Required Information

The EIAR includes information identified in Annex IV to the EIA Directive and in Schedule 6 of the Planning and Development Regulations 2001 (as amended), as follows.

1.3.2.1 Annex IV to the EIA Directive

1. Description of the project, including in particular:

(a) a description of the location of the project;

(b)a description of the physical characteristics of the whole project, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;

(c) a description of the main characteristics of the operational phase of the project (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;

(d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operation phases.

2. 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.

3. A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.

4. A description of the factors specified in Article 3(1) likely to be significantly affected by the project: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.

5. A description of the likely significant effects of the project on the environment resulting from, inter alia:

(a) the construction and existence of the project, including, where relevant, demolition works;

(b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;

(c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;

(d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);

(e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;

(f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;

(g) the technologies and the substances used.

The description of the likely significant effects on the factors specified in Article 3(1) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the project. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project.

6. A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.

7. A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.

8. A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council (*) or Council Directive 2009/71/Euratom (**) or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.

9. A non-technical summary of the information provided under points 1 to 8.

10. A reference list detailing the sources used for the descriptions and assessments included in the report.

1.3.2.2 Schedule 6 to the Planning and Development Regulations 2001 (as amended) - Information to be contained in an EIAR

1. (a) A description of the proposed development comprising information on the site, design and size of the proposed development.

(b) A description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects.

(c) The date required to identify and assess the main effects which the proposed development is likely to have on the environment.

(d) An outline of the main alternatives studied by the developer and an indication of the main reasons for his or her choice, taking into account the effects on the environment.

2. Further information, by way of explanation or amplification of the information referred to in paragraph 1, on the following matters:-

(a) (i) a description of the physical characteristics of the whole proposed development and the land-use requirements during the construction and operational phases;

(ii) a description of the main characteristics of the production processes, for instance, nature and quantity of the materials used;

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(iii) an estimate, by type and quantity, of expected residues and emissions (including water, air and soil pollution, noise, vibration, light, heat and radiation) resulting from the operation of the proposed development;

(b) a description of the aspects of the environment likely to be significantly affected by the proposed development, including in particular:

- *human beings, fauna and flora,*
- *soil, water, air, climatic factors and the landscape,*
- *material assets, including the architectural and archaeological heritage, and the cultural heritage,*
- *the inter-relationship between the above factors;*

(c) a description of the likely significant effects (including direct, indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative) of the proposed development on the environment resulting from:

- *the existence of the proposed development,*
- *the use of natural resources,*
- *the emission of pollutants, the creation of nuisances and the elimination of waste,*

and a description of the forecasting methods used to assess the effects on the environment;

(d) an indication of any difficulties (technical deficiencies or lack of know-how) encountered by the developer in compiling the required information.

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1.3.3 Requirements of an EIAR

An EIAR document is produced as the key component of the environmental impact assessment (EIA) process. It provides a description of:

a) The baseline environment
b) Identification of the potential effects (if any - both positive and negative) that are predicted to be incurred as a result of the Project; and,
c) A description of any control and mitigation measures required to avoid, reduce or eliminate such potential effects.

The EIA Directive and its implementing Regulations requires that an environmental impact assessment must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of a project on the following factors and the interaction between those factors:

- population and human health;
- biodiversity, and in particular species and habitats protected under Council Directives 92/43/EEC (the Habitats Directive) and 2009/147/EC (the Wild Birds Directive);
- land, soil, water, air and climate;
- material assets, cultural heritage and the landscape.

1.3.4 Methodology

The methodology employed in the EIAR provides for a staged approach, which can be summarised as follows:

- **Desktop analysis and consultation**: has been undertaken to compile relevant background data and identify issues and constraints.
- **Baseline surveys**: including walk-over visits, detailed specialist surveys and discussions with relevant statutory and other consultees to determine the nature and extent of the existing environment.
- **Identification of potential significant effects**: predicting the likely significant environmental effects of the development during construction and operation of the facility for the range of predicted uses as well as setting the scene for the identifying appropriate mitigation for the development.

- **Mitigation**: on-going development and description of mitigation proposals which will be incorporated into the project design as it evolves, including regular review and evaluation, to mitigate the potential environmental effects.
- **Monitoring**: if considered necessary, monitoring requirements may be identified for both the construction and operational phase of the development.
- **Residual and cumulative effects**: consideration of the residual effects remaining after mitigation.
- **Reporting**: preparation of the EIA Report, including NTS.

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The assessment of the likely significant effects of the Project on the environment will be undertaken through a variety of methods:

- Professional judgement and experience based on published guidance criteria
- Assessment of both temporary and permanent effects
- Assessment of cumulative effects
- Assessment of duration, frequency and reversibility of effects
- Assessment against local, regional and national planning policy
- Consultation with statutory and non-statutory consultees

Significance criteria will be based on the type of potential consequences, the probability of the consequence occurring and the magnitude of the consequence. Individual chapters set out the scale that will be used to evaluate significance of effect, thus providing a consistent approach throughout the EIAR. Each topic chapter will identify significant effects relevant to each topic having regard to this scale.

Tables 1.2 and 1.3 below provide *example* descriptions for value (sensitivity) of receptors and descriptions for magnitude of impact.

Table 1.2: Environmental Sensitivity and Descriptions

Sensitivity of Receptor	Typical Description
Very High	*Very high importance and rarity, international scale and very limited potential for substitution.*
High	*High importance and rarity, national scale, and limited potential for substitution.*
Medium	*High or medium importance and rarity, regional scale, limited potential for substitution.*
Low	*Low or medium importance and rarity, local scale.*
Negligible	*Very low importance and rarity, local scale.*

Table 1.3: Magnitude of Impact and Typical Descriptions

Magnitude	Example Descriptor
High	*Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse).* *Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial).*
Medium	*Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse).* *Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).*
Low	*Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse).* *Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).*

Negligible	*Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse).* *Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).*
No change	*No loss or alteration of characteristics, features or elements; no observable impact in either direction.*

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There are seven generalised degrees of effect significance that are commonly used in EIA: *Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant and Profound.* The approach to deriving effects of significance from receptor value and magnitude of impacts is based on the Figure 1.5 below.

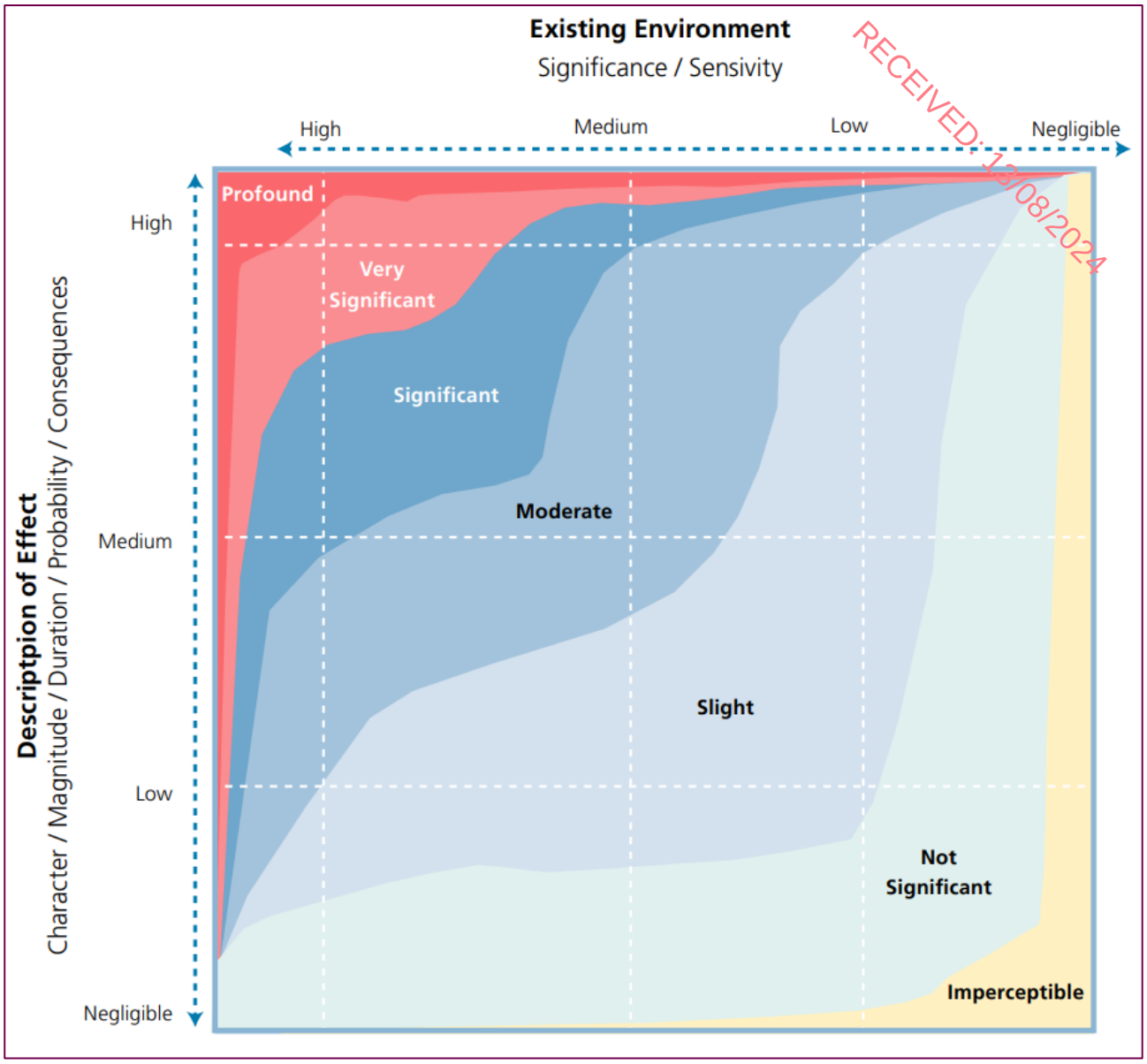

Figure 1.5: Chart Showing Typical Classifications of the Significance of Effects (*Guidelines on the information to be contained in Environmental Impact Assessment Reports*, EPA, 2022)

1.4 Cumulative Effects

1.4.1 Definition of Cumulative Effects

This EIAR considers and assesses the potential for cumulative effects arising from the Project in association with other developments as detailed below in Table 1.4.

The cumulative effects of a development refer to the way in which an environmental resource may be subject to a particular type of impact from more than one Project. The impacts from multiple projects may overlap or act in combination at a particular location or upon a particular resource, thereby leading to more significant environmental impacts than if the impacts were considered in isolation.

The EIA Directive 2014/52/EU specifies at Annex III that:

"the likely significant effects of projects on the environment must be considered […] taking into account [inter alia] the cumulation of the impact with the impact of other existing and/or approved projects"; and at Annex IV that "a description of the likely significant effects of the project on the environment resulting from, inter alia […] the cumulation of effects with other existing and/or approved projects, taking into account any existing

environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources" is required.

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1.4.2 Cumulative and In-Combination Impacts

Cumulative effects are assessed in each chapter in respect of impacts resulting from the accumulation of impacts generated by the Project on the same receptors and the impacts potentially arising from adjacent or nearby developments together with those predicted for the Project.

The following guidelines and publications were considered when determining the other projects to be considered for their potential to generate cumulative effects with the Project:

- European Commission (EC) Guidelines for the Assessment of Indirect and Cumulative Impacts (1999).

The first step in determining cumulative effects comprised the identification of a list of other projects which may have the potential to overlap with the Project based on available information.

Other projects for which a development consent application has been submitted or consent granted were included. Potential future projects which have not submitted an application for consent were not included.

Those other projects whose impacts could foreseeably overlap with the construction or operation of the Project or where construction impacts may be consecutive but cumulative, were considered. The cut-off date for sourcing information on the other projects considered was June 2024.

Cumulative effects are changes to the environment that are caused by an action in combination with other actions. They can arise from a number of sources, where relevant, including:

- the interaction between all of the different projects in the same area; and
- the interaction between the various impacts within a single project.

The cumulative effects of the Project, in conjunction with other proposed projects, are considered within each topic chapter. Relevant developments considered within the cumulative assessments include those which are:

- under construction;
- permitted, but not yet implemented;
- submitted, but not yet determined.

Each topic chapter further considers whether there are significant cumulative effects which are likely to arise as a result of interaction between effects as part of the same project, so as to identify potential secondary, cumulative or synergistic effects.

1.4.3 Planning History

A planning history search was carried out to establish the most recent planning applications within and immediately adjacent to the site boundary, for the purposes of cumulative assessment. Whilst no pertinent permissions were identified on the subject site, a number of relevant applications were identified in the wider locale of the subject site.

Table 1.4 identifies all those projects which have been assessment with regards to cumulative impacts.

Table 1.4: Projects to be Assessed for Cumulative Impacts

Planning Reference	Address	Description	Status	Determination Date
201418	Kerdiffstown and Monread North,Naas,Co. Kildare	A proposed solar farm on an area of approximately 10.8 hectares, comprising photovoltaic panels on ground mounted frames, 4 no. single storey inverter/transformer stations, 1 No. onsite terminal station, storage containers and temporary site compound, security fencing, new and upgraded internal access tracks, CCTV and all associated ancillary development works. Elgin Energy Services Limited are applying for the proposed solar farm to have planning permission that is	Granted	05/05/2021

		effective for 10 years (and an operational period of 40 years)		
PL09.305953	Townlands of Drehid, Mulgeeth,Ballynamullagh, Mucklon, Kilmurray (Carbury By),Killyon and Timahoe East, Co. Kildare	A ten-year planning permission to develop a renewable energy development. The proposed renewable energy development will comprise of (a) the construction and operation of 2 areas of solar photovoltaic arrays mounted on metal frames over an area of approximately 200ha, and having a maximum overall height of 3 metres over ground level; (b) Internal solar farm underground cabling; (c) 2 no. temporary construction compounds; (d) recreation and amenity works, including looped walk (upgrade of existing tracks and provision of new tracks, car parking and vehicular access); (e) 1 no. Battery Storage compound; (f) upgrade of existing tracks and provision of new site access roads; (g) site drainage; (h) forestry felling and replanting; (i) permanent signage; and (j) all associated site development and ancillary works. The proposed renewable energy development will have an operational life of 35 years from the date of commissioning. The overall renewable energy project also includes the provision of a 110kV substation with associated electrical plant, welfare facilities, waste water holding tank, security fencing, upgrade of existing tracks and provision of new site access roads, 110kV overhead line grid connection cabling with associated angle lattice masts and supporting polesets and all ancillary works	Granted with conditions	29/07/2020
181328 & PL09.303577	Townlands of Guidenstown South and Rahilla Glebe,Co. Kildare	The development consist / consists of a ground mounted solar photovoltaic (PV) farm within a site area of 26 hectares consisting of solar photovoltaic panels covering an area of up to 185,000m2 on ground mounted steel frames, 1 no; on-site substation / control room and palisade fencing, up to 5 no. inverter / transformer stations, underground cables and ducts, boundary security fence, use of existing entrance to public road at Dunmurry Springs Golf Club, upgrade to parts of existing track from the public road to the proposed solar farm, new and upgraded internal tracks, CCTV cameras, two temporary site compounds and all associated site services and works located within townlands. Permission is sought for 10 years.	Refused	23/05/2019
18969	Brownstown and Carnalaway,Kilcullen,Co. Kildare	A solar farm to be installed over restored landfill with an export capacity of approximately 3MW comprising photovoltaic panels on ground mounted frames, connection to existing single-storey ESB Sub- Station / switch room building, installation of 3 No. transformers, ducting and underground electrical cabling and all associated ancillary works and services. Revised by significant further information consisting of; construction management plan detailing construction techniques	Granted	21/08/2019
18250	Killeenlea, Ardrass Lower & Killadoon,Celbridge,Co.Kildare	A 10 year permission (to construct development) for a solar farm comprising: the installation of photovoltaic panels on ground mounted frames in rows on a site of C.47.44 hectares, a single storey onsite 38kV substation with compound, with 2 no single storey storage containers, 25 no. invertor stations , ducting & underground electrical cabling, perimeter fencing, 23.no mounted CCTV Cameras, provision of a new access from the L5066/Killadoon Road, provision of internal access	Granted	11/01/2019

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		tracks, and all associated site development and landscaping works		
12577	Bord na Mona,Main Street,Newbridge ,Co. Kildare.	Construction of a new I.T. data centre building, concrete slab to facilitate a 550 Kva back-up generator and a concrete fuel storage bund to hold a 3000L fuel tank	Granted	03/09/2012
18247	Porterstown and Kilteel Lower,Kill,Co. Kildare	Development of a grid system services facility within a total site area of up to 1.95 hectares, to include 1no. TSO compound including 1no. single storey TSO electrical substation building and 1no. single storey customer substation, 1no. customer switchgear, electrical inverter /transformer station modules, containerised battery storage modules on concrete support structures, heating, ventilation and air conditioning units (HVAC units), access tracks and upgraded site entrance, associated electrical cabling and ducting, security gates, perimeter security fencing, CCTV security monitoring system, culverts and landscaping works and all associated ancillary infrastructure	Granted	11/06/2018
20745	Porterstown,Kill, Co. Kildare.	The development of a new electrical substation and additional equipment in the existing ESB Kilteel 110kV Substation to facilitate the connection of the Porterstown Battery Storage Facility (Planning Ref 18/247) The total site area is 1.2 hectares. The new electrical substation will include 1 control building (GRP Containerised Substation), a 110kV transformer, surge arresters, instrument transformers, a 110kV busbar connecting to the ESB substation, a lightning mast and other electrical equipment to be installed on concrete support structures. Additional features will include palisade fencing, security gates, access tracks, external lighting, drainage, associated electrical cabling and ducting, CCTV security monitoring system, landscaping and all associated ancillary infrastructure. The additional equipment to be installed in the ESB substation to facilitate the connection of the new substation will include a 110kV busbar extension, a 110kV transformer bay, a 110kV coupler bay, a 110kV busbar connecting to the new substation, an interface kiosk, palisade fencing, a lightning mast and all associated ancillary infrastructure required for the connection	Granted	05/10/2020
PL09.310841	Dunnstown, Co. Kildare	A 10 year planning permission for the construction of: 1. An enclosed battery energy storage system compound on c. 4.089 ha with 76 no. battery storage units (each with associated containerised step-up transformer), 1 no. containerised control room and 1 no. containerised switch room, 1 no. containerised switchgear unit and CCTV cameras; 2. new site entrance off the L6044 and site access road; 3. site access road extension to a proposed substation site (proposed substation currently subject of a Strategic Infrastructure Development Pre-Application Consultation with An Bord Pleanála); and 4. all associated ancillary development works. The operational lifespan of the battery energy storage system will be 35 years.	Granted with Conditions after Appeal	30/09/2022
221203	Coolcarrigan,Timahoe West,Co. Kildare.	for a 10-year permission, for the construction and operation of a renewable energy development within a site boundary of c. 114 ha. The proposed development will consist of a development area of circa 71.7 ha including solar on fixed on ground mounted frames with a maximum height of 3 metres, 1 No. battery storage compound, 1 No. customer switchgear container, 1 No. 110kv grid	Grant	15/05/2023

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		connected single storey substation, 1 No. single storey customer substation and all associated electrical plant, inverter units, electrical transformers, battery units, cooling equipment, underground cabling and ducting, boundary fencing, security entrance gates, CCTV, upgrading of existing access road and new internal access roads and all associated ancillary activities. The proposed development will have a 35-year operational life from the date of commissioning. Revised by significant further information which consists of Provision of quantum of energy export (of up to 80MW) in the proposed development and storage capacity of proposed battery compound (of up to 80MWh). Clarification of energy export (of up to 15MW, no battery storage) of adjacent permitted development 15/1172 (extension of duration under 20/1052); Submission of details of adjacent permitted development 15/1172 (extension of duration under 20/1052); Provision of details of minor works to site entrance, construction traffic warning signage to public roadway, at proposed site entrance and also within internal haul routes; Clarification of extent of private roadway (haul roads) within the site; Provision of a fire risk assessment of hazards for on or near the solar array and battery storage compound; Provision of programme/schedule of works for proposed development and adjacent permitted development 15/1172 (extension of duration under 20/1052; Provision of amended Archaeological Impact Assessment. Provision of draft Construction Traffic Management Plan; Provision of Independent Road Safety Audit Stage 1/2; Provision of amended preliminary Construction and Environment Management Plan; Provision of Preliminary Public Liaison Engagement Plan		
2360047 & PL09.318151	Kildare Innovation Campus (KIC), Barnhall Meadows,Leixlip, Co. Kildare	Will consist of Demolition of existing Buildings No's 7, 8 and 9 (total gfa c. 84,838sqm). - Existing Buildings No's 1 – 6 will be retained for deep tech and innovation related uses (total gfa c.42,862sqm) - Construction of 2 no. new deep tech buildings and 4 no. new data centre buildings, all including ancillary office spaces. The deep tech buildings will have an overall maximum height of c.16m and vary in size from30,945sqm – 41,190sqm with a combined total gfa of c. 72,135 sqm. The data centres will be c.15 m in height to parapet and c.16.5m in height to top of roof plant screening. The data centres will vary in size from 13,225 sqm – 21,000 sqm with a combined total gfa of c. 76,225sqm. All buildings will be provided with Solar PV panels at roof level and green walls along selected elevations. - The new deep tech buildings (A1 & A2) will be provided with service yard areas, loading docks, car parking, access roads, security fencing/gates and landscaping. The deep tech buildings will include rainwater harvesting tanks and green roofs over office areas. - Each data centre (B1, C1, C2 & C3) will include data halls, admin blocks (comprising offices, breakroom, loading dock, storage, and ancillary areas) and a variety of mechanical and electrical plant areas/structures including battery storage rooms and mechanical rooms. Car parking, access roads, security fencing/gates, gate houses and landscaping will also be provided. - B1 will include	Granted on 07/09/2023 but has been appealed	An Bord Pleanala decision due by 14/02/2024

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14 no. fuel oil generators, MV rooms and associated mechanical flues. C1 – C3 will each include 22 no. fuel oil generators, MV rooms and associated mechanical flues (each c.18.6m high). Car parking, access roads, security fencing/gates, gate houses and landscaping will also be provided. - 2 no. district heating pump house areas and inground piping for district heating system. - Construction of a Replacement 110kV Gas Insulated Switchgear (GIS) Substation adjacent to the existing 110kV Rinawade Substation. The current Air Insulated Switchgear (AIS) substation known as the Rinawade 110kV sub is fed by 2 x 110kV Overhead lines. The new substation will connect to these overhead lines via short runs of underground cable. The replacement 110kV substation will include 6 No. transformers, with client control building and a 2 storey GIS substation building within a 2.4m high fenced compound. - Decommissioning and removal of the existing 110kV Rinawade substation. - Construction of an on-site energy centre to provide to the national electrical grid. The Energy Centre will include 9 no. gas powered combustion turbine generators (CTG's) and 9 no. Flues with a maximum height of c.15 metres. The turbines will be enclosed by a screen wall 14m in height. The energy compound will include all required infrastructure including 2 no. back-up fuel oil (HVO) tanks, an administration building, pump house, fire water tank, access roads, 14 no. parking bays, security fencing etc. Provision of a Gas Networks Ireland (GNI) gas skid surrounded by a 2.4m high fence and access from Celbridge Road (R404). The GNI skid will replace the existing gas skid along Celbridge Road. Provision of a GNI AGI (Above Ground Installation) including 1 no. kiosk building, c.32m high surrounded by a 2.4m high fence. Closure of the existing main entrance to the campus on Celbridge Road and reinstatement of the boundary. Construction of a new signalised entrance/exit on Celbridge Road c.80meters north of the existing main entrance. Use of the existing secondary entrance/exit off Barnhall Road Roundabout in the south-east as a principal entry/exit. Construction of internal access roads, footpaths and cycle paths including a publicly accessible link road between Celbridge Road (R404) to the east and Barnhall Road (R449) to the west. Construction of a new pedestrian and cycle overpass across the M4 motorway and pedestrian/cycle path adjacent to lands known as the Wonderful Barn Allotments; the overpass will link the new publicly accessible link road within Kildare Innovation Campus to the entrance of Barnhall Meadows estate. Undergrounding and diversion of the existing overhead 10Kv/20kv overhead line adjacent to the M4 Motorway. The pedestrian and cycle route within the Kildare Innovation Campus will provide a link from the new public link road, along the protected view corridor (between Castletown Estate & Wonderful Barn) to the north-eastern boundary of Castletown Estate. The provision of a net increase of 678 new car spaces, resulting in a total of 2291 car spaces across the site (including a total of 244 EV car spaces). The provision of a new private EV Bus

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		charging hub with parking for 10 no. electric buses. The provision of a net increase of 310 new bicycle spaces, resulting in a total of 350 bicycle spaces across the site. The diversion of the c.500 m stretch of an existing 1.5m culvert, located to the north of the site along the existing loop road, southwest by c.60m; the diverted culvert will be located along the proposed link. All associated site development works, drainage and services provision, landscaping, boundary treatments (including security fencing), and associated works. An Environmental Impact Assessment Report has been prepared in respect of and will be submitted with the planning application. The application relates to a development for the purposes of an activity requiring an industrial emissions licence		
23567	Brannockstown, Brownstown, Carnalway, Coghlanstown West,Corbally, Delamain, Dunnstown, Gaganstown, Greenhills,Harristown, Hillsborough, Moorhill & Rochestown,Co. Kildare	10 Year Planning Permission for a solar farm with a total area of circa 246 hectares in the townlands of Brannockstown, Brownstown, Carnalway, Coghlanstown West, Corbally, Delamain, Dunnstown, Gaganstown, Greenhills, Harristown, Hillsborough, Moorhill and Rochestown in County Kildare. The solar farm will consist of solar photovoltaic panels with a surface area of 1,130,000m2 on ground mounted frames, 40 no. single storey electrical inverter/transformer stations,4 no. single storey spare parts containers, 19 no. Ring Main Units, 9 no. weather stations underground electrical ducting and cabling within the development site, private lands and within the L6063, L2032, L6071, R448, L6072, R412, L6074, L6047 and R413 public roads to connect solar farm field parcels, security fencing, CCTV, access tracks, 5 no. stream and drain deck crossings, temporary construction compounds, landscaping and all associated ancillary development and drainage works. Construction and operational access will be via entrances from the R412, R413, L6044, L6047 and L6063. The solar farm will have a maximum export capacity of circa 210 megawatts. The operational lifespan of the solar farm will be 40 years and planning permission is requested for this duration. Part of the proposed development is situated within the demesne land of Harristown House which contains Protected Structures, but no works are proposed to these Protected Structures. Revised by significant Further Information consisting of revised site layout plans to reduce panelled areas in Parcels 1 and 2, relocation meterological mast in parcel 1 and all associated landscaping and ancillary works	Granted	28/11/2023

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1.4.4 Gas Networks Ireland Gas Connection

The Project will use highly efficient on-site gas turbines to generate the majority of electrical energy required to operate the Data Centres. Whilst the Project includes an on-site Above Ground Installation (AGI) to regulate the supply to the turbines, a physical connection to the Gas Networks Ireland (GNI) gas network is required to provide the supply to the gas turbines.

GNI will be responsible for providing the required infrastructure works, to construct a new high-pressure gas distribution pipeline, to the Project site boundary (on the R409), from the existing GNI AGI at Glebe West, Co. Kildare.

The final, detailed design, consenting and construction of the required infrastructure works will be the responsibility of GNI in the exercise of their own statutory functions, and therefore Herbata Ltd is not seeking planning consent to carry out these works as part of the Project.

Notwithstanding the fact that Herbata Ltd is not seeking planning consent to carry out these works as part of the Project, given the functional interdependence that exists between the Project and the GNI Gas Connection, the cumulative impacts of the Project with the GNI Gas Connection have been considered and assessed in this EIAR, and their in-combination effects are considered and assessed in the related Appropriate Assessment Screening Report. This is consistent with the approach endorsed by the High Court on a number of occasions in the context of Environmental Impact Assessment of, for example, proposed wind farm developments and their associated grid connections (see, for example, the decisions of the High Court in Ó Gríanna & Ors v An Bord Pleanála & Ors [2014] IEHC 632 and [2017] IEHC 7, and the line of case law following those decisions).

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In order to inform this consideration and assessment of the cumulative impacts of the Project with the GNI Gas Connection, a report identifying the most likely route for the new high-pressure gas distribution pipeline and a description of the works required to provide same has been prepared.

The GNI Infrastructure Upgrade Outline Report has been prepared following a review of the existing GNI network, to determine the most likely source of the connection and the most likely route. The location of the existing GNI above ground installations (AGIs) at Glebe West and Naas Town and the associated existing high-pressure transmission line between, has been used to inform the most likely connection point and route for the new high-pressure gas distribution pipeline.

From the existing Naas Town AGI, the most likely route for the new high-pressure gas distribution pipeline is considered to follow a combination of the existing road network (along the Southern Link Road, Naas) and the route of existing utilities (foul drainage network wayleave). From this point, the most likely route is considered to cross the M7 (east of the Project site) before following the route of the R409 to the Project site; ducts with capacity to facilitate the pipeline crossing of the M7 are known to be present.

The likely specification of the new high-pressure gas distribution pipeline, pressure levels, construction methodology and timelines, as set out with the GNI Infrastructure Upgrade Outline Report have been informed by experience and knowledge of comparable infrastructure developments. The GNI Infrastructure Upgrade Outline Report is included in Volume II, Appendix 1.2 and provides sufficient detail and information to allow a robust cumulative impacts assessment to be conducted. A summary of the most likely route and a description of the works required is also provided in Chapter 4 of the EIAR, section 4.2.4.2.

The cumulative impacts of the Project with the GNI Gas Connection have been considered and assessed under each environmental discipline in the relevant chapters of this EIAR and in Chapter 17 Cumulative Effects and Interactions.

1.4.5 Off Site Renewable Energy

Corporate Power Purchase Agreements (CPPAs) will be used to procure sustainable energy from wind / solar farms. In addition to providing energy for the Project, CPPAs will fund the construction of wind and solar farms. The Applicant has had discussions with various solar and wind renewable energy suppliers with a view to supplying energy through CPPAs.

The process and technical aspects of CPPAs are considered more fully in the Herbata Data Centre Sources of Energy report (provided in Volume II, Appendix 1.3). CPPAs will be finalised following a grant of permission (along with a connection agreement with Eirgrid). As demonstrated within the aforementioned report and accompanying letter from BOS Energy Limited, there is sufficient capacity available from suppliers to meet the 30% operational renewable energy target set out in the Kildare County Development Plan 2023-2029.

In implementing the CPPA arrangements as outlined, the Project will operate on the basis of a minimum of 30% energy from off site renewables, in line Kildare County Council's policy requirements as follows:

The Kildare County Development Plan 2023-2029 (KCDP):

> *RE O72 Require Data Centres to consider the use of sustainable renewable sources of energy to fuel their operations in whole in the first instance or in part (minimum of 30%) where this is not possible and where it has been satisfactorily demonstrated not to be possible, subject to all relevant and cumulative environmental assessments and planning conditions."*

The proposed Project energy strategy is further set out within The *Energy Efficiency and Climate Change Adaptation Design Statement* and *Energy Policy Compliance Report*, Volume II, Appendices 4.2 K and 4.9 respectively.

1.4.6 Planning Policy

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Planning reports are submitted in support of both the Data Centre and Substation applications and should be read in conjunction with the EIAR. The concluding points of the reports are as follows:

- The Data Centre Application aligns with national, regional and local policy supporting the ICT sector and Data Centres as a key component of this sector. At construction and operation phases the Data Centre Application will generate significant direct, indirect and induced employment.
- The innovative approach to energy generation and storage means the Data Centre Application does not require energy from the national electricity network. Indeed, the Data Centre Application will add resilience to national energy production and storage capacity. The onsite gas turbines and gas engines will be capable of exporting excess electricity to the wider network.
- The proposed gas turbines and engines will be fuelled from GNI's gas network ultimately, comprising of biomethane, abated natural gas and the use of hydrogen for the turbines in line with GNI objectives to ensure that there is a zero dependency on gas from fossil fuels at the subject Data Centre when GNI objectives are met.
- The energy storage component shall enable more efficient use to be made of renewable energy now being produced. Such an approach is considered to align fully with national policies and commitments and specifically the Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy.
- The proposed Data Centre use at this site accords with the local land use zoning objective set out in the Naas LAP which has explicitly identified this location as being appropriate for a Data Centre.
- It is considered that the Data Centre Application accords with sustainable development objectives and adopts an exemplary approach to Data Centre development within the State.

1.5 EIAR Project Team

The production of the EIAR has been co-ordinated by RPS. The EIAR structure, responsibility and qualified input for each chapter are detailed in Table 1.5 below. The EIAR has also been informed by design and technical input provided by the wider project team (the applicant, technical and design team and planning consultants).

Table 1.5: EIAR Project Team

EIAR Chapter	EIAR Topic	Lead Author / Company Consultant	
EIAR Project Lead	-	Raymond Holbeach	RPS
Chapter 1	Introduction and Need for EIAR	Alastair McKinley	RPS (+ input from wider project team)
Chapter 2	Alternatives	Alastair McKinley	RPS (+ input from wider project team)
Chapter 3	Project Scoping and Consultation	Alastair McKinley	RPS (+ input from wider project team)
Chapter 4	Description of the Project and Project Need	Alastair McKinley	RPS (+ input from wider project team)
Chapter 5	Biodiversity	Samuel O'Hara James McCrory	RPS
Chapter 6	Lands and Soils	Richard Kiernan	Donnachadh O'Brien & Associates Consulting Engineers Ltd.
Chapter 7	Water and Hydrology	Mark Magee	RPS
Chapter 8	Air Quality	Stephen McAfee	RPS
Chapter 9	Noise and Vibration	Lisa Payne	RPS
Chapter 10	Cultural Heritage	Martin McGonigle	John Cronin Associates

		Camilla Brännström	
Chapter 11	Landscape and Visual	Raymond Holbeach	RPS
Chapter 12	Traffic and Transportation	Conor O'Hara	RPS
Chapter 13	Material Assets – Built Services	Richard Kiernan	Donnachadh O'Brien & Associates Consulting Engineers Ltd.
Chapter 14	Population	Sarah Little	RPS
Chapter 15	Human Health	Eva Policarpo	RPS
Chapter 16	Climate Change	Alice Paynter	RPS
Chapter 17	Cumulative Effects and Interactions	Multiple	Multiple
Chapter 18	Summary of Mitigation	Multiple	Multiple

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1.5.1 Project Team Experience

Raymond Holbeach – BSc, MLA, CMLI, ILI

Raymond is an RPS Director, a Chartered Landscape Architect with both the UK Landscape Institute and the Irish Landscape Institute and a member of IEMA and has over 30 years' experience in LVIA, urban and rural design, and planning. Raymond has significant experience in Landscape & Visual Impact Assessment and acting as expert witness. Raymond has project managed numerous Masterplans, Environmental Impact Assessments and LVISA for Energy Infrastructure, Offshore Energy and Ports and Harbour Infrastructure Developments, as well as industrial, leisure and residential developments throughout the UK and Ireland.

Alastair McKinley – BSc, PG Dip, MRPTI

Alastair is a Senior Associate with over 19 years of experience working with RPS, primarily working on electrical infrastructure projects including but not limited to renewable grid connections and substations. He has also project managed numerous grid enforcement projects advising on planning and environmental assessment and discharge of conditions. Alastair has worked on numerous EIAs on a range of developments, including ports and harbours, energy infrastructure, sports stadia, waste management and mineral extraction.

Alastair completed a degree in Town and Regional Planning (2002) and a post graduate diploma in European Urban Conservation (2003) at the University of Dundee. Alastair has been a full Member of the Royal Town Planning Institute since 2007.

Samuel O'Hara – BSc, CIEEM

Samuel O'Hara, is an Associate Ecologist with RPS and holds a BSc (Hons) in Ecology and has over nine years of experience in the field of ecology consultancy. Samuel has extensive experience of ecological field survey including habitat, mammal and bird survey and is a protected species license holder. Samuel is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM).

James McCrory – BA Hons, MSc, CEcol, CBiol, CIEEM

James McCrory, is a Senior Associate of Ecology within RPS and holds a BA (Hons) in Natural Sciences (Mod) Botany and a MSc in Habitat Creation and Management. James is a Chartered Environmentalist (CEnv), a Chartered Ecologist (CEcol) and a Chartered Biologist (CBiol). James is part of the CIEEM Policy Review Group in Ireland and is a member of the CIEEM technical committee updating the seminal Guidelines for Ecological Impact Assessment in the United Kingdom.

Richard Kiernan – BA Hons, Ceng MIEI

Richard is an Associate and Senior Chartered Engineer with over 15 years of experience in the Civil and Structural Engineering sector, having graduated from DIT Bolton Street in 2008 with an Honours Degree in Structural Engineering. Richard has extensive experience in the design and delivery of major public and private projects and has acted as lead engineer on a number of large Educational, Residential, Commercial and Healthcare Projects. Richard also has extensive experience in the delivery of specialist Pipe Stress Analysis engineering services for Pharmaceutical and Data Centre applications. Richard is a registered Chartered Engineer with Engineers Ireland (CEng MIEI) since 2013 and a Registered Professional Consulting Engineer with ACEI (RConsEI) since 2018.

Richard has worked on numerous EIAs on a range of developments including Mixed Use Commercial/Residential and Healthcare projects.

Mark Magee – BA, MSc, CIWEM

Mark is a chartered environmentalist, chartered scientist and chartered water and environmental manager with 24 years' experience in aquatic ecology, catchment management and river basin planning, environmental assessment, appropriate assessment, environmental appraisal of infrastructure projects, hydrology, hydraulic modelling and water quality assessment. Mark manages a team of environmental scientists and engineers involved in provision of the full range of professional services. He has undertaken numerous environmental impact assessments and prepared numerous appropriate assessment screening statements and Natura Impact Assessment or Habitat Regulation Assessments for water dependent SAC/SPAs.

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Mark completed a degree (BA Mod) in Natural Sciences at Trinity College Dublin in 1998 and a Master (MSc) in Environmental Engineering at Queens University Belfast in 1999. Mark has been a full member of the Charter Institute of Water and Environmental Management (CIWEM) since 2007.

Stephen McAfee – BSc, MSc, MIEMA, MIAQM, MEncSc, CSci

Stephen is a chartered scientist with over 19 years' experience in environmental assessment, environmental management plans, appraisal of port and harbour developments, computer modelling, air quality, climate, dust and odour assessment. He has a BSc (Hons) in Geography from Queens University Belfast and a Masters in Environmental Engineering from Queens University Belfast. He also has acted as an Expert Witness and environmental expert at various public inquires/oral hearings. Stephen has a wealth of experience working on major infrastructure, port, energy, waste and brownfield/greenfield development projects in the UK and Ireland. He has undertaken surveying and assessment of both large and small scale development proposals. This experience has provided him with an ability to manage and coordinate interdisciplinary and multi-jurisdictional issues which may arise as a professional EIA practitioner.

Stephen has a BSc (Hons) Geography, Queens University Belfast and a MSc Environmental Engineering, Queens University Belfast. He is also a member of the following institutes; Associate Environmentalist with the Institute of Environmental Management & Assessment (MIEMA); Full Member of the Institute of Air Quality Management (MIAQM); Full Member (MIEnvSc) & Chartered Member of the Institute of Environmental Sciences (CSci).

Lisa Payne – BSc MSc, MIOA

Lisa is an Associate Noise Consultant at RPS, with extensive experience in acoustics in general and environmental acoustics in particular. Lisa has a BSc (Hons) in Music Technology from Queen's University, Belfast and in 2008 obtained an MSc in Engineering Acoustics from the Institute of Sound and Vibration Research (ISVR), University of Southampton.

Lisa has experience working in environmental acoustics within UK, Ireland and the Middle East. She has worked across various sectors including energy (oil and gas and renewables), infrastructure, agriculture, schools, hospitals and residential. Lisa has expertise in acoustic modelling of construction and operational noise, with the capability to build complex noise models for projects which have included port developments and oil refineries amongst others. In addition, Lisa has experience of industrial noise control and working with clients to identify solutions to environmental and workplace noise issues. Lisa is a full member of the Institute of Acoustics (MIAO).

Martin McGonigle – BA, MSc, MIAI

Mr McGonigle graduated with a BA in Heritage Studies from G.M.I.T in 2001, followed by an MSc in Maritime Archaeology at the University of Ulster, Coleraine in 2002. Mr McGonigle is a Senior Archaeologist with John Cronin & Associates (JC&A) and has been a full-time professional archaeologist since 2002, a Licensed Archaeologist in RoI since 2008 & NI since 2009 and is a full member of Institute of Archaeologists of Ireland (MIAI). Since joining JC&A in 2008 Mr McGonigle has worked as Senior Archaeologist on numerous archaeological schemes and heritage projects, including cultural heritage assessments for environmental impact assessments, archaeological works on large infrastructure projects, etc. Mr McGonigle has also published nationally and internationally on a wide range of cultural heritage and archaeological subjects. In 2021 Mr McGonigle graduated with an MSc in Applied Landscape Archaeology from the University of Oxford, passing with distinction.

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Ms Brännström graduated with a Master of Arts with a major in Archaeology from the Dept. of Archaeology, Umeå University, Sweden (2000-2004). Ms Brännström has been a Licensed Archaeologist in NI since 2015 and in the RoI since 2019. Since joining JC&A in 2018, Ms Brännström has been involved with numerous archaeological excavations as well as the production of pre-development archaeological desktop assessments

and EIARs for small and large scale projects throughout Ireland. Ms Brännström is a full member of Institute of Archaeologists of Ireland (MIAI).

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Conor O'Hara – BSc Hons, CMILT, MCIHT

Conor O'Hara is a Technical Director within the RPS Highways and Transportation section and has over 20 years' experience within Transport Planning, Conor holds a BSc (hons) in Transportation. Conor is a Chartered Member of the Institute of Logistics and Transportation (CMILT) and a Member of the Chartered Institution of Highways and Transportation (MCIHT).

Sarah Little – BA Hons

Sarah Little graduated with a B.A. Hons in Geography from Queens University, Belfast followed by a M.A. in Environmental Impact Assessment and Management from The University of Manchester. Sarah has over 12 years' experience working within the Environmental and Planning sector of large-scale infrastructure projects across the UK and ROI, including work on numerous EIAs on a range of developments.

Eva Policarpo – BSc, MSc, IEMA

Eva is a Senior Consultant (Health and Social Impact) at RPS. Eva has over seven years' experience in undertaking and coordinating environmental and social impact assessments (ESIA) both in the ROI, EU and worldwide. She is a Senior Project Scientist at RPS, where she primarily works in Environmental Impact Assessment (EIA) and Health Impact Assessment (HIA). Eva has a BSc (Hons) in Environmental Science and MSc (Marine Environmental Protection). Eva has extensive experience in the delivery of Health Impact Assessment, including human health scoping, human health EIAR chapters and bespoke Health Impact Assessments for a range of projects, including commercial and housing developments and onshore and offshore renewable energy developments. Eva is a Practitioner member of the Institute of Environmental Management and Assessment (PIEMA).

Alice Paynter - BSc

Alice is a Senior Consultant in EIA and Sustainability with over 8 years experience and is experienced in the assessment of carbon and climate change, and the implementation of sustainable principles within corporate reporting. Alices role includes the delivery of carbon footprint analysis and public disclosure documents that align with benchmark indices, such as TCFD and GRESB. Alongside this, Alice works to deliver climate change assessments for Environmental Impact Assessment, involving the quantification of lifetime emissions arising from an array of developments.

Alice studied geography at University, with a particular interest in climate science and glaciology. Since graduating, and before joining RPS, she worked as an Environmental Consultant, managing environmental assessments for planning applications of residential, industrial and energy infrastructure projects (largely solar farms) in addition to delivering climate change and sustainability assessments.

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HERBATA DATA CENTRE, NAAS

EIAR
VOLUME I MAIN TEXT – CHAPTER 2 ALTERNATIVES

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2 ALTERNATIVES

2.1 Introduction

This chapter of the EIAR identifies and outlines the alternatives considered for the Project. EIA legislation as set out in Chapter 1 indicates that the EIAR must provide a description of the reasonable alternatives studied by the applicant, which are relevant to the project and its specific characteristics. Article 5(1)(d) of the Amended EIA Directive provides that the EIAR shall contain "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."

Annex IV to the Amended EIA Directive, provides that the EIAR shall 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 chapter of the EIAR outlines the rationale for selection of the site and key considerations for the design and layout of the main elements of the Project with comparison of environmental effects between alternatives where applicable.

2.2 The Do-Nothing Scenario

The Project site currently comprises of predominantly lands is agricultural grass with smaller elements of residential and agricultural buildings; in a do-nothing scenario the Project site would remain in its current use.

The Project site comprises a range of vegetation that offers biodiversity potential for habitats for species such as bats, birds and bees, and in a do-nothing scenario these habitats will likely endure however in line with the findings of the EIAR (Vol I, Chapter 6 Biodiversity), the Project site currently demonstrates a relatively low level of species or habitat diversity.

The Naas Local Area Plan (LAP) 2021 – 2027 explicitly identifies the Project site for Data Centre; the do-nothing scenario in this case would not fulfil the intended development of the site in accordance with local planning policy.

2.3 Project Location

2.3.1 National and Regional Site Selection

The *Twin Transitions* of Digitalisation and Decarbonisation are considered *mega-trends* which will almost certainly shape economies and societies on a global scale. In the National context, the Irish Government states *the twin transitions are largely complementary – digital solutions can unlock decarbonisation opportunities, for example through smart energy devices and networks. Digitalisation also presents opportunities for reducing carbon emissions, increased remote working, reduced business travel and digitalisation of supply chains* (Statement on The Role of Data Centres in Irelands Enterprise Strategy, July 2022). In parallel, the Irish Governments *Harnessing Digital - The Digital Ireland Framework* (2022) sets out the national digitisation strategy to position Ireland as a digital leader, at the heart of European and global digital developments.

The need for the development of Data Centres in Ireland, versus alternative national locations, is established, with national policy reflective of the same.

Ireland further represents a preferred location, in comparison to alternative national locations, due to the suitability of the climate which facilitates the use of outside air for cooling, reducing the need for additional technology to assist in temperature control which would require in turn, an increase in energy demands. Data Centres in Ireland represent a lower energy demand development in comparison to nations with a warmer climate. Reductions in potential impacts arising from noise and air quality emissions (arising from the need to employ additional temperature controls) are also realised in an Ireland development context.

In a regional context, it is acknowledged that many large, United States based clients are already headquartered in Dublin for their European operations. Consequently, there is a need to reduce the concentration of Data Centres in clustered areas of the greater Dublin region and distribute them more widely. The readiness of an available, suitable site and the availability of the necessary infrastructure connections, determines that the consideration of the Naas area as an alternative to Dublin, is acceptable.

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2.3.2 Local Site Selection

In the selection of an appropriate site for the development of a Data Centre, the Applicant give due consideration to compliance with local plan policy, in considering options. The Project site is one of two sites zoned for development of a Data Centre within the *Naas LAP 2021 – 2027*. In respect of these sites, the LAP states *a specific zoning for the development of Data Centres has been applied to two sites which are considered suitable for land extensive development*; these zonings are Caragh Road South (Zoning P(2)) and Jigginstown (Zoning P(1)). This section provides a summary of the LAP zonings which have influenced the selection of the Project site (Zoning P(1)).

Sites not zoned for development of Data Centres within the LAP, were not considered or assessed by the Applicant as they would be perceived as less favourable in terms of plan policy.

2.3.2.1 Commercial Availability

Notably, the delivery of the Project is dependent upon the availability of the subject lands to the Applicant. Agreement has been reached with the owner(s) of the subject lands, with letters of consent provided in support of the planning applications for the same. The lands associated with Zoning P(2) were not available to the Applicant.

2.3.2.2 Naas LAP 2021 – 2027 Zoning

The LAP states the relative land use zoning objective as *to provide for Data Centre development and their associated infrastructure only*.

In respect of the Economic, Retail and Social Infrastructure Capacity (Section 3.7), the LAP states:

The Plan seeks to designate a sufficient amount of land for both enterprise and employment functions, commercial development and for industry and warehousing uses commensurate with Naas's role as a Key Town. The Plan continues to support the town centre as the commercial core. It is envisaged that the larger campus style sites and high-end office complexes will be located in the Northwest Quadrant. Industry and Warehousing are proposed to the southwest and northeast of the town. Sites have been identified for commercial/residential development on land located in the northeast of Naas off the Dublin Road and on the corner of the Newbridge Road / South Ring Road. Lands have been zoned for a mix of general commercial/ industrial/ enterprise uses at the Maudlins Interchange.

The related policy and objectives in respect of the zoning, as stated in the LAP are as follows:

Policy ED 1 Enterprise and Economic Development

It is the policy of the Council to support the development of Naas as the enterprise and employment hub for County Kildare and the region, increase employment located within the town, reduce commuting and ensure new employment development contributes towards reducing carbon output.

Objectives

It is an objective of the Council to:

EDO 1.1 It is the policy of the Council to support the development of Naas as the enterprise and employment hub for County Kildare and the region, increase employment located within the town, reduce commuting and ensure new employment development contributes towards reducing carbon output.

EDO 1.2 Promote enterprise and employment development in the Northwest Quadrant, focusing on high-tech manufacturing, research and development, ICT, food science and production, large scale offices, public administration, banking, tourism and bloodstock, within a high quality campus/park type development.

EDO 1.12 (a) Facilitate the location of Data Centre development on land designated P: Data Centre at… Jigginstown for the identified land use only subject to appropriate environmental assessments, heat mapping, transport impact assessments and consideration of the cumulative impact on the electricity network supply

capacity and targeted reductions in greenhouse gas emissions. (b) Any Data Centre project will be required to include measures to generate energy (sustainable, then renewable in the first instance) on site as part of the overall development proposal.

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The LAP expands on the rationale for the zonings, noting that Data Centres are *central to the digital economy and generate added economic benefit across the value chain.*

The LAP further states that *Data Centres by their nature… are land extensive and energy hungry developments and can have differing locational requirements depending on the type of data accessibility speeds they cater for. All Data Centres have common infrastructure requirements such as access to high voltage electricity lines, high powered fibre optic cables, good site security and accessibility. This Plan promotes Naas as a sustainable international destination for ICT infrastructures such as Data Centres.*

In respect of these Zonings, the LAP makes the following observations about the suitability of the sites and justification for the zoning:

Land has been designated between Junction 10 and Junction 9a, located centrally between two of the motorway junctions.

The sites identified in this LAP have the ability to cater for space extensive enterprises contiguous to the existing urban form, proximate to electricity and telecommunication infrastructure.

These lands are identified exclusively for Data Centres, to ensure the location of these types of proposals are controlled proximate to serviced areas of the county.

With regards to Zoning P(1), the LAP makes the following observations about the suitability of the site and justification for the zoning:

The site will be served by the local road network which would disperse traffic between motorway interchanges to reduce any impacts on the motorway network.

Notably, the LAP states that *The Council will not consider any alternative use on these lands, other than those associated with Data Centres.* The only use therefore, considered by the Naas LAP to be 'Permitted in Principle' in lands zoned 'P', is Data Centres; in this regard, both sites are considered equal in terms of plan policy.

Figures 2.1 and 2.2 are extracts of the LAP zonings for both sites, Zonings P(1) and P(2) respectively.

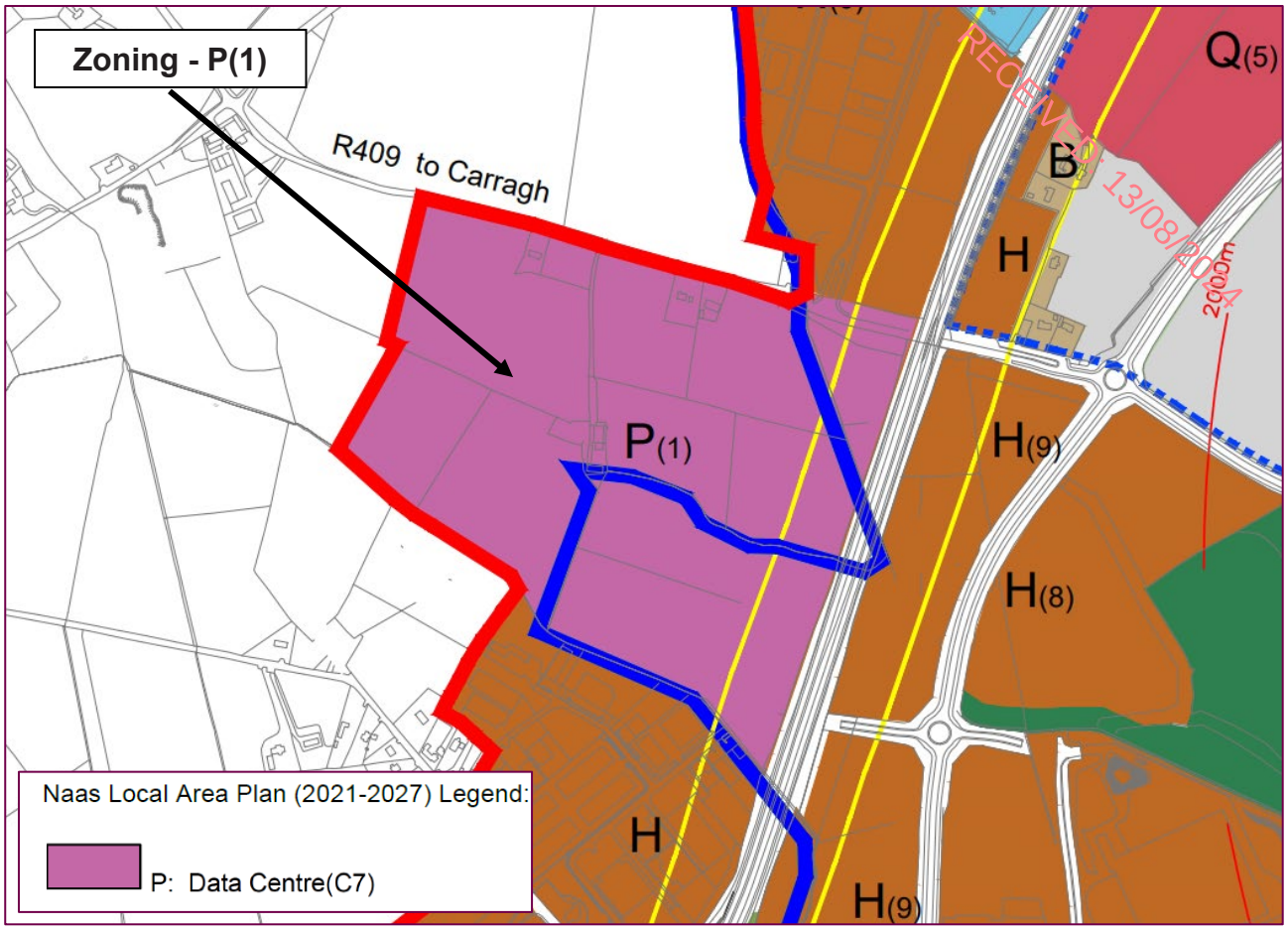

Figure 2.1: Naas LAP 2021 – 2027 (Extract) Indicating Data Centre Zoning, P(1) Jigginstown

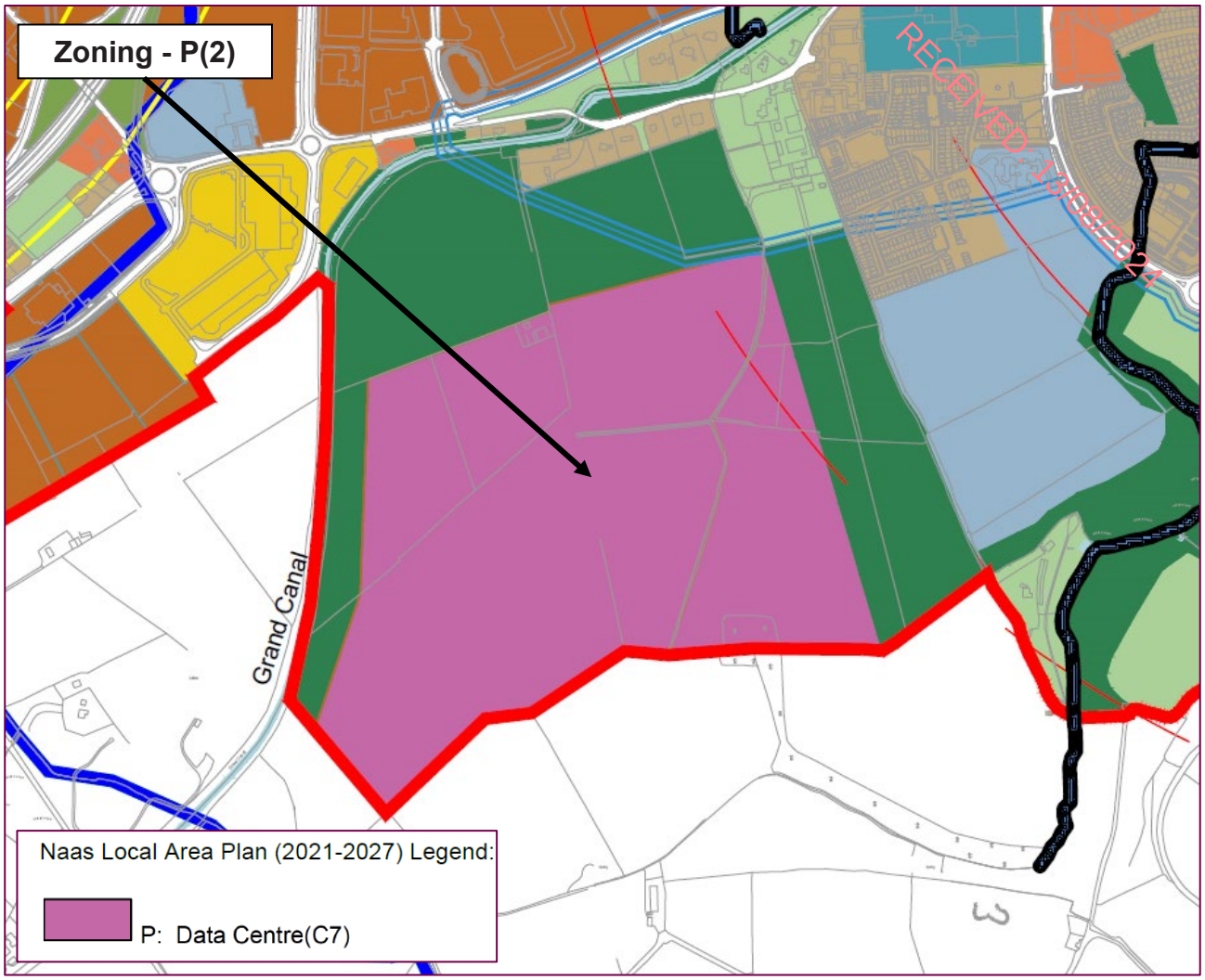

Figure 2.2: Naas LAP 2021 – 2027 (Extract) Indicating Data Centre Zoning, P(2) Caragh Road South

The selection of the Project site and development of a Data Centre is considered entirely in line with the LAP and the realisation of LAP zoning and associated policies.

The selection by the Applicant of Zoning P(1) at Jigginstown, in favour of Zoning P(2) is not considered a deviation from the LAP as both sites, are equally justified in terms of plan policy.

2.3.2.3 Adjacent Land Use Zonings

Zone P(1) is adjoined by lands zoned within the LAP as Industry & Warehousing, to the north and south, relative to the existing M7 and Osberstown business parks. The adjacent LAP zonings are considered compatible with the land use proposed by the Project.

2.3.2.4 Site Access

Transport connectivity is a key consideration in site selection for any development. The LAP notes that both Zonings P(1) and P(2) benefit from close proximity to the motorway network.

Zoning P(1) is located south of the R409, on the western side of the M7 motorway, positioned between Junctions 9a and 10, approximately 2.5km west of Naas. Zoning P(1) benefits from an extensive frontage to the R409, providing direct access (vehicular and pedestrian) to the Project during the operational phase with a secondary emergency access also available via the M7 Business Park to the south.

Utilising the proximity to the R409, the Project seeks to enhance connectivity via provision of a new footpath, cycleway and bus layby to the southern side of the R409. This access will be extended across the R409 bridge over the M7 motorway and link up to the existing footway to the eastern side of the bridge.

Proximity to the R409 also facilitates the provision of a separate, temporary construction access entrance, approximately 120m west of the Osbertown industrial park entrance (to the north of the R409). This entrance will be used for the construction of Phases 1 and 2 of the Project.

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2.3.2.5 110kV Grid Connection

Zoning P(1) is located in close proximity to the existing 110kV network. The location of the 110 kV overhead line, traversing the north west corner of the Project site, assists in the ability of the Project to connect with the grid, via the proposed circuit diversion, undergrounding and substation.

Consequently, the extent of the necessary grid connection infrastructure works and potential associated impacts are considered to be limited.

2.3.3 Further Site Connectivity

Proximity to other existing infrastructure which assists in facilitating the Project whilst also contributing to its functionality in terms of connectivity, is also a key consideration in selection of the Project site.

2.3.3.1 Fibre Communications Connectivity

In the national context, Ireland is well served by global fibre connectivity with multiple direct routes to the UK and North America. There are existing multiple submarine Optical Fibre Networks, that provide complete *end to end* services including direct connections from Ireland to North America and multiple indirect routes (via UK landing points) from Ireland to mainland Europe and North America.

In terms of the localised context of the Project site, extensive fibre ducting is present along both the Caragh Road and the Millennium Park Road; in total there are 15 different fibre providers servicing the adjacent Millennium Park industrial estate.

The Project site is comprehensively served from a fibre and telecoms perspective, providing the opportunity for a straightforward and secure fibre and telecoms connection, whilst also limiting the works and associated impacts of the same.

2.3.3.2 Other Services Connections

In addition to the above, the availability of other existing services is a key consideration for the development of the Project site, both in order to provide the necessary services to the Project whilst also limiting the requirement for extensive infrastructure connections, beyond the site boundary. The Project site benefits from the following:

2.3.3.2.1 Mains Water

An existing mains water supply is present along the R409 with appropriate flow and pressure to facilitate a connection and provision of service to the Project.

2.3.3.2.2 Foul Drainage

Whilst there is no existing public foul drainage system serving the Project site, the public foul drainage network is located approximately 275m to the south of the site and runs along the L2030, Newhall Road.

Connection is proposed to the network via a rising main which extends south from the site across agricultural land, to Newhall Road.

2.4 Alternative Site Layouts and Structure Design

Whilst responding to the physical characteristics, environmental considerations and desire to realise the capacity of the Project site, the design of the Project has been subject of an iterative process.

The scale, mass and layout of the Project has been informed by a Site Strategy Masterplan developed with design and technical input from architectural, civil, electrical, and mechanical consultants, taking account of

the necessary technical and physical requirements to deliver a functional Data Centre facility which will seek to attract and serve the widest range of end user tenants (including *hyperscale* clients).

The masterplan design seeks to develop a high-quality Data Centre campus with site strategies to allow the development to integrate sympathetically into its surroundings and create a positive and carefully designed site layout. There is a high priority to retain the existing biodiversity throughout the site and to minimise visual impacts where possible on the site boundaries through planting. (Data Centre Application - Architectural Design Statement, Volume II, Appendix 4.1)

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From the outset, the project planning and environmental consultants have worked closely with the design team to ensure the Project is compliant with necessary planning policy whilst minimising environmental impacts.

A comprehensive review of available desktop data along with information derived from project and site-specific technical surveys, has informed every aspect of the design of the Project

Engagement with statutory bodies including Kildare County Council planning authority, has also further influenced many aspects of the Project.

Key site specific considerations, which influenced the design layout from the outset of the process included:

- Bluebell Stream / southern boundary of the site;
- Retention of existing vegetation, particularly at the site boundaries;
- Setback from the M7 motorway to the eastern boundary;
- Exclusion zones associated with existing 220kV powerline.

The above matters shaped the initial Concept Sketch as illustrated in Figure 2.3 below; an extract from the Data Centre Application - Architectural Design Statement (Volume II, Appendix 4.1), the sketch illustrated site constraints which informed the initial design process.

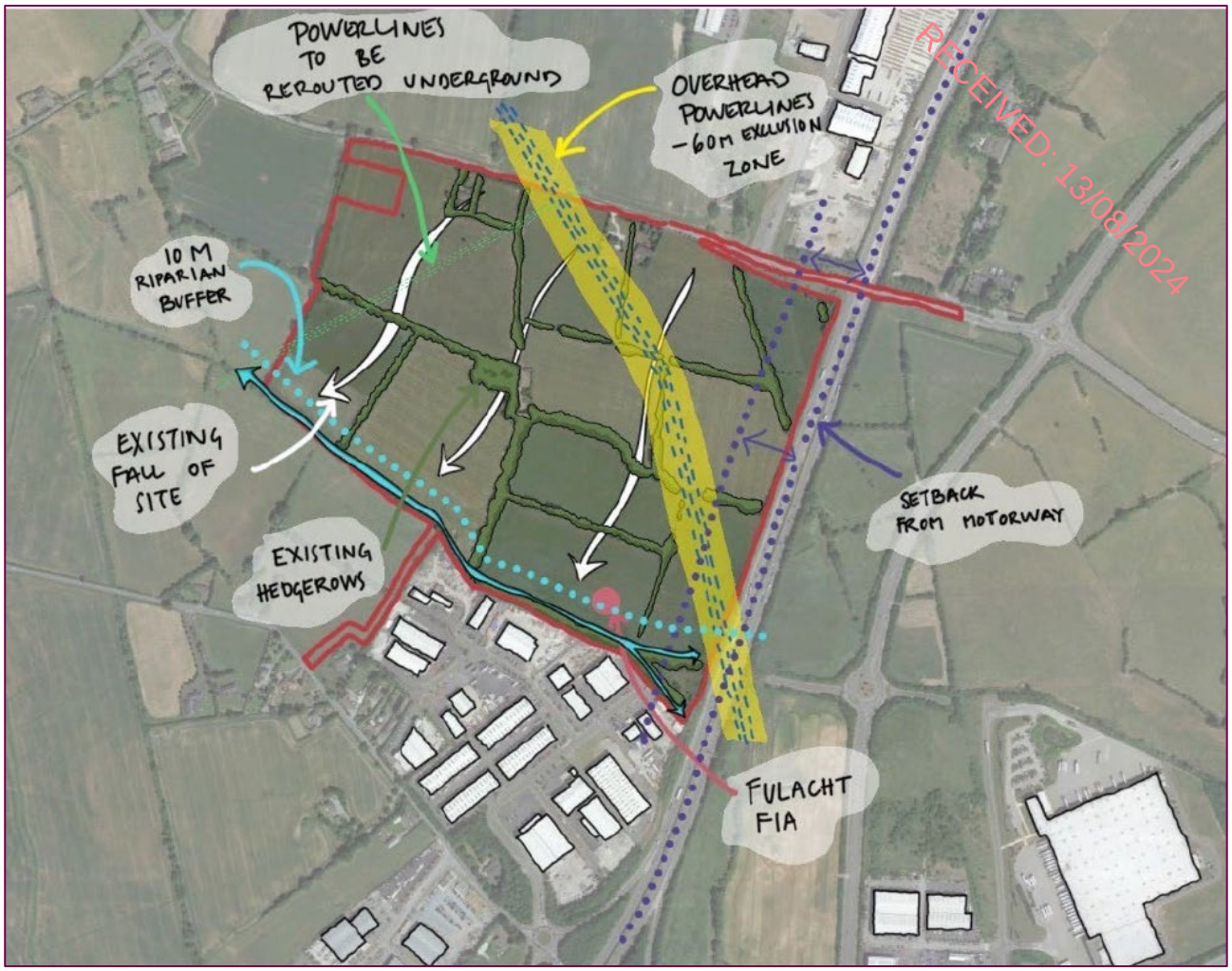

Figure 2.3: Concept Sketch (Data Centre Application - Architectural Design Statement, Volume II, Appendix 4.1)

In consideration of the above site constraints, a Preliminary Design was developed. As illustrated in Figure 2.4 below, the preliminary site layout was developed to incorporate 6 Data Centre buildings, GIS substation, exclusion zones, internal road network and 3 large attenuation ponds.

Due diligence and consideration of planning, environmental and technical matters undertaken at the outset of the design process, resulted in a Preliminary Design which is broadly reflective of the final, proposed Project Design.

Figure 2.4: Preliminary Site - Layout Drawing

The Preliminary Design site layout was further developed to illustrate additional design detail including preliminary landscape planting and boundary vegetation retention, as illustrated in Figure 2.5 below.

Figure 2.5: Detailed Preliminary Site Layout Drawing

As the design process progressed, it was informed by further site, environmental and technical information including geotechnical site investigations, cut and fill analysis, services infrastructure surveys, landscape, ecology and arboriculture studies.

The next iteration of the design process represented a notable shift in the location and orientation of the Data Centre buildings, Data Centre 1 – 3 facing to the fore of the site (in terms of the main access from the R409) and re-distribution of attenuation ponds across the wider site and an increase in areas of land available for landscaping; this revision is more aligned with the final proposed Project Design.

The revised site layout in Figure 2.6, represents a realisation of the following:

- Minimise cut and fill within the site boundary (to ensure excess material is not required to be removed from site);
- Reuse of cut and fill material to develop berms (to enhance screening) along R409 and M7 boundaries;
- Maximising retention of existing hedgerows and trees including some of those which extend into the site from perimeter boundaries;

- A setback of the building line from the M7 (of approximately 51m) as agreed with KCC Roads Planning Section;
- A riparian buffer along the southern boundary (the Bluebell Stream).

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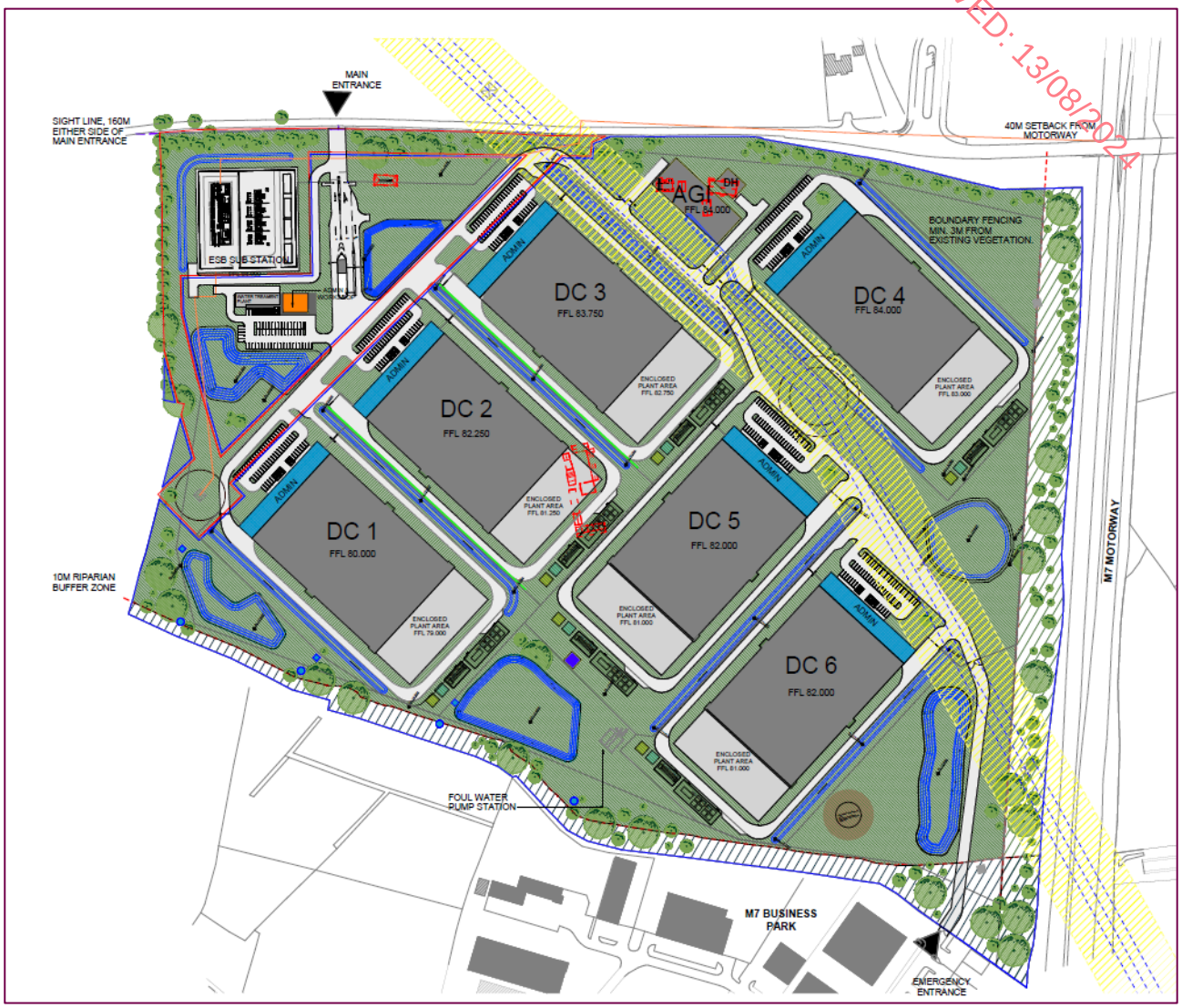

Figure 2.6: Revised Site Layout Drawing

Expansion on further influencing, environmental and technical factors which defined the proposed Project layout design and by default, the consideration of alternatives, are set out in Section 2.4.1 – 2.4.10 below.

2.4.1 Field Boundaries, Hedgerows and Treelines

The Project site is currently defined by treelines and hedgerows, dividing the internal site into multiple fields; additionally, the external boundary of the site is largely made up of mature and semi-mature treelines and hedgerows.

Maximising the retention of this vegetation, particularly to the boundary of the site has been a key driver for the overall site layout. Whilst development of the site requires removal of vegetation to the centre of the site, retention of treelines and hedgerows to the external boundaries has been maximised, achieved by ensuring the proposed Project is scaled and orientated in such a manner to minimise the loss of existing vegetation.

Implementation at an early stage of the design process of landscape planting and management strategy, a 10m riparian buffer zone (to the southern boundary of the site, along the Bluebell Stream watercourse) and setback from the M7 motorway to the east in line with KCC planning requirements, informed the layout and orientation of the Data Centre buildings, the internal road network, location of attenuation ponds and site

entrance points have all been chosen in order to retain as much of the existing treelines and hedgerows as possible.

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2.4.2 Landscape Strategy

A Landscape Masterplan (Figure 2.7 below (also see Volume III, Drawing BSM-ZZ-ZZ-DR-L-0301)) has been prepared as part of the wider site design process with alternative layouts progressed and refined throughout.

The iterative approach has resulted in a Landscape Masterplan for the proposed Project design which incorporates the following key principles:

- Retention, protection and enhancement of the boundary hedgerows and tree lines
- Development of new areas of open space, for amenity use as well as for biodiversity
- Increase and enhance biodiversity
- Creation of quality landscaped network and boundary settings for the development
- Provision of exercise opportunities for staff wellbeing at the site
- Good quality, low maintenance hard and soft landscape measures throughout the site
- Integrated sustainable water management.
- Green roof proposals.

Figure 2.7: Landscape Masterplan

The landscape proposals have been largely defined in response to the existing site characteristics. In consideration choices of species, whilst alternatives may be available, the overall Masterplan seeks to implement native species planting, giving consideration to those species retained on site, vegetation lost (i.e. replacement planting) and good practice in the delivery of habitat enhancement measures. Whilst a range of species are proposed, native species of tree, hedges and grasses are key elements of the landscape proposals.

In development of the landscape strategy, engagement with KCC Parks Department was undertaken to explore initial design proposals, visual mitigation strategy and landscape proposals. The use of vertical green walls was considered as a potential opportunity for screening of the Project however ultimately excluded from the strategy due to the availability of space, ventilation, fire access, exposure and potential high failure rates, and high consumption of water due to irrigation.

An alternative implementation of the use of *green walls* as part of the wider site surface water management across the site is proposed as part of the landscape strategy, with an integrated green wall system proposed for all vertical elements. This system will be utilised to soften or replace all retaining wall elements and headwalls and offers a more sustainable solution to providing vertical vegetation and screening of heavy elements, alongside a robust, resilient and deliverable perimeter boundary treatment of structural screening woodland, scrub and hedgerows.

The Landscape Statement is provided in Volume II, Appendix 11.1.

2.4.3 Site Levels and Drainage

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Consideration of alternative site layouts has been determined in part, by the existing and proposed levels of the Project site. The existing levels of the Project site differ by approximately 6m between the levels along the northern boundary (84 O.D) and levels along the southern boundary (78 O.D).

A detailed cut and fill analysis was undertaken in order to inform the proposed final levels; all buildings within the Project site are stepped from north to south to follow the existing site levels allowing for a minimum cut and fill within the site.

In consideration of alternative site layouts, the proposed Project arrangement and orientation of the buildings within the site, represents a solution which minimises the amount of cut and fill.

Reuse of cut and fill material within the site boundary represents the preferred alternative, to removal of material from the site.

The cut from the attenuation ponds and foundations is to be reused for the landscape berms which form part of the landscape strategy and provided screening of Data Centre buildings from the R409 and M7.

Figure 2.8 illustrates the proposed building levels which serve to achieve the preferred option in terms of cut and final balance.

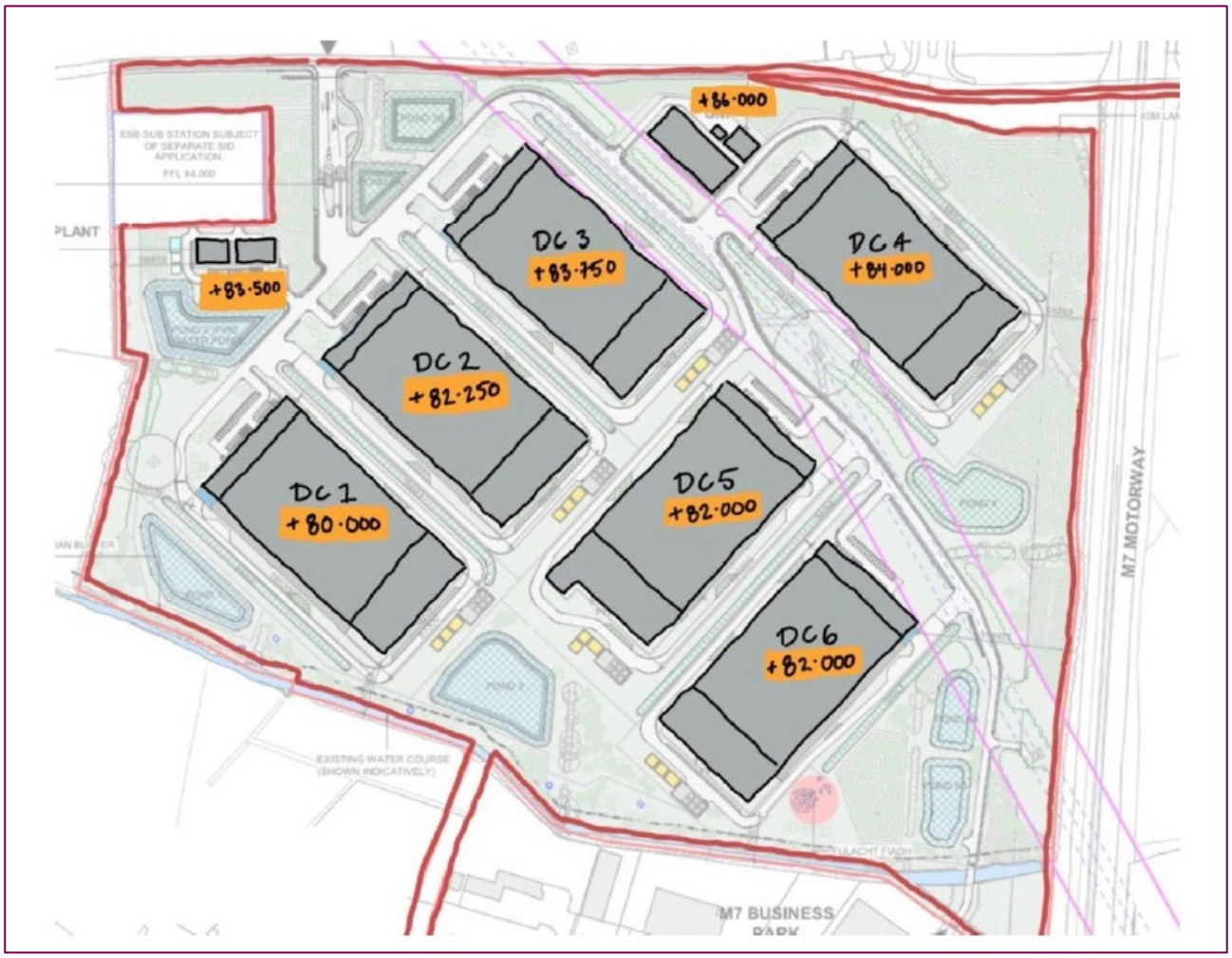

Figure 2.8: Sketch Site Plan with Proposed Levels (Data Centre Application - Architectural Design Statement, Volume II, Appendix 4.1)

The Cut and Fill Analysis Report is provided in Volume II, Appendix 4.3.

The design and location of the attenuation ponds for as set out in the proposed Project design represents an alternative arrangement from the Preliminary design which comprised larger, but fewer ponds.

The attenuation ponds represent one element of the nature-based Surface Water Drainage Strategy SUDS with other features including swales, wetland edges, bioretention, permeable paving, filter drains and rainwater harvesting. The proposed drainage strategy represents an effective drainage design which also maximises sustainability and promotes nature-based solutions for the management of surface water run-off.

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2.4.4 Heritage

A recorded archaeological site is located within the boundary of the Project, to the south east corner of the Project site. The site is a *fulacht fia,* identified and recorded with the reference number KD019-028. No obvious visible remains are present on the surface but the location of the feature was a consideration of early design layouts, including the Preliminary Design phase, on the basis of the location data recorded on the National Monuments Record. A 20m exclusion was overlaid on the site with building footprints and internal road network designed to avoid direct impact upon the site from the outset of the site layout design process.

Further iterations of design were developed upon completion of heritage led, geophysical survey work (as detailed within Volume I, Chapter 10 Cultural Heritage), which identified the extent of potential, subsurface archaeological materials. In particular, the proposed location of Data Centre 6, associated access road, earthworks and drainage infrastructure were further refined to accommodate separation from the archaeological site.

Figure 2.9 below illustrates the avoidance of the potential, subsurface features as identified during the geophysical survey, with Data Centre 6 and associated road, set back from the same, as represented in the proposed Project design.

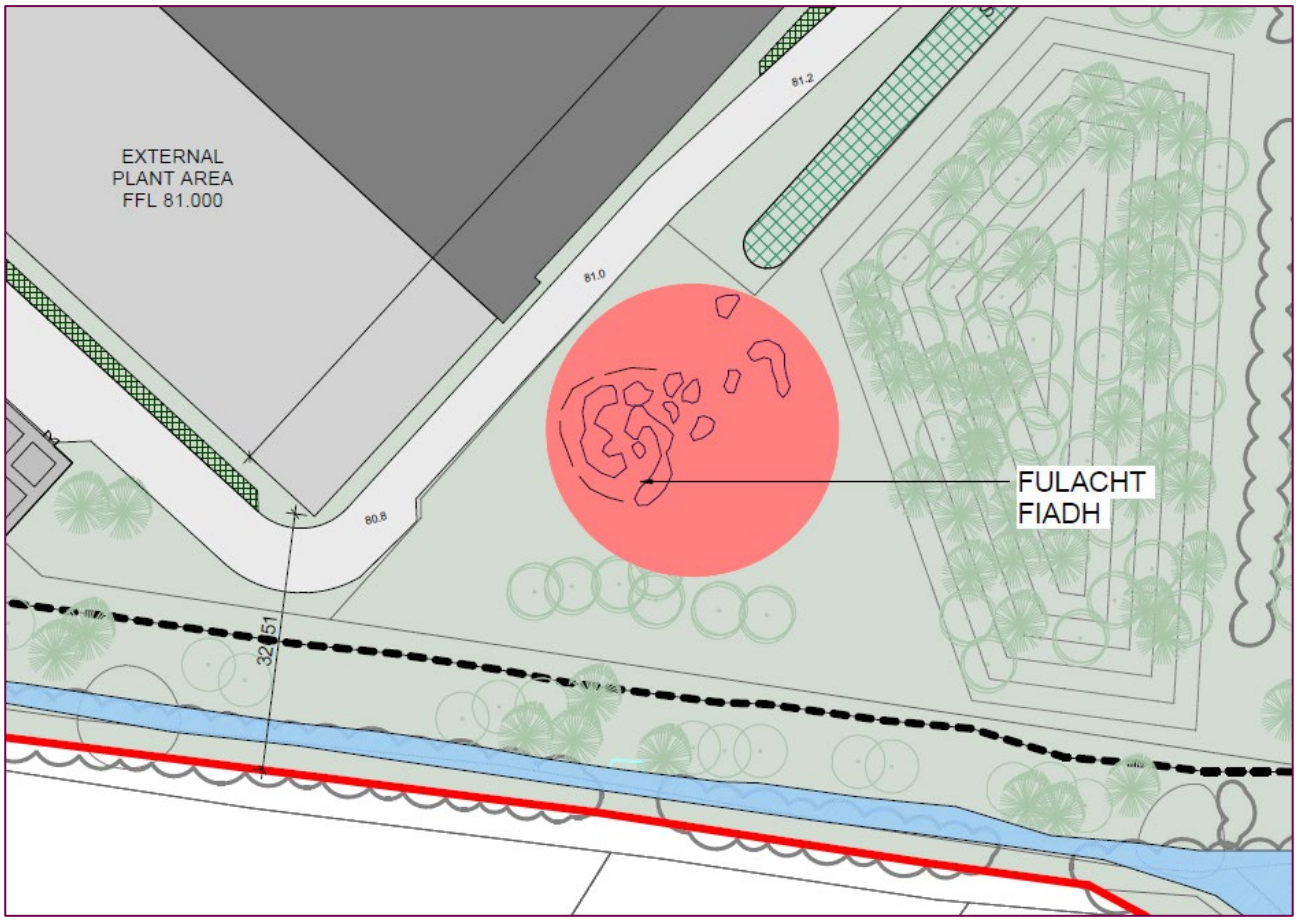

Figure 2.9: Setback of Data Centre 6 and Roadway from Potential Subsurface Features

2.4.4.1 Site Layout Options – Comparison of Effects

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As noted above, the proposed Project layout is reflective of the iterative design process, which was, from the outset, considerate of planning, environmental and technical matters. As a result, the Preliminary design phase is considered to be broadly reflective of the final, proposed Project Design. Table 2.1 below however provides a summary of the environmental effects, of those disciplines where a differentiation is apparent, comparing the preliminary design to the proposed Project layout.

Table 2.1: Preliminary Design and Proposed Project Design – Comparison of Effects

Environmental Discipline Considered	Comparison of Environmental Effects - Summary
Landscape Resources	*The Preliminary Design is considered to have a greater impact upon existing vegetation on site, including hedgerows and trees which form field boundaries within the site. The Proposed Project Design facilitates retention of greater extent of existing vegetation due to the orientation and layout of the site.*
Biodiversity	*The Preliminary Design is considered to have a greater impact upon biodiversity through loss of existing vegetation on site, including hedgerows and trees. The Proposed Project Design facilitates greater biodiversity resource of the site due to the greater retention of existing vegetation due to the orientation and layout of the site.*
Soils / Cut and Fill Balance	*The Proposed Project Design is considered to have a lesser impact as it achieves a cut and fill balance which does not require removal of spoil material from site.*
Cultural Heritage	*The Preliminary Design is considered to have a greater impact upon cultural heritage features, namely the known fulacht fia site. The Proposed Project Design is considered to have a lesser impact as the design of Data Centre 6 and associated works avoids potential, subsurface features as identified by the geophysical survey*

2.4.5 Data Centre Buildings

2.4.5.1 Scale and Mass

A total of 6 Data Centre buildings are proposed as part of the Project. In broad terms, a duplicate design has been employed across the 6 buildings, with each comprising of a 2-storey admin block, data hall and external plant yard.

The number and scale of the proposed Data Centre buildings is principally dictated by the demands of end user tenants, to include sufficient capacity, servicing and the facility requirements, needed to deliver a functional Data Centre, suitable for hyperscale clients.

The space requirements of the data halls (and associated equipment), the plant yards comprising of gas turbines and associated stacks and air circulation space, along with the various ancillary spaces which form the administration blocks, have all informed the final dimensions of the proposed Data Centre buildings which have remained principally the same throughout the design process. As such, there is limited scope to consider alternatives for the Data Centre buildings in terms of their scale and mass.

2.4.5.2 External Design

An iterative design process has been applied to the external elements of the Data Centre buildings. Careful consideration however was given to the choice of material, finishes and architectural details at the outset and the proposed building designs have remained largely consistent throughout the design process.

Whilst conforming to a broadly duplicate design, careful consideration has been given to the façade design of each Data Centre, with the heights and materials of the sperate components of each building, being chosen to help break up the massing.

Alternatives have been considered with regards to materials and colours used throughout the exterior of the Data Centre buildings in order to create an attractive façade approach. The mass of the large volume of the Data Centre building long elevations has been broken up by variations in the façade profile and the range of materials used.

Careful consideration has been given to the design of the admin block to create a visually appealing entrance to each building and use of colour to help with wayfinding throughout the site. A wide range of materials, finishes has been proposed to integrate the Data Centre buildings to site as much as possible, balancing access and wayfinding factors, taking cues from the surrounding landscape colour palettes.

Overall, the Data Centre buildings have been designed in such a manner as to assist in integrating the buildings to the site, in the context of the earthworks, landscape planting, existing retained vegetation and other built elements of the Project. The Data Centre Application - Architectural Design Statement, Volume 3 Appendix 4.1, provides further detail on the architectural design of the Project.

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2.4.6 Energy Strategy

Whilst many Data Centre developments are typically powered via a *traditional* grid connection (obtaining [near to] 100% of energy demand directly from the grid), this Project seeks to utilise an alternative approach, incorporating an innovative, low carbon and renewable energy strategy in its operation.

Data Centres have become essential components of almost every element of everyday life. The Irish Government *Statement on The Role of Data Centres in Irelands Enterprise Strategy* (July, 2022) recognises that '*data centres are core digital infrastructure and play an indispensable role in our economy and society.'*

Whilst *demand* and *need* are clearly apparent, it is acknowledged that concerns existing around the resource demand associated with the functioning of Data Centres with the security of demand and impact upon Ireland's electrical grid, being an increasingly emotive issue.

Since 2018, annual increases in electricity demand usage associated with Data Centres have been around 600 GWh per year; this equates to an additional 140,000 households being added per year. The Irish Government Statement on The Role of Data Centres in Irelands Enterprise Strategy (July, 2022) notes that *EirGrid predicts that if all contracted capacity were connected, data centres would make up between 25% and 33% of Ireland's electricity demand by 2030.* This rate of increase in demand, coupled with new Data Centre projects (not currently contracted) and geographically dictated demand, has implications for the regional and national energy grid systems.

In 2020, 42% of all electricity generated in Ireland came from renewable sources with the remaining 58% generated from non renewable sources including a range of fossil fuels including coal and oil. Whilst the most recent approved Climate Action Plan 2024 sets a course for Ireland's targets to halve emissions by 2030 and reach net zero no later than 2050, at present a significant proportion of energy is still derived from fossil fuels.

In consideration of the trend for demand and the current makeup of the energy grid, it is apparent that the traditional model, of a *grid reliant* Data Centre development is not representative of a sustainable approach.

The Project seeks to provide an environmentally conscious facility by reducing embodied carbon and maximising the utilisation of renewable, power-grid free energy sources whilst also using the latest technologies in on-site power generation and power storage.

Accordingly, by way of considering an alternative approach, the energy strategy proposed for the Project, represents a low carbon, renewable strategy which meets the KCC policy of a minimum of 30% of the operational energy from renewable sources with the remaining 70% of energy for the Data Centres, to be generated on site using adjacent gas turbines, also linked directly to local battery storage of BESSs.

The proposed strategy was a fundamental element of the Project from the outset and has remained principally the same, throughout the design process.

2.4.6.1 Power Generation

The primary source of power generation will be derived on site using highly efficient gas turbines for most of the generation, with top up from gas engines. This strategy is in line with recent EU and Irish Government direction on the use of gas for generation as a transitional fuel. It also avoids any negative impact from the Project on the public electricity distribution system and allows for any excess power to be exported to the grid to aid Eirgrid in their supply of electricity. The onsite power generation capacity will be in excess of that required for the operation of the Data Centre and will provide an opportunity for the export of energy to the grid if and when required.

2.4.6.2 Gas Supply

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2.4.6.2.1 Network Attributes

Gas supply from Gas Networks Ireland (GNI) will provide the primary energy supply to gas turbines in each Data Centre. Currently GNI supply gas mainly imported from the UK derived from the UK's or Norway's North Sea gas fields. GNI have clearly stated that they intend to decarbonize the gas network over the next 20 – 30 years. The GNI Vision 2050 states that the decarbonisation will be achieved by 2050 by replacing natural gas with renewable gases, such as biomethane and green hydrogen, with a goal of ultimately reducing to zero dependency on fossil fuel gasses by 2050.

The proposed strategy of adopting the supply of gas from GNI will over the next 20-30 years significantly reduce the carbon footprint of the power generated on site.

2.4.6.2.2 GNI Network Connection

Whilst the Project includes an on-site Above Ground Installation (AGI) to regulate the supply to the turbines, a physical connection to the GNI network is required to provide the supply to the gas turbines.

GNI will be responsible for providing the required infrastructure works, to construct a new high-pressure gas distribution pipeline, to the Project site boundary (on the R409), from the existing GNI AGI at Glebe West, Co. Kildare.

The final, detailed design, consenting and construction of the required infrastructure works will be the responsibility of GNI in the exercise of their own statutory functions, and therefore Herbata Ltd is not seeking planning consent to carry out these works as part of the Project. To support the decarbonisation of the gas network, a biomethane injection point is included as part of Gas Networks Ireland equipment which will be installed.

To inform consideration and assessment of the cumulative impacts of the Project with the GNI Gas Connection, a report identifying the most likely route for the new high-pressure gas distribution pipeline and a description of the works required to provide same has been prepared. The GNI Infrastructure Upgrade Outline Report is included in Volume II, Appendix 1.2.

The GNI Infrastructure Upgrade Outline Report has been prepared following a review of the existing GNI network, to determine the most likely source of the connection and the most likely route. The location of the existing GNI above ground installations (AGIs) at Glebe West and Naas Town and the associated existing high-pressure transmission line between, has been used to inform the most likely connection point and route for the new high-pressure gas distribution pipeline.

From the existing Naas Town AGI, the most likely route for the new high-pressure gas distribution pipeline is considered to follow a combination of the existing road network (along the Southern Link Road, Naas) and the route of existing utilities (foul drainage network wayleave). From this point, the most likely route is considered to cross the M7 (east of the Project site) before following the route of the R409 to the Project site. It is understood that similar crossings, below the M7 have previously been implemented in order to deliver comparable service infrastructure.

The likely specification of the new high-pressure gas distribution pipeline, pressure levels, construction methodology and timelines, as set out with the GNI Infrastructure Upgrade Outline Report have been informed by experience and knowledge of comparable infrastructure developments.

Alternatives to the most likely route for the new high-pressure gas distribution pipeline (as set out above and in the GNI Infrastructure Upgrade Outline Report) were considered, however were not deemed feasible/likely as GNI hold a wayleave agreement over the existing high-pressure pipeline route from Glebe West to Naas Town AGI. As such, the route of the existing pipeline, represents the most direct route from the nearest available AGI on a high pressure pipeline within 27km of the site.

2.4.6.3 Battery Energy Storage System

Turbines operate at Medium Voltage (MV) level and are coupled with Battery Energy Storage Systems (BESS) to provide low emission 365/24/7 support to critical loads. Each gas turbine and BESS act as one together, they are independent of each other but are linked to the incoming Eirgrid supply to allow export of spare power.

The turbines and engines will provide the primary energy supply to each building. The running of the turbines and engines will be continuous with the quantity of units operating at any one time dependent on the load demand in the data halls and the resilience required.

For the purposes of providing uninterrupted and conditioned power, each Data Centre building will have a dedicated BESS.

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2.4.6.4 Renewable Energy Sources

To achieve a minimum 30% renewable energy target, CPPAs will be used from a variety of sources as the Data Centre load level increases over time. Herbata Ltd have been in advanced discussions with various solar and wind renewable energy suppliers with a view to provide capacity through CPPAs. Whilst commitment to these CPPAs will not be possible until planning permission has been granted, it is anticipated that provision of these CPPAs will be a condition of planning consent.

The proposed energy strategy and arrangement of the same, has at least in part, informed the design of the Project, particularly the Data Centre plant yards which accommodate the gas turbines, with the associated grid connection (via the 110kV substation SID application) and exclusion zone (associated with the existing 220kV overhead line) also being key considerations in the layout of the overall site.

2.4.6.5 Consideration of On-Site Alternative Renewable Technologies

The following Low and Zero Carbon (LZC) energy technologies were considered to determine feasibility for on-site use in the Project.

2.4.6.5.1 Solar Panels

Solar photovoltaic (PV) panels were deemed viable for the site on the following basis:

- Orientation of building roof space (south-west facing and/or flat);
- Availability of sufficient unshaded roof space;
- Sufficient electrical demand on site.

Solar thermal technology was not deemed viable due to infrequent demand and conflict with roof mounted solar PV panels.

2.4.6.5.2 Ground Source Heat Pumps

Whilst the use of on-site Ground Source Heat Pump (GSHP) technology was considered compatible in terms of Project demand and cooling systems, the use of such a system was excluded due to lack of availability of suitable (above and underground) land for piping and installation of the GSHP facility and auxiliary equipment. Water source heat pump technology was excluded due to the lack of availability of a sufficient water source close to the site.

2.4.6.5.3 Wind Turbines

Whilst the Project site was considered to have sufficient wind resources to provide on-site energy, the use of on-site (roof mounted or standalone) wind turbines was considered not viable on the following basis:

- Insufficient open land to accommodate turbine(s);
- Potential noise impacts upon nearby sensitive receptors

2.4.6.5.4 Biomass Heating Scheme

Biomass heating (using wood chips/pellets) was considered viable for to provide on-site heating, however the use of such a system was excluded due to the infrequent thermal demand of the Project.

2.4.6.5.5 Biofuel Combined Heat and Power

A Biofuel Combined Heat and Power (CHP) system was considered not viable, however the use of such a system was excluded due to the infrequent hot water baseload demand.

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2.4.6.5.6 Fuel Cells

The use of fuel cells (with a primary fuel source of hydrogen) was considered not viable, however the use of such a system was excluded due lack of availability of hydrogen (or suitable alternative) and space on site for fuel cells and associated auxiliary equipment.

As noted, except for roof mounted solar PV panels, none of the alternative renewable technologies were incorporated into the Project, on the basis of technical limitations or availability of a necessary resource.

2.4.6.6 Energy Strategy Alternatives – Comparison of Effects

As noted above, the energy strategy the Project is reflective of intention to implement a low carbon, renewable approach. In consideration of this, the trend for demand and the current makeup of the energy grid, the proposed strategy was a fundamental element of the Project from the outset and has remained principally the same, throughout the design process.

Table 2.2 below however provides a summary of the environmental effects, of those disciplines where a differentiation is apparent, comparing the proposed energy strategy with an alternative, *grid reliant* development.

Table 2.2: Energy Strategy – Comparison of Effects

Environmental Discipline Considered	Comparison of Environmental Effects - Summary
Climate Change	*Whilst the energy grid seeks to decarbonise, a wholly grid reliant development is considered likely to have potential greater reliance upon fossil fuel generated energy, including coal and oil*
Human Environment / Utilities	*A wholly grid reliant development is considered likely to have potential for greater demand upon the electricity grid which currently trends towards unsustainable capacity and demand.*
Nuisance / Noise and Visual Amenity	*Use of wind turbines for energy generation is considered likely to have potential for a greater impact in terms of amenity (visual and noise) upon sensitive receptors*
Land / Land Use	*Use of wind turbines and ground source heat pumps for energy generation is considered likely to have potential for a greater impact in terms of amenity (visual and noise) upon sensitive receptors and an increase in land take requirements*

2.4.7 Electrical Grid Connection Design

As noted in Section 2.4.6, a connection with the existing 110kV network is proposed as part of the Project; the connection facilitates the use of renewable energy from the grid whilst also providing opportunity to feed back into the grid to aid capacity and assist in frequency stability.

An associated Gas Insulated Substation (GIS) is proposed to be located to the north west corner of the Project site and will provide the Project with the grid connection, formed from the *breaking into* and partial undergrounding of the existing 110kV overhead line that currently crosses the site.

The provision of the substation and grid connection will enable the export of energy generated onsite to the wider network. The substation will also enable the energy storage facility to be connected to the national grid and add greater capacity and resilience to the national electric energy generation capacity and the national electric grid. The substation will also allow for development outside of the site to be enabled by having spare 110kV circuits if required. As such, it is considered an essential element for the delivery and functionality of the Project.

The location of the existing 110kV overhead infrastructure, has heavily influenced the placement of the GIS in the north west corner of the Project site, from the outset of the design process (as included in Figure 2.3 Preliminary Site Layout Drawing). The relatively close proximity of the existing 110kV overhead line and tower

infrastructure, readily accommodates the proposed 110kV connection (more so than if the existing 110kV infrastructure were more remote).

With regards to the design and technical specification of the GIS and 110kV connection, these matters are determined by Eigrid requirements for such connections, which are made in accordance with Eirgrid *Policy Statement on Options for Connecting Customers to the Transmission Network* (https://www.eirgridgroup.com/site-files/library/EirGrid/Policy-Statement-on-Options-for-Connecting-Customers-to-the-Transmission....pdf). As such, the ability to consider alternatives sits out with the scope of the Applicant.

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The design of the proposed GIS comprises an 8 bay format (2 bays for the incoming and outgoing connections to the existing transmission line, 2 bays for the Project and 4 remaining bays remaining available for future capacity [unrelated to the Project] in the Naas area). The 8 bay format therefore represents additional potential for connections, in comparison to a 4 bay solution.

Appendix 4.13 (Volume II) 110KV Grid Substation and Transmission Line Report which sets out further the context of the proposed connection and the rationale for the proposed specification and layout.

2.4.8 Gas Turbine and External Plant Area Design

During the design phase, the Project noise consultant worked in parallel with the design team in refining the detailed design of the gas turbine and external plant areas associated with the Data Centre buildings.

Following completion of baseline noise monitoring and modelling, to determine operational noise levels, it was predicted that the preliminary gas turbine and external plant area design had the potential to negatively affect noise-sensitive receptors (residential properties) in the vicinity.

In order to address this issue, the design team and noise consultant considered a series of alterations and refinements to the gas turbine and external plant design

Whilst the number and specification of the turbines, their placement relative to the Data Centre buildings and wider site layout and the open roof nature of the external plant area (to permit air circulation), were all relatively fixed parameters to ensure operational viability, a range of design alternative design elements were implemented.

The final design of the gas turbines and external plant area as proposed, includes the following:

- Use of noise absorbing panels for walls within external plant area;
- Bespoke acoustic enclosure for the gas turbine main casing;
- Exhaust silencer.

Modelling undertaken of the alternative turbine and plant area design, as proposed for the Project (along with other operational parameters), determined that operational noise and vibration impacts would be negligible/low at sensitive receptors. Further detail is provided in Chapter 9 Noise and Vibration.

Table 2.3 below provides a summary of the environmental effects between the preliminary design of the gas turbine and external plant areas and the proposed design.

Table 2.3: Preliminary and Proposed Gas Turbine and External Plant Area Design– Comparison of Effects

Environmental Discipline Considered	Comparison of Environmental Effects - Summary
Nuisance / Noise and Vibration	*The Preliminary Design is considered to have a greater significant impact upon sensitive receptors on the basis of noise modelling results. The Proposed design incorporated design led mitigation measures to ensure no significant impacts occurred during operation.*

2.4.9 Surface Water Drainage

The proposed Surface Water Drainage Strategy is based on applying Greater Dublin Strategic Drainage Study (GDSDS) and Sustainable Drainage Systems (SuDS) best practice to provide an effective drainage design that maximises sustainability and promotes nature-based solutions for the management of surface water runoff.

The sustainable management of water throughout the site is a key element of the Project and seeks to ensure there is no increased flood or pollution risk to the catchment, whilst ensuring the integration of SuDs principals throughout.

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Study of the Project site established that the implementation of significant, infiltration-based water management is limited and not considered as a suitable solution across the site as a whole. The alternative solution proposed, comprises of the attenuation and discharge of surface water runoff to the Bluebell Stream at the southern boundary. The Project site has been divided into three catchments to reflect the pre-development conditions of the site. Each catchment will have separate discharge points into the Bluebell Stream so that run-off from the site is distributed along the length of the site boundary with the stream, broadly in line with the existing greenfield conditions.

The location and extents of the attenuation ponds through the site have been subject of iterative design, in response to the wider site layout changes and studies informing detailed design. The attenuation of surface water runoff is proposed in a wide variety of nature-based SUDS and surface water network features including Swales, Bioretention areas, Bioretention Ponds, Blue/Green Roofs, Permeable Paving, Filter Drains, Rainwater Harvesting, using flow control devices.

Further detail on the proposed surface water drainage is provided in the Data Centre Application - Planning Engineering Report, Volume II, Appendix 4.2.

2.4.10 District Heating

The KCC *Naas LAP 2021 – 2027* notes that '*waste heat presents a huge indigenous resource and is the single largest available low-carbon source of energy available in the Region that is not being used… Data centres generate significant levels of waste heat which can be used in District Heating systems.'* '

In response, an alternative arrangement for recovery and reuse of waste heat has been implemented as part of the Project. Two of the gas turbines associated with Data Centre 5 are proposed to have waste heat thermal boilers installed within their exhaust flues in order to recover the medium to high grade heat. The heat from the thermal boilers will then be pumped via heat exchangers to the perimeter of the Data Centre campus, to enable district heating pipework to be connected to the identified uses.

Further detail on the proposed district heating element of the Project, is included within The Energy Efficiency and Climate Change Adaptation Design Statement and Energy Policy Compliance Report, Volume II, Appendices 4.2 K and 4.9 respectively.

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HERBATA DATA CENTRE, NAAS

EIAR
VOLUME I MAIN TEXT – CHAPTER 3 PROJECT SCOPING AND CONSULTATION

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June 2024

3 PROJECT SCOPING AND CONSULTATION

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3.1 Introduction

This chapter of the EIAR outlines the preparatory work undertaken to inform both the design of the Project and the scope and processes undertaken in completion of the EIAR.

The design of the Project has been informed through a consultation process undertaken with Kildare County Council (KCC) and other relevant statutory and non-statutory agencies. This process has been vital in the progression of the Project and has both influenced and assisted in the design solutions.

Pre-application engagement has also assisted in informing the EIAR approach and the scope of associated surveys and assessments.

3.2 Pre-Application Engagement

Pre-application engagement can positively inform the design, planning and EIA process. It provides the applicant and the environmental and design team with an opportunity to engage directly with the relevant consenting authority and other statutory bodies, to identify critical issues and likely environmental impacts of the proposal at an early stage, ensuring a robust EIA process.

3.3 Summary of Pre-Application Engagement

Whilst responding to the physical characteristics, environmental considerations and desire to realise the capacity of the subject site, the design of the Project has been subject of an iterative process.

The scale, mass and layout of the Project has been informed by a Site Strategy Masterplan developed with design and technical input from architectural, civil, electrical, and mechanical consultants, taking account of the necessary technical and physical requirements to deliver a functional Data Centre facility.

The project planning and environmental consultants worked in parallel with the design team to ensure the Project is compliant with necessary planning policy and minimises environmental impacts.

A comprehensive review of available desktop data along with information derived from project and site-specific technical surveys, has informed every aspect of the design of the Project.

Notably, this process was undertaken in parallel with and supplemented through, engagement with a number of statutory and non-statutory agencies. Such engagement by the Applicant and the project team has been beneficial in the progression of the project and has both influenced and assisted in the design solutions.

As noted in Chapter 1, the Project is subject of both a full planning application to KCC and a SID application to An Bord Pleanála. Pre-Application was undertaken with both of these bodies as summarised below.

3.3.1 Kildare County Council

The Applicant and the project team liaised with a number of departments of KCC including pre-planning consultation meetings on 23rd November 2022, 16th March 2023 and 24th May 2023.

Pre-Planning meetings were attended by KCC representatives and by representatives from the Applicant, the project architects, engineers, environmental consultants, landscape designers and planners. Additionally a number of meetings were held with individual departments within KCC and the various team disciplines.

Key aspects of the Project were discussed with KCC, including the following:

3.3.1.1 Landscaping and Green Walls

The landscaping proposals for the Project, including the consideration of *green walls* was discussed with KCC Parks Department. Use of an integrated green wall system was discussed and noted to be a more sustainable solution to providing vertical vegetation and screening of structural elements within the Project site, alongside a robust, resilient and deliverable perimeter boundary treatment of structural screening woodland, scrub and hedgerows.

3.3.1.2 Building Setback

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The Project comprises of a setback of the building line of approximately 51m from the M7 which bounds the eastern boundary of the subject site. The 51m distance relates to the external plant yard of Data Centre 4 however the building itself is approximately 77m from the site boundary.

The proposed layout of the Data Centre buildings and associated setback distance were discussed with KCC Roads Planning Section as part of the pre-application process.

3.3.1.3 Car Parking Provision and R409 Works

Consultation with KCC Roads Planning Section was also undertaken with respect of the extent of car parking and provision of adequate bicycle parking on site. Furthermore, the nature and extent of the proposed works, including those relating to Vulnerable Road Users (VRU) were discussed with KCC.

The relevant design aspects of the Project are reflective of the consultation engagement; related pre-application consultation with KCC is provided in Correspondence with KCC Roads Department Appendix 4.2 G, Volume II.

3.3.1.4 District Heating

Provision for district heating forms part of the Project with two of the gas turbines associated with Data Centre 5, designed to recover the medium to high grade heat from the turbines. This provision is in line with KCC LAP 2021 - 2027 policy (EC O62) for provision of district heating to *'ensure that all significant development proposals for Data Centres are accompanied by an Energy Analysis that explores the potential for the development of low carbon district heating networks.'*

Pre-application engagement with KCC included discussion on how this requirement would be reflected in the design of the Project and the extent of supporting information which would be necessary to support the same. The proposed design elements and the Feasibility Assessment - District Heating included as Appendix 4.10, Volume II is reflective of this engagement.

3.3.1.5 LVIA Viewpoints

As detailed in Chapter 11 Landscape and Visual of the EIAR the landscape and visual assessment is accompanied by a number of viewpoints, providing photomontage images, representative of the Project.

KCC were consulted on the number and location of viewpoints with feedback taken onboard to inform the imagery presented in the photomontages (Appendix 11.3, Volume II) and associated impact assessment.

3.3.1.6 Noise Monitoring Locations and Assessment Methodology

Prior to completion of noise modelling (as detailed in Chapter 9 of the EIAR), direction was sought from KCC Environmental Health with regards to the proposed methodology of assessment including the gathering of baseline noise data.

KCC Environmental Health advised on the acceptability of the assessment methodology and requested additional locations for noise monitoring to be undertaken. These are detailed and form part of the assessment within the Chapter 9 Noise and Vibration.

3.3.1.7 Sustainable Drainage Systems

Engagement was undertaken with KCC Water Services Department to inform the proposed surface water drainage design and the implementation of an acceptable SUDS strategy (incorporating elements of the proposed landscape masterplan for the subject site).

The implementation of the nature-based SUDS proposals across the site, incorporation of wetland areas and wetland planting, use of blue roofs and limitation of run-off to adjacent watercourses were matters consulted upon and ultimately reflected in the design of the Project.

3.3.1.8 Fire Safety

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Engagement was undertaken with KCC Fire officer with regards to issue of fire risk associated within the Project. A Fire Hazard Analysis Report was prepared in respect of the Project and issued to KCC in September 2023. Following a review of the report and further engagement between KCC and the project design team, an updated Fire Hazard Analysis Report was submitted to KCC in May 2024; the report is provided in Volume III, Appendix 3.1.

The Report sets out the outline fire safety strategy employed in the Project design. Individual buildings shall fully comply with the relevant building regulations and will be subject to the fire safety certificate process.

The Fire Hazard Analysis Report sets out the fire hazards and mitigation measures associated with the generation and storage of electrical energy, specifically with regards the generator turbines and battery units located externally to the rear of each Data Centre building. The fire hazard risk review within the Fire Hazard Analysis Report indicates that risks identified are categorised as *low risk* (requiring monitoring) or *little or no significant risk.*

3.3.2 An Bord Pleanála

With regards to the substation element of the Project (comprising a grid substation and 110kV transmission connection) the project team met with An Bord Pleanála on the 15th March 2023 to discuss the Project in the context of Strategic Infrastructure Development under the Planning and Development Act 2000. On the 5th July 2023 a determination was sought from An Bord Pleanála who subsequently issued a determination confirming that the substation element of the Project, falls within the scope of section 182 of the 2000 Act and as such, an application for approval for the Project must be made directly to An Bord Pleanála. A copy of the An Bord Pleanála Section 182A Determination is included in Volume II, Appendix 1.1.

3.3.3 Additional Pre-Application Engagement

In addition to the above, members of the project team liaised with other statutory bodies where necessary to inform elements of design or the scope of environmental surveys as part of the EIAR, including the National Parks and Wildlife Service, Uisce Éireann, Eirgrid, ESB and Bord Gáis.

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HERBATA DATA CENTRE, NAAS

EIAR
VOLUME I MAIN TEXT – CHAPTER 4 DESCRIPTION OF THE PROJECT AND NEED FOR THE PROJECT

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4 DESCRIPTION OF THE PROJECT AND PROJECT NEED

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4.1 Introduction

This chapter of the EIAR comprises of a description of the Project in line with the requirements of the EIA Directive and implementing regulations, and the Environmental Protection Agency (EPA) *Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)* (May 2022).

This chapter should be read in conjunction with the design drawings included in Volume III which comprise of selected design drawings of the Project. Furthermore, the EIAR should be read in conjunction with the planning application submission(s) including all documentation, supporting materials and full drawing pack.

Design drawings included in Volume III are as follows:

Ref.	Drawing Number	Drawing Title
1.	22217-RKD-ZZ-ZZ-SK-A-0012	Proposed Site Context Plan – KCC and SID Boundary Comparison
2.	22217-RKD-ZZ-ZZ-DR-A-1000	Site Location Map
3.	22217-RKD-ZZ-ZZ-DR-A-1001	Overall Existing Site Plan
4.	22217-RKD-ZZ-ZZ-DR-A-1010	Overall Proposed Site Plan
5.	22217-RKD-ZZ-ZZ-DR-A-1025	Site Demolition Plan
6.	22217-RKD-ZZ-ZZ-DR-A-1030	Site Phasing Plan
7.	22217-RKD-ZZ-00-DR-A-1100	Data Centre - Overall Ground Floor Plan Type A
8.	22217-RKD-ZZ-00-DR-A-1105	Data Centre - Overall Ground Floor Plan Type B
9.	22217-RKD-ZZ-00-DR-A-1110	Data Centre - Overall Ground Floor Plan Type C
10.	22217-RKD-ZZ-01-DR-A-1101	Data Centre - Overall First Floor Plan Type A
11.	22217-RKD-ZZ-01-DR-A-1106	Data Centre - Overall First Floor Plan Type B
12.	22217-RKD-ZZ-01-DR-A-1111	Data Centre - Overall First Floor Plan Type C
13.	22217-RKD-ZZ-RF-DR-A-1102	Data Centre - Overall Roof Plan Type A
14.	22217-RKD-ZZ-RF-DR-A-1107	Data Centre - Overall Roof Plan Type B
15.	22217-RKD-ZZ-RF-DR-A-1112	Data Centre - Overall Roof Plan Type C
16.	22217-RKD-ZZ-ZZ-DR-A-1002	Existing Site Sections - Sheet 1
17.	22217-RKD-ZZ-ZZ-DR-A-1003	Existing Site Sections - Sheet 2
18.	22217-RKD-ZZ-ZZ-DR-A-1017	Proposed Site Sections - Sheet 1
19.	22217-RKD-ZZ-ZZ-DR-A-1018	Proposed Site Sections - Sheet 2
20.	22217-RKD-ZZ-ZZ-DR-A-1019	Proposed Site Boundary Sections - Sheet 1
21.	22217-RKD-ZZ-ZZ-DR-A-1020	Proposed Site Boundary Sections - Sheet 2
22.	22217-RKD-ZZ-ZZ-DR-A-1021	Proposed Site Elevations - Sheet 1
23.	22217-RKD-ZZ-ZZ-DR-A-1022	Proposed Site Elevations - Sheet 2
24.	22217-RKD-ZZ-ZZ-DR-A-1304	Proposed CGIs
25.	22217-RKD-ZZ-ZZ-DR-A-1400	Proposed Boundary And Fence Details
26.	22217-RKD-ZZ-ZZ-DR-A-1401	Entrance Plans And Elevations
27.	2232-DOB-ZZ-ZZ-DR-C-0200	Proposed Surface Water Drainage - Overall
28.	2232-DOB-ZZ-ZZ-DR-C-0220	Proposed R409 Road Surface Water Drainage Layout
29.	2232-DOB-ZZ-ZZ-DR-C-0260	SUDS DETAILS-Masterplan
30.	2232-DOB-ZZ-ZZ-DR-C-0300	Proposed Foul Water Drainage - Overall
31.	2232-DOB-ZZ-ZZ-DR-C-1600	Proposed R409 Road Realignment
32.	2232-DOB-ZZ-ZZ-DR-C-1700	Proposed Culvert Details at M7 Business Park Access
33.	2232-DOB-ZZ-ZZ-DR-C-1800	Proposed Foul Rising Main Stream Crossing
34.	22217-RKD-ZZ-ZZ-DR-A-1050	Site Location Map
35.	22217-RKD-ZZ-ZZ-DR-A-1051	Existing Site Context Plan
36.	22217-RKD-ZZ-ZZ-DR-A-1055	Proposed Site Context Plan
37.	22217-RKD-ZZ-ZZ-DR-A-1060	Existing Substation Compound Layout
38.	22217-RKD-ZZ-ZZ-DR-A-1063	Proposed Substation Compound Layout
39.	22217-RKD-ZZ-ZZ-DR-A-1065	Proposed Substation Compound Elevations
40.	22217-RKD-ZZ-ZZ-DR-A-1069	Proposed ESB Substation - Elevations (Sheet 1 of 2)
41.	22217-RKD-ZZ-ZZ-DR-A-1070	Proposed ESB Substation - Elevations (Sheet 2 of 2)
42.	2232-DOB-ZZ-ZZ-DR-C-1001	Proposed Typical Drainage Details SID Area

43.	2232-DOB-ZZ-ZZ-DR-C-0250	Proposed Surface Water Drainage - SID Area
44.	2232-DOB-ZZ-ZZ-DR-C-0350	Proposed Foul & Watermain Layout - SID Area
45.	BSM-ZZ-ZZ-DR-L-0101	Existing Tree Survey 01 of 04
46.	BSM-ZZ-ZZ-DR-L-0102	Existing Tree Survey 02 of 04
47.	BSM-ZZ-ZZ-DR-L-0103	Existing Tree Survey 03 of 04
48.	BSM-ZZ-ZZ-DR-L-0104	Existing Tree Survey 04 of 04
49.	BSM-ZZ-ZZ-DR-L-0301	Landscape Masterplan
50.	BSM-ZZ-ZZ-DR-L-0311	Landscape Boundary Treatment
51.	BSM-ZZ-ZZ-DR-L-0302	Proposed Substation Landscape Plan
52.	BSM-ZZ-ZZ-DR-L-0401	Landscape Sections 01 of 02
53.	BSM-ZZ-ZZ-DR-L-0402	Landscape Sections 02 of 02
54.	BSM-ZZ-ZZ-DR-L-0405	Landscape Elevations 01 of 02
55.	BSM-ZZ-ZZ-DR-L-0406	Landscape Elevations 02 of 02
56.	10360452-HDR-XX-XX-DR-C-112250	Campus Road Layout
57.	10360452-HDR-ZZ-02-DR-E-602003	Solar PV Layout
58.	22217-RKD-ZZ-ZZ-DR-A-1402-	Bicycle Shelter, Smoking Shelter and Bat Houses Details

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As set out in Chapter 1 Introduction, the Project is subject of both a full planning application to Kildare County Council (KCC) and a Strategic Infrastructure Development (SID) application to An Bord Pleanála; the applicant for both applications is Herbata Limited.

The overall Data Centre development includes two main elements, namely:

The Data Centre Application – comprising 6 no. two storey Data Centre buildings, an administration/management building, car parking, landscaping, energy infrastructure and other associated works. These elements are the subject of the planning application submitted to KCC

The Substation Application – comprising a grid substation and 110kV transmission connection. These elements are subject of the SID application to An Bord Pleanála.

The Data Centre Application and the Substation Application together constitute the “Project” for the purposes of Environmental Impact Assessment and Appropriate Assessment, and references to the “Project” in this EIAR should be read as references to those two applications taken together as one project. Figure 4.1 below illustrates the extent of both planning application boundaries and the relevant project layout as subject of assessment within the EIAR.

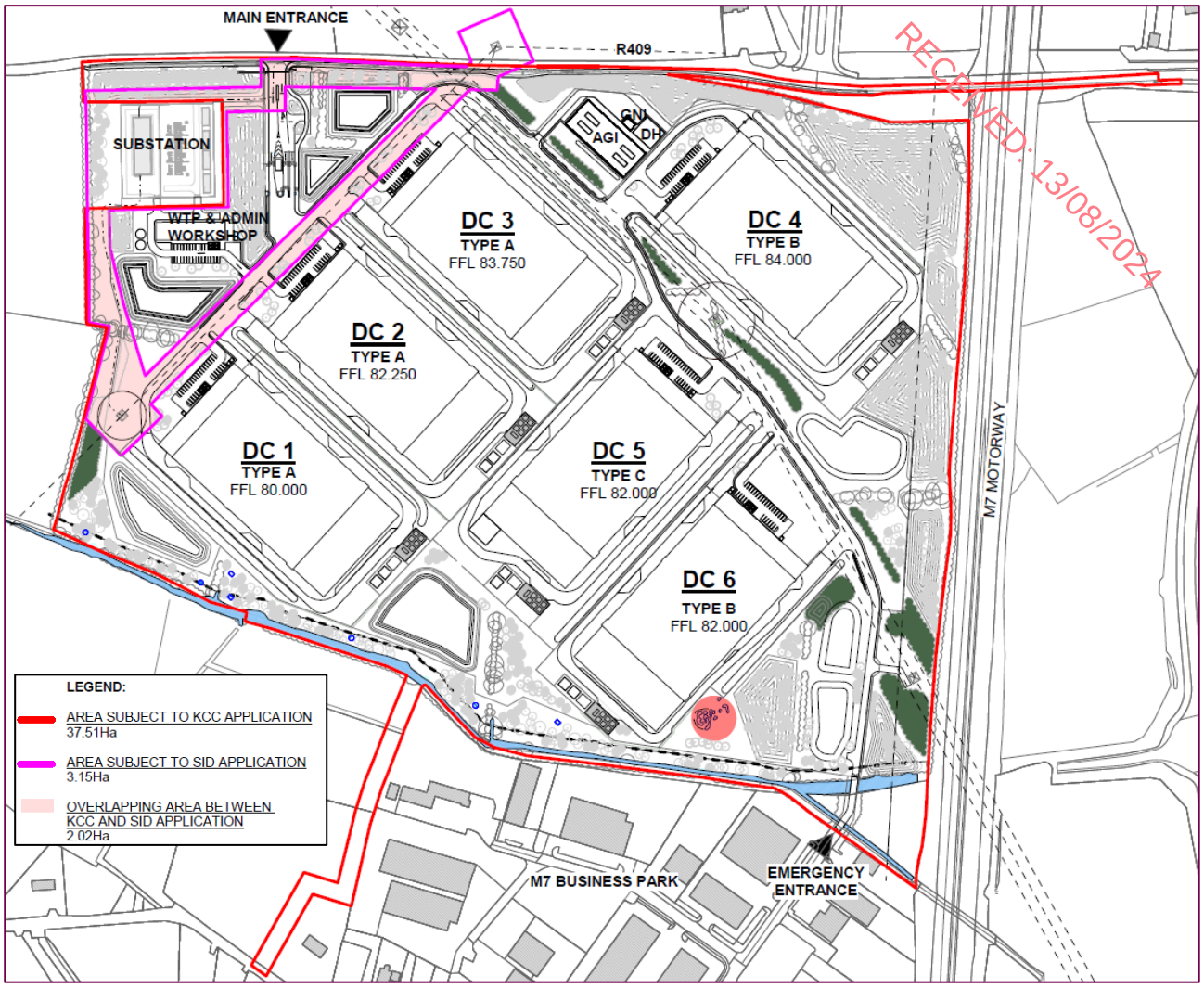

Figure 4.1: Proposed Site Context Plan Indicating both KCC (the Data Centre) Application and SID (the Substation) Application Planning Boundaries

For clarity, Figures 4.2 and 4.3 below illustrate the planning boundaries as they relate only to the KCC (the Data Centre) and SID (the Substation) applications respectively.

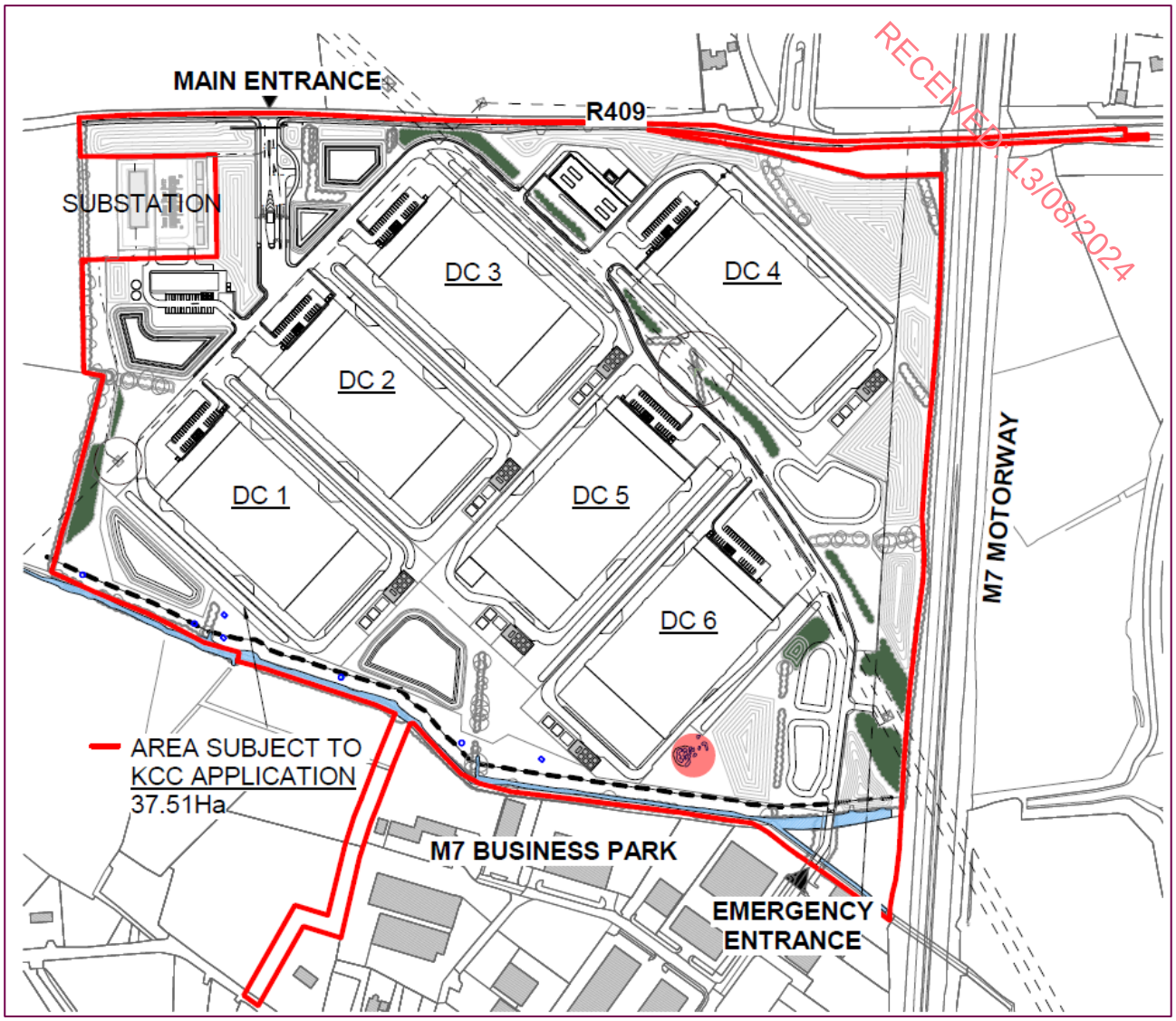

Figure 4.2: The Data Centre Application Planning Boundary

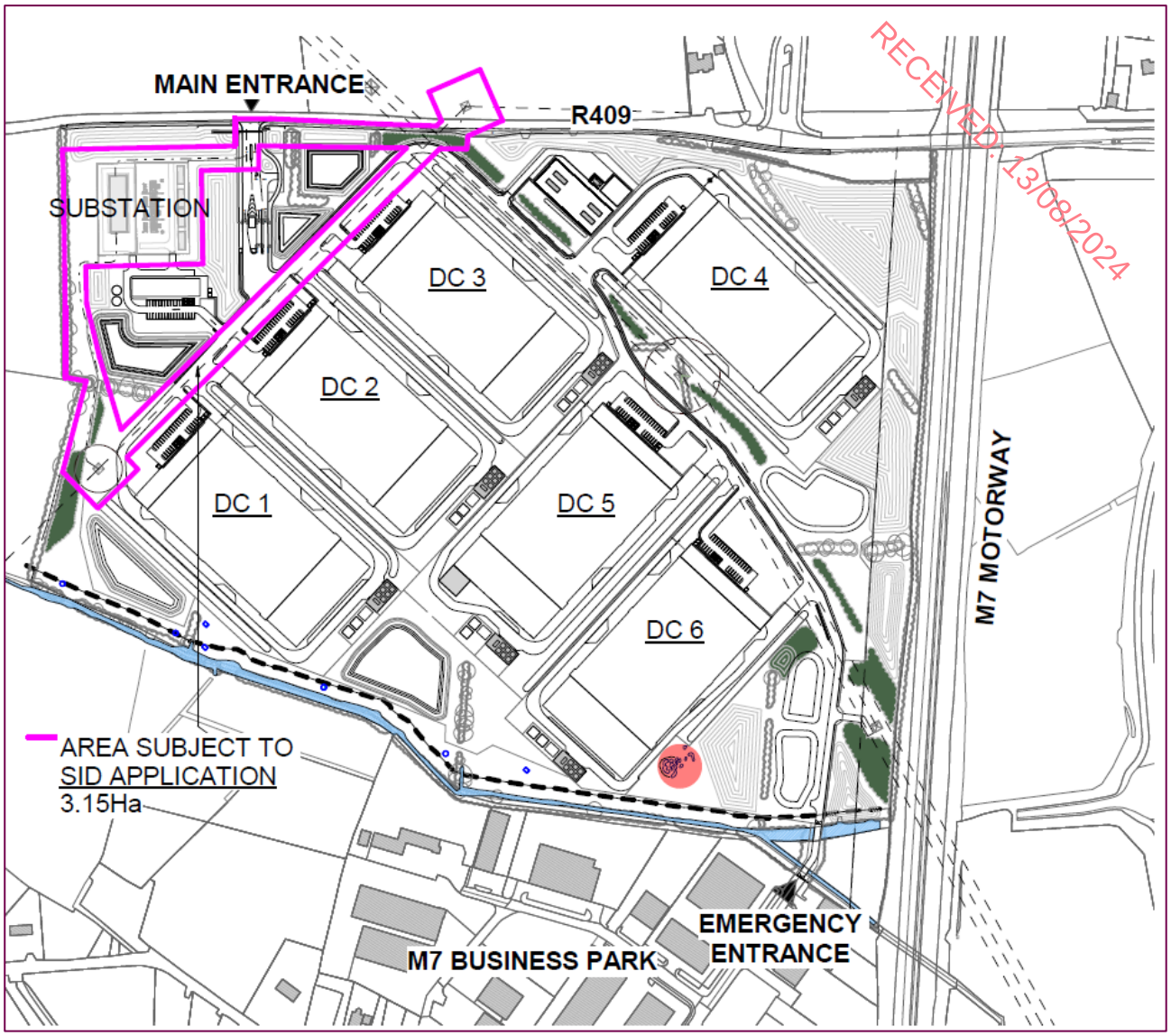

Figure 4.3: The Substation Application Planning Boundary

For the avoidance of doubt, it should be noted that the EIAR considers all the above elements in their entirety.

Reference to the Project from this point forward, should be taken as meaning *all* the above elements unless stated otherwise.

4.2 Characteristics of the Project

4.2.1 Description of the Site

The subject site of the Project is largely located south of the R409, on the western side of the M7 motorway, positioned between Junctions 9a and 10, approximately 2.5km west of the Naas.

The site area (planning boundary) of the Data Centre Application is 37.51 ha. The layout of the Data Centre Application, is illustrated in Figure 4.4 below (the corresponding drawing, number 22217-RKD-ZZ-ZZ-DR-A-1010 is also provided in Volume III of the EIAR):

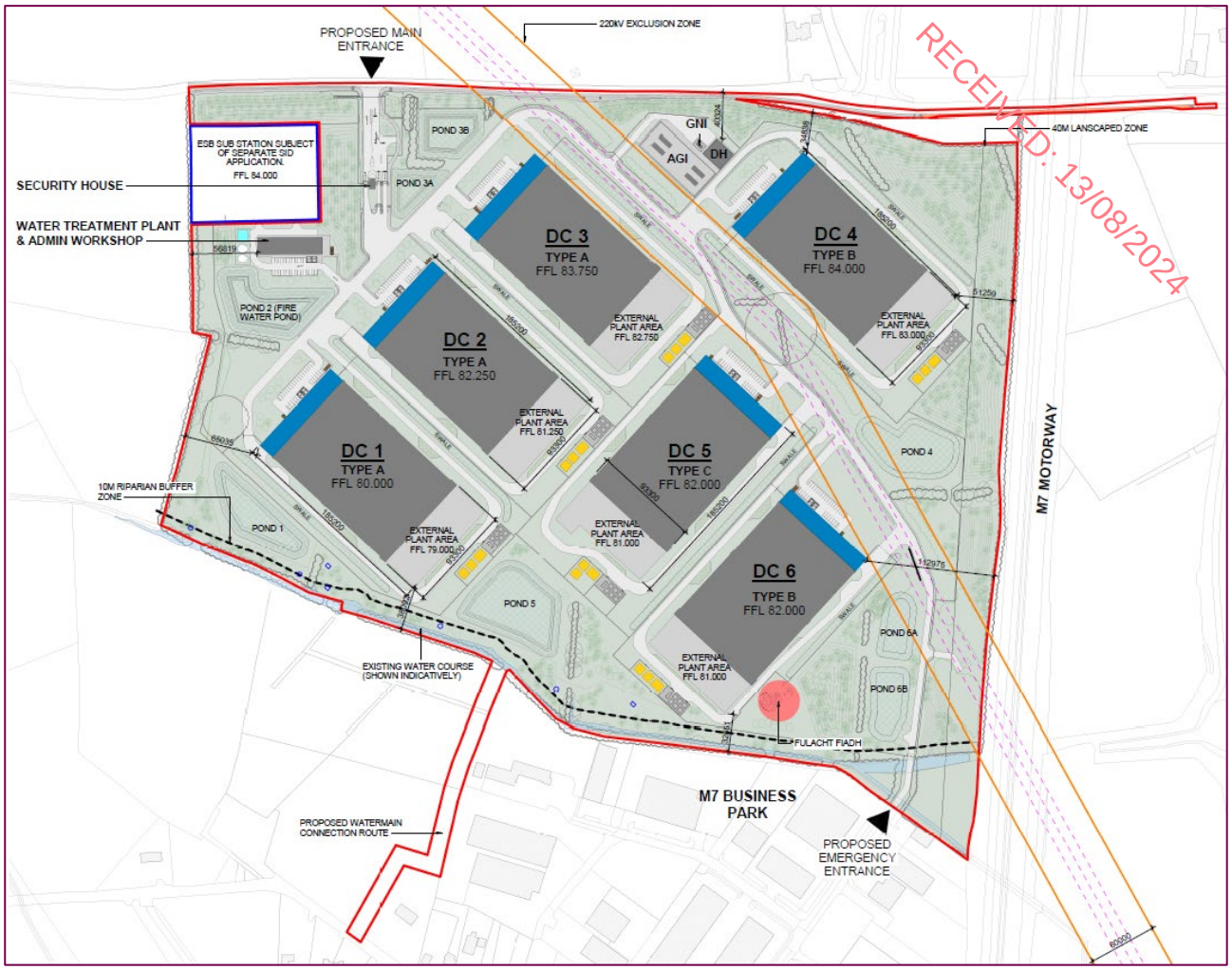

Figure 4.4: Data Centre Application Layout and Planning Boundary

The site area (planning boundary) of the Substation Application is 3.15 ha. The layout of the Substation Application, is illustrated in Figure 4.5 below (the corresponding drawing, number 22217-RKD-ZZ-ZZ-DR-A-1063 is also provided in Volume III of the EIAR):

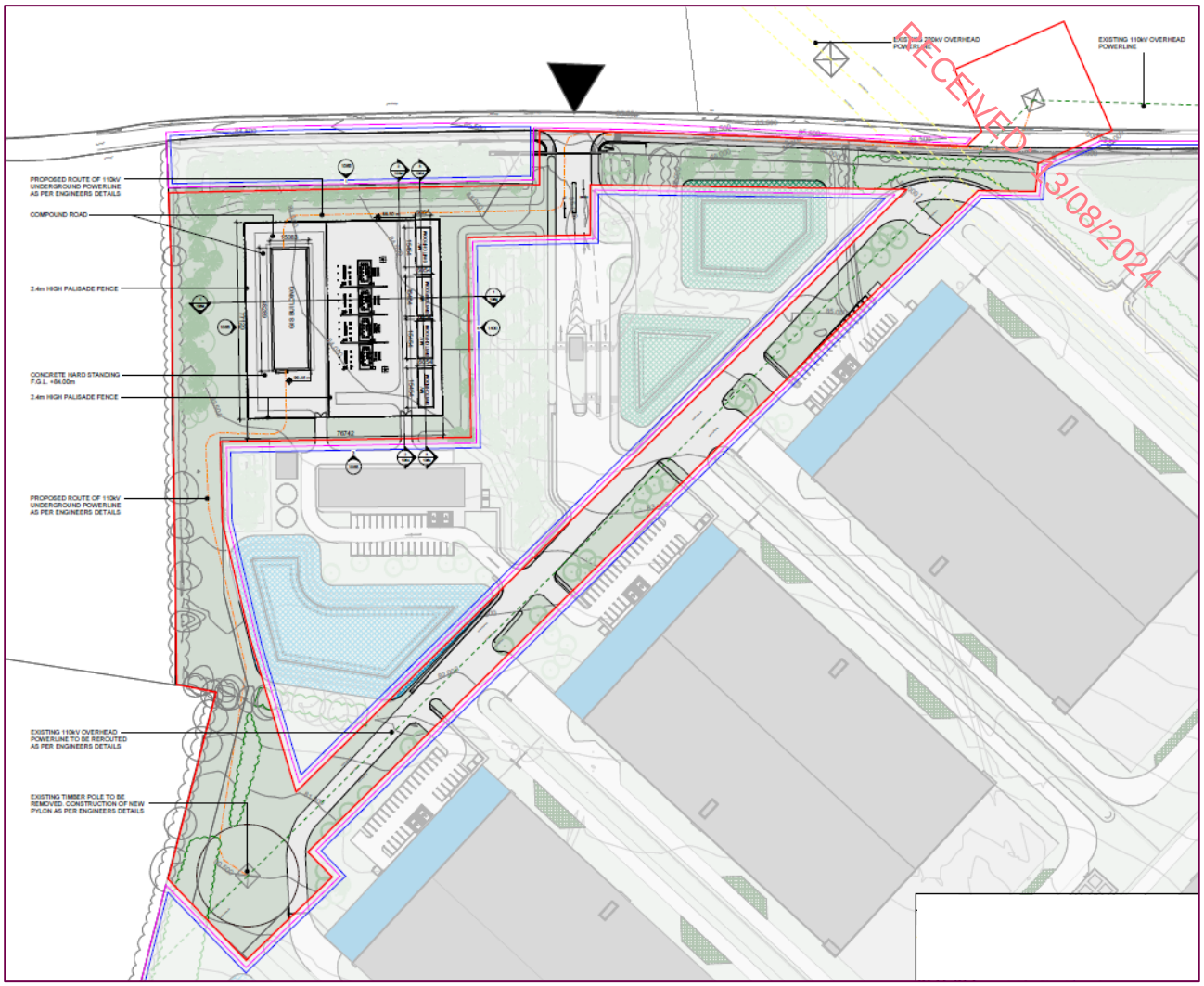

Figure 4.5: Substation Application Layout and Planning Boundary

The combined site area of both the Data Centre and Substation Applications is 38.64 ha. It should be noted that the aforementioned application boundaries, have a partial overlap – this is due primarily to the alignment of the proposed underground 110kV connection because the existing overhead 110kV line (to be removed and replaced with an underground connection) runs above part of the area the subject of the Data Centre Application, and the proposed underground 110kV connection is to be provided in the substratum beneath part of the area the subject of the Data Centre Application

The subject sites is largely bound to the north by the R409 road. The subject site comprises predominantly of agricultural grass land and smaller elements of residential and agricultural buildings.

There are 3 no. dwellings (along the frontage of the R409) and 5 no. farm buildings located on the subject site, these buildings are to be demolished as part of the proposed works.

There has been significant development in the locality in recent years, particularly light industry, logistics and services. The site is located between the existing 'M7 Business Park' and 'Osberstown Business Park'.

The Osberstown Wastewater Treatment Plant is located approximately 0.5km to the north of the subject site.

The subject site is largely bounded to the east by the M7 motorway and to the west by agricultural lands. The 'Newhall Retail Park' is located to the south of the site, on the east side of the M7 motorway.

The subject site is located in the townlands of Halverstown, Jigginstown, Osberstown and Newhall.

The rising main which extends south from the site across agricultural land, to Newhall Road, is within the townland of Newhall.

The SID application site boundary extends northwards, across the R409 to connect with the existing steel pylon, located in agricultural land.

There are public transport services in the vicinity of the site. The following bus services stop on the R445 c. 750m south of the site: 126 Dublin – Rathangan (29 times daily in each direction), 726 Dublin Airport – Portlaoise (via Red Cow Roundabout) (34 times daily in each direction) and the 125 University College Dublin – Newbridge (twice daily in each direction).

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The site is currently in agricultural use and comprises a number of fields which are bounded by hedgerows, mature and semi-mature trees. A watercourse, the Bluebell Stream, is located to and largely forms the southern boundary of the site.

The site falls at a generally even grade from north to south.

Two overhead power lines currently cross the site (110kV and 220kV). The 110kV line crosses the northwestern corner of the site and the 220kV crosses the eastern part of the site.

A recorded monument is located within the south-eastern area of the site: recorded monument Ref. no. KD019-028, classified as a 'Fulacht Fia' (an ancient Irish *cooking pit*).

4.2.2 Overview of Project

Key elements of the Project are set out below:

- Combined site areas (planning boundaries) of both the Data Centre and Substation Applications - 38.64 ha
- Site area (planning boundary) of Data Centre Application – 37.51 ha;
- Site area (planning boundary) of Substation Application – 3.15 ha.
- 6no. Data Centre buildings following a *template design*, each with a total internal area and height as follows:
    - Total gross internal area (GIA) – 27,261m^2
    - Height to parapet – 18m
    - Height to flue – 19m
- Each Data Centre building will be c.19m in height;
- Admin workshop and Water Treatment Plant (WTP) GIA - 818.9 m^2;
- Site security hut GIA - 42.1m^2;
- District Heating (DH) building GIA - 340.5m^2;
- Total of 210 no. car parking spaces comprising of 63 electric car charging spaces and 14 disabled car parking spaces;
- Of the 210 total, each of the 6 Data Centre buildings will have 30 car parking spaces (total) and the administration building will also have 30 car parking spaces;
- 7 no. smoking shelters of 9m^2 each are proposed proximate to the entrance to each Data Centre and the admin / workshop building.
- Total number of 104 bicycle spaces (16 per each of the 6 Data Centre buildings and 8 for the administration workshop)
- Demolition of 5 no. agricultural buildings to the centre of the site;
- Demolition of 3 no. dwellings along the northern boundary of the site, fronting onto R409 road;
- Provision of a rising main, extending from south from the site and connecting into the existing network at Newhall Road; and
- Removal of internal hedgerows and provision of site wide landscaping, including 30m mounded landscape buffer along M7.

4.2.3 Data Centre Buildings and Processes

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Each Data Centre will comprise of its own secure site boundary, encompassing the main building with dedicated car parking to the fore of the building.

Each of the Data Centre buildings will comprise of 8no. data halls with a capacity to support up to 30MW of IT equipment load in each building. Each data hall has an individual electrical capacity of 3.75MW allowing each Data Centre building to be split to facilitate multiple end users.

Whilst subject to internal layout requirements of end users, each Data Centre building will consist of the main data hall block with an external plant gantry and an enclosed yard to the rear encompassing the building energy infrastructure. The front of each Data Centre building will comprise of end-user clients administration/office areas, plus storage areas and the loading/receiving docks.

The administration/office space of the building is split over two floors with the ground floor facilitating security screening and check in, loading and associate storage. The upper level primarily comprises of office and welfare facilities to support client's operational needs.

Figure 4.6 below (extract from Volume II, Appendix 4.1 Data Centre Application - Architectural Design Statement) illustrates the separate elements the Data Centre building and relative heights.

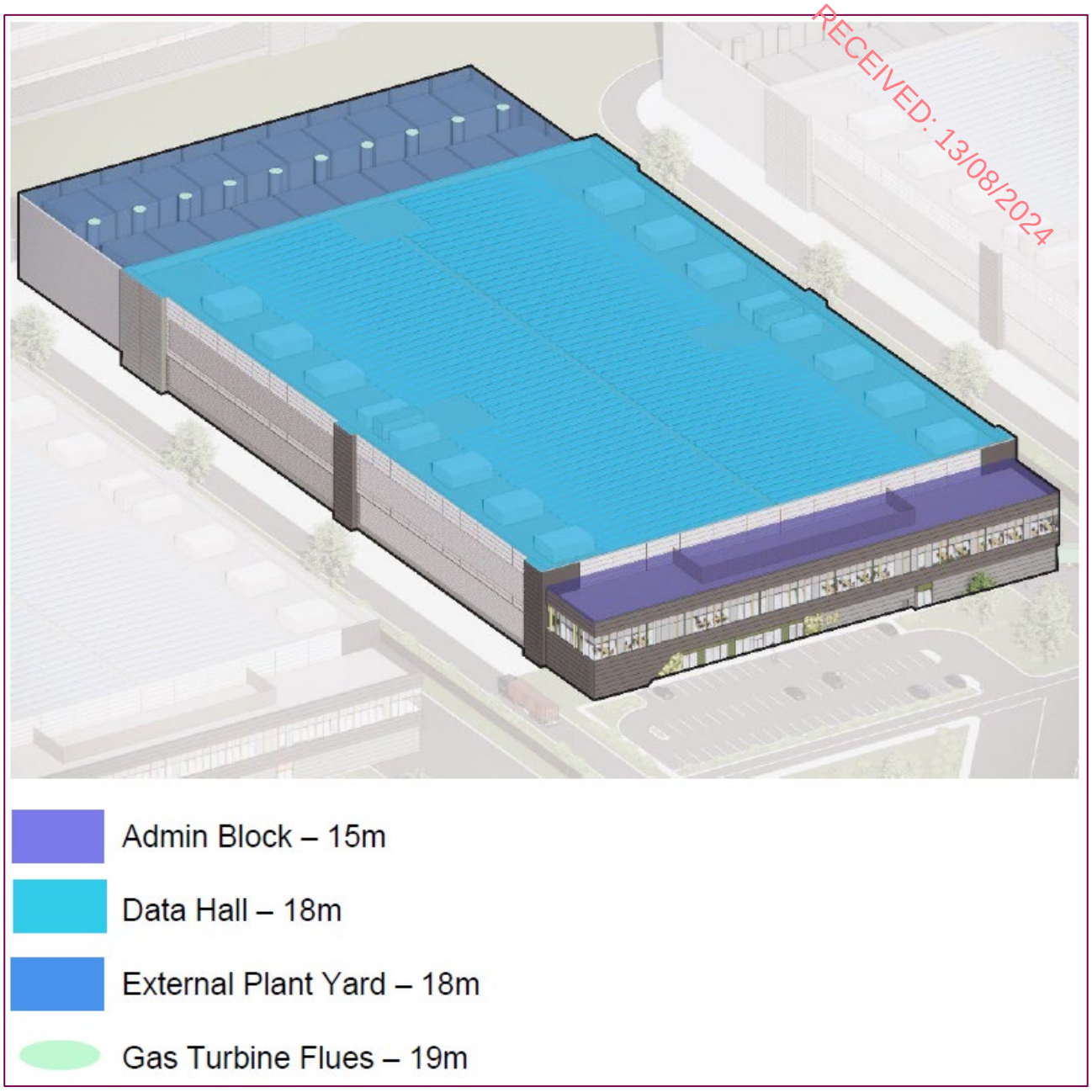

Figure 4.6: Data Centre Building Height (Volume II, Appendix 4.1, Data Centre Application - Architectural Design Statement)

Due to the secure nature of the building the ground floor has a flat panelled finish with the building entrance being accentuated with a featured coloured cladding pattern. The first floor by comparison is give more prominence due to the architectural overhang with large area of floor to ceiling glass.

The buildings will be steel-framed with insulated metal faced cladding panels to the façade which serves to maximise the speed of construction whilst also providing a sleek and modern appearance. The material choice is complemented a continuous louvre system with the massing of the building further compartmentalised by feature metal stairs located centrally along the façade. The rear external yard is also enclosed with a metal louvre system to align with the main building form and the building entrance area will have large, glazed windows.

Figures 4.7 and 4.8 below provide computer generated imagery (CGI) of the external facades of the Data Centre buildings.

Figure 4.7: CGI Example of Data Centre External Façade (Volume II, Appendix 4.1, Data Centre Application - Architectural Design Statement)

Figure 4.8: CGI Example of Data Centre External Façade (Volume II, Appendix 4.1, Data Centre Application - Architectural Design Statement)

The roof of each Data Centre building will be provided with a reflective finish to improve solar reflectivity and better sustainability. Solar panels will be provided on the roof of each Data Centre building to improve on-site renewable energy generation.

4.2.4 Overview of Energy Strategy

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Energy usage and sourcing is a key element of any Data Centre development. The incorporation of low carbon and renewable energy sourcing a key objective of the applicant and reflective of the energy strategy as set out within The *Energy Efficiency and Climate Change Adaptation Design Statement* and *Energy Policy Compliance Report*, Volume II, Appendices 4.2 K and 4.9 respectively. The inclusion of a low carbon energy strategy is also a requirement of national, regional and local policy.

The Project will have its primary source of power generation on-site. Generation of electricity is proposed on site using highly efficient gas turbines for the majority of the generation, with top up from gas engines. This is in line with recent EU and Irish Government direction on the use of gas for generation as a transitional fuel. It also avoids any negative impact from the Project on the public electricity distribution system and allows for any excess power to be exported to the grid to aid Eirgrid in their supply of electricity.

The onsite power generation capacity will be in excess of that required for the operation of the Data Centre and will provide an opportunity for the export of energy to the grid if and when required.

The various elements which comprise of the energy strategy for the Project are detailed below.

4.2.4.1 Gas Turbines

Mains (Gas Networks Ireland [GNI]) connected, on-site natural gas turbines are the proposed primary energy source for the Project. Generation of electricity is proposed using gas turbines, located within a dedicated, adjoined plant area, to the rear of each Data Centre building. Each Data Centre building will comprise of 8no. turbines.

This is in line with recent EU and Irish Government direction on the use of gas for generation as a transition fuel. It also avoids any negative impact from the Project on the public electricity distribution system and allows for any excess power to be exported to the grid to aid Eirgrid in their supply of electricity. The on-site power generation capacity will be in excess of that required for the operation of the Data Centre and will provide an opportunity for the export of energy to the national grid if and when required.

The gas supply from GNI will be sourced to provide the primary energy supply to the gas turbines. Gas Networks Ireland as set out in the Vision 2050 publication aim to decarbonise their gas network by 2050 by injecting renewables gas (biomethane), abated natural gas, and hydrogen into the gas network over time. A biomethane gas injection point is proposed to allow sustainable gas to be inputted for use in the turbines and more broadly in the wider network.

In the unlikely event that gas supply to the turbines is interrupted or becomes unavailable, the reciprocating gas engines can operate either on piped gas supply or natural gas.

4.2.4.2 Gas Networks Ireland Gas Connection

The Project will use highly efficient on-site gas turbines to generate the majority of electrical energy required to operate the Data Centres. Whilst the Project includes an on-site Above Ground Installation (AGI) to regulate the supply to the turbines, a physical connection to the Gas Networks Ireland (GNI) gas network is required to provide the supply to the gas turbines.

GNI will be responsible for providing the required infrastructure works, to construct a new high-pressure gas distribution pipeline, to the Project site boundary (on the R409), from the existing GNI AGI at Glebe West, Co. Kildare.

The final, detailed design, consenting and construction of the required infrastructure works will be the responsibility of GNI in the exercise of their own statutory functions, and therefore Herbata Ltd is not seeking planning consent to carry out these works as part of the Project.

Notwithstanding the fact that Herbata Ltd is not seeking planning consent to carry out these works as part of the Project, given the functional interdependence that exists between the Project and the GNI Gas Connection, the cumulative impacts of the Project with the GNI Gas Connection have been considered and assessed in this EIAR, and their in-combination effects are considered and assessed in the related Appropriate Assessment Screening Report. This is consistent with the approach endorsed by the High Court on a number of occasions in the context of Environmental Impact Assessment of, for example, proposed wind farm developments and their associated grid connections (see, for example, the decisions of the High Court in Ó

Gríanna & Ors v An Bord Pleanála & Ors [2014] IEHC 632 and [2017] IEHC 7, and the line of case law following those decisions).

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In order to inform this consideration and assessment of the cumulative impacts of the Project with the GNI Gas Connection, a report identifying the most likely route for the new high-pressure gas distribution pipeline and a description of the works required to provide same has been prepared. The GNI Infrastructure Upgrade Outline Report has been prepared following a review of the existing GNI network, to determine the most likely source of the connection and the most likely route. The location of the existing GNI above ground installations (AGIs) at Glebe West and Naas Town and the associated existing high-pressure transmission line between, has been used to inform the most likely connection point and route for the new high-pressure gas distribution pipeline.

From the existing Naas Town AGI, the most likely route for the new high-pressure gas distribution pipeline is considered to follow a combination of the existing road network (along the Southern Link Road, Naas) and the route of existing utilities (foul drainage network wayleave). From this point, the most likely route is considered to cross the M7 (east of the Project site) before following the route of the R409 to the Project site. It is understood that similar crossings, below the M7 have previously been implemented in order to deliver comparable service infrastructure.

The likely specification of the new high-pressure gas distribution pipeline, pressure levels, construction methodology and timelines, as set out with the GNI Infrastructure Upgrade Outline Report have been informed by experience and knowledge of comparable infrastructure developments. The GNI Infrastructure Upgrade Outline Report is included in Volume II, Appendix 1.2 and provides sufficient detail and information to allow a robust cumulative impacts assessment to be conducted.

The cumulative impacts of the Project with the GNI Gas Connection have been considered and assessed under each environmental discipline in the relevant chapters of this EIAR and in Chapter 17 Cumulative Effects and Interactions.

A summary of the gas connection, as set out within the aforementioned report, is set out below:

4.2.4.2.1 Overview

- The proposed works will likely comprise of a new high-pressure gas distribution pipeline from the existing GNI AGI at Glebe West, Co. Kildare to the subject site of the Project.
- The high-pressure gas pipeline is expected to be made available by GNI, to the Project site boundary on the R409, to connect into the AGI gas infrastructure compound which forms part of the Project.
- The high-pressure gas pipeline will comprise of a 300mm diameter high pressure gas pipeline.
- The most likely route for the gas pipeline is to follow the existing pipeline route from the Glebe West AGI to the Naas Town AGI, a distance of approximately 6.5km. It is considered that the gas pipeline will likely be constructed immediately adjacent to the existing pipeline, allowing for minimum separation requirements.
- From the point of the Naas Town AGI it is considered that the most likely route for the gas pipeline will be to follow the existing low-pressure distribution network around the Southern Link Road to the junction with the R445 Newbridge Road, after which it will likely cross the canal to follow the existing public foul sewer network which crosses agricultural lands, heading northwest.
- The gas pipeline will then likely cross under the M7 motorway, most likely, by directional drilling / pipe jacking to reach the west side of the M7, emerging onto the R409 Caragh Road, whereupon it will enter the Project site.
- The likely route from Naas Town AGI to the Project site is approximately 4km (2km along the public road from Naas Town AGI to the Newbridge Road, 1.55km across agricultural lands from the Newbridge Road to the M7 motorway and circa 0.5km crossing beneath the motorway and running along the R409 to the Project site).

Alternatives to the most likely route for the new high-pressure gas distribution pipeline (as set out above and in the GNI Infrastructure Upgrade Outline Report) were considered, however were not deemed feasible/likely as GNI hold a wayleave agreement over the existing high-pressure pipeline route from Glebe West to Naas Town AGI. As such, the route of the existing pipeline, represents the most direct route from the nearest available AGI on a high pressure pipeline within 27km of the site.

4.2.4.2.2 General Description of the Works

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- A large portion of the gas pipeline will cross agricultural / open lands.
- A construction corridor for the works will be required in order to complete the construction and installation of the pipeline. This usually consists of a 14m wide strip, centred on the pipeline which will become the permanent wayleave following completion of the works.
- Access to the works on agricultural lands will typically be provided at public road crossing locations.
- Special considerations for construction traffic management, adequate site signage and risk assessments will be required for the route through agricultural lands and particularly at interfaces/accesses with public roads.
- Temporary roads may need to be constructed from existing access points to the location of the works in remote locations.
- Works along the public road will likely involve the installation of the new pipeline along the verge of the Southern link road, where the existing low-pressure transmission pipes are also located.
- There will also be a requirement for crossings at several public roads along the route of the pipe. Consultations with Kildare Co. Council Roads Department will be required as well as the preparation of temporary traffic management plans, road opening licences, construction traffic management plans and all associated safety and signage requirements in order to complete the works.

4.2.4.2.3 Typical Pipeline Installation

- The installation of the pipeline requires excavation of a trench through the agricultural land / roadway.
- Typically, the depth of burial will be 1.2m of cover to the pipe, with 2 layers of marker tape to be laid in the trench.
- The new pipeline will likely be installed at a pressure of 19 bar.

4.2.4.2.4 Watercourse Crossing

- The assumed route of the new pipeline will require crossing a number of watercourses, including the Grand Canal, Naas Rive, Bluebell Stream and numerous land drainage ditches.
- The method of constructing these crossings will typically consist of either open excavation (from smaller watercourses and ditches) or directional drilling / pipe jacking as appropriate.
- GNI will determine the best crossing method for all watercourses as part of their Environmental Assessment.
- The final design will be subject to consultations with Waterways Ireland / Inland Fisheries Ireland and Kildare Co. Council Water Services and Environment departments.

4.2.4.2.5 Construction Timeline

- The nature and extent of the required works dictate an approximate construction programme of 7-12 months.
- The construction of the AGIs will take approx. 7- 8 months each.

4.2.4.3 Battery Energy Storage System

For the purpose of providing uninterrupted and conditioned power, each Data Centre building will have a dedicated battery energy storage system (BESS) located within the adjoined plant area, to the rear of each Data Centre building.

The system will comprise of individual modules connected in parallel, with the total quantity of modules for each Data Centre building as required to match the load of the Data Centre. The modules will be housed in outdoor-rated enclosures.

The battery energy storage system will consist of rack mounted lithium iron phosphate battery modules connected to a DC bus. Rectification from AC to DC is achieved via an input inverter and conversion back to AC is achieved via an output inverter.

The inverters are contained within the BESS enclosures. Each BESS enclosure contains its own dedicated cooling and fire protection systems.

The storage capacity provides a back-up energy source and in addition adds resilience to the wider network, having the capacity to provide immediate export of energy to the national grid, or the capacity to store excess electricity generated externally, if required.

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4.2.4.4 Reciprocating Gas Engines

The gas turbines are supported by smaller, reciprocating gas engines which provide a back up for various running scenarios to include for maintenance and demand requirements. In the unlikely event that gas supply to the turbines is interrupted or becomes unavailable, the reciprocating gas engines can operate either on piped gas supply or natural gas.

4.2.4.5 Off Site Renewable Energy

CPPAs will be used to procure sustainable energy from wind / solar farms. In addition to providing energy for the Project, CPPAs will fund the construction of wind and solar farms. The Applicant has had discussions with various solar and wind renewable energy suppliers with a view to supplying energy through CPPAs.

The process and technical aspects of CPPAs are considered more fully in the Herbata Data Centre Sources of Energy Report (provided in Volume II, Appendix 1.3). CPPAs will be finalised following a grant of permission, along with a connection agreement with Eirgrid). As demonstrated within the aforementioned report and accompanying letter from BOS Energy Limited, there is sufficient capacity available from suppliers to meet the 30% operational renewable energy target set out in the Kildare County Development Plan 2023-2029.

In implementing the CPPA arrangements as outlined, the Project will operate on the basis of a minimum of 30% energy from off site renewables, in line Kildare County Council's policy requirements as follows:

The Kildare County Development Plan 2023-2029 (KCDP):

> *RE O72 Require Data Centres to consider the use of sustainable renewable sources of energy to fuel their operations in whole in the first instance or in part (minimum of 30%) where this is not possible and where it has been satisfactorily demonstrated not to be possible, subject to all relevant and cumulative environmental assessments and planning conditions."*

The proposed Project energy strategy is further set out within The *Energy Efficiency and Climate Change Adaptation Design Statement* and *Energy Policy Compliance Report*, Volume II, Appendices 4.2 K and 4.9 respectively.

4.2.4.6 Electrical Grid Connection

A 110kV GIS is proposed to be located to the north west corner of the subject site. The substation will provide the grid connection on site, formed from the *breaking into* and partial undergrounding of the existing 110kV overhead line that currently crosses the site. Appendix 4.13 (Volume II) 110KV *Grid Substation and Transmission Line Report* which sets out further the context of the proposed connection and the rationale for the proposed specification and layout.

The substation and undergrounding of the 110kV overhead lines are subject of a Strategic Infrastructure Development (SID) planning application to An Bord Pleanála as it involves changes to electricity transmission and is considered strategic infrastructure. Pre-application consultation undertaken with An Bord Pleanála confirmed that *'the Board… is of the opinion that the Project falls within the scope of section 182A of the Planning and Development Act 2000, as amended. Accordingly, the Board has decided that the Project would be strategic infrastructure within the meaning of section 182A of the Planning and Development Act 2000 as amended. Any application for approval for the Project must therefore be made directly to An Bord Pleanála under section 182A(1) of the Act'* (*An Bord Pleanála correspondence, July 2023*). A copy of the An Bord Pleanála Section 182A Determination is provided in Volume II, Appendix 1.1.

The provision of the substation and grid connection will enable the export of energy generated onsite to the wider network. The substation will also enable the energy storage facility to be connected to the national grid

and add greater capacity and resilience to the national electric energy generation capacity and the national electric grid. The substation will also allow for development outside of the site to be enabled by having spare capacity for 110kV circuits if required.

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The design and technical specification of the GIS and 110kV connection are largely influenced by Eigrid requirements and standard arrangements, in accordance with Eirgrid *Policy Statement on Options for Connecting Customers to the Transmission Network* (https://www.eirgridgroup.com/site-files/library/EirGrid/Policy-Statement-on-Options-for-Connecting-Customers-to-the-Transmission..pdf)

The proposed design and specification (derived from the above Policy Statement) is *Option 1*, *a new looped-in transmission substation*, utilising an 8 bay format (2 bays for the incoming and outgoing connections to the existing transmission line, 2 bays for the Project and 4 remaining bays remaining available for future capacity [unrelated to the Project] in the Naas area).

The substation will comprise of the following elements:

- 110kV GIS Building/Grid Substation c. 1350sqm and 15m in height;
- Undergrounding of the 110kV transmission line;
- Interface towers (17m in height);
- Connection of the new 110kV underground cables into the substation;
- Client control building;
- Internal road layout;
- Boundary fences;
- Underground services (watermain, surface water, foul, power); and
- Ancillary works (including removal of obsolete 110kV infrastructure).

It should be noted that all of the works that are intended to be handed over to Eirgrid will be specified, procured and constructed to Eirgrid's standards and requirements for a grid substation at a node. The proposed design and layout of the GIS is a *standard arrangement* and has been developed in liaison with ESB. Figure 4.9 below illustrates the proposed GIS arrangement in principle.

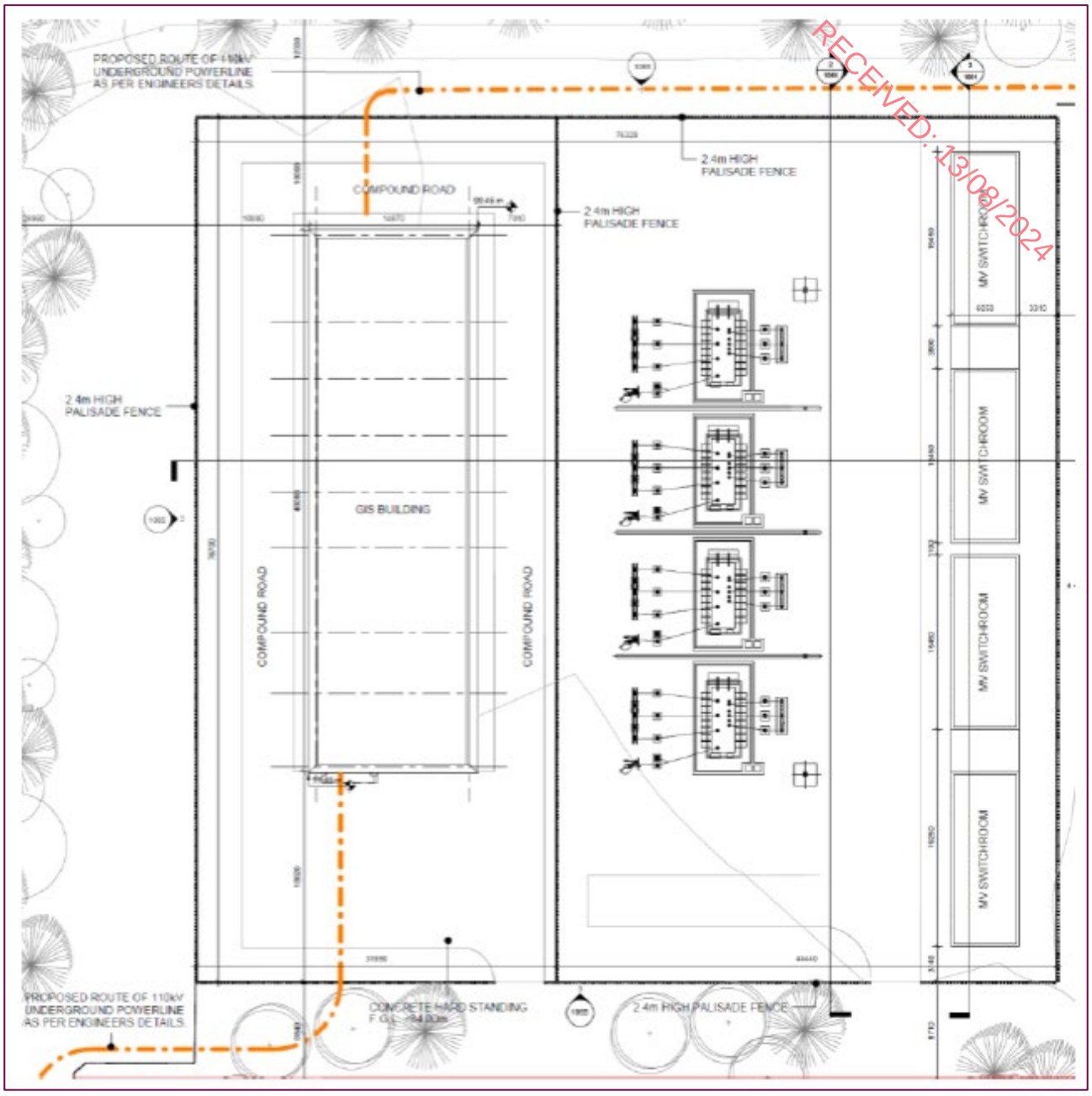

Figure 4.9: Proposed GIS Layout (Volume II, Appendix 4.13, 110KV Grid Substation and Transmission Line Report)

The general arrangement and scale of the GIS has been largely determined on the basis of technical requirements, including the dimensions of the plant and equipment (including necessary separation and distances). In order to provide consistency across all elements of the Project, the design of the GIS buildings is in keeping with that of the Data Centre buildings; the use of comparable materials and finishes is proposed as illustrated in Figure 4.10 below (extract of Volume II, Appendix 4.11 Substation Application – Architectural Design Statement)

Figure 4.10: CGI Example of GIS Buildings

Termination of the existing 110kV overhead lines will be delivered by new single circuit line/cable (L/C) interface towers, as illustrated in Figure 4.11 below.

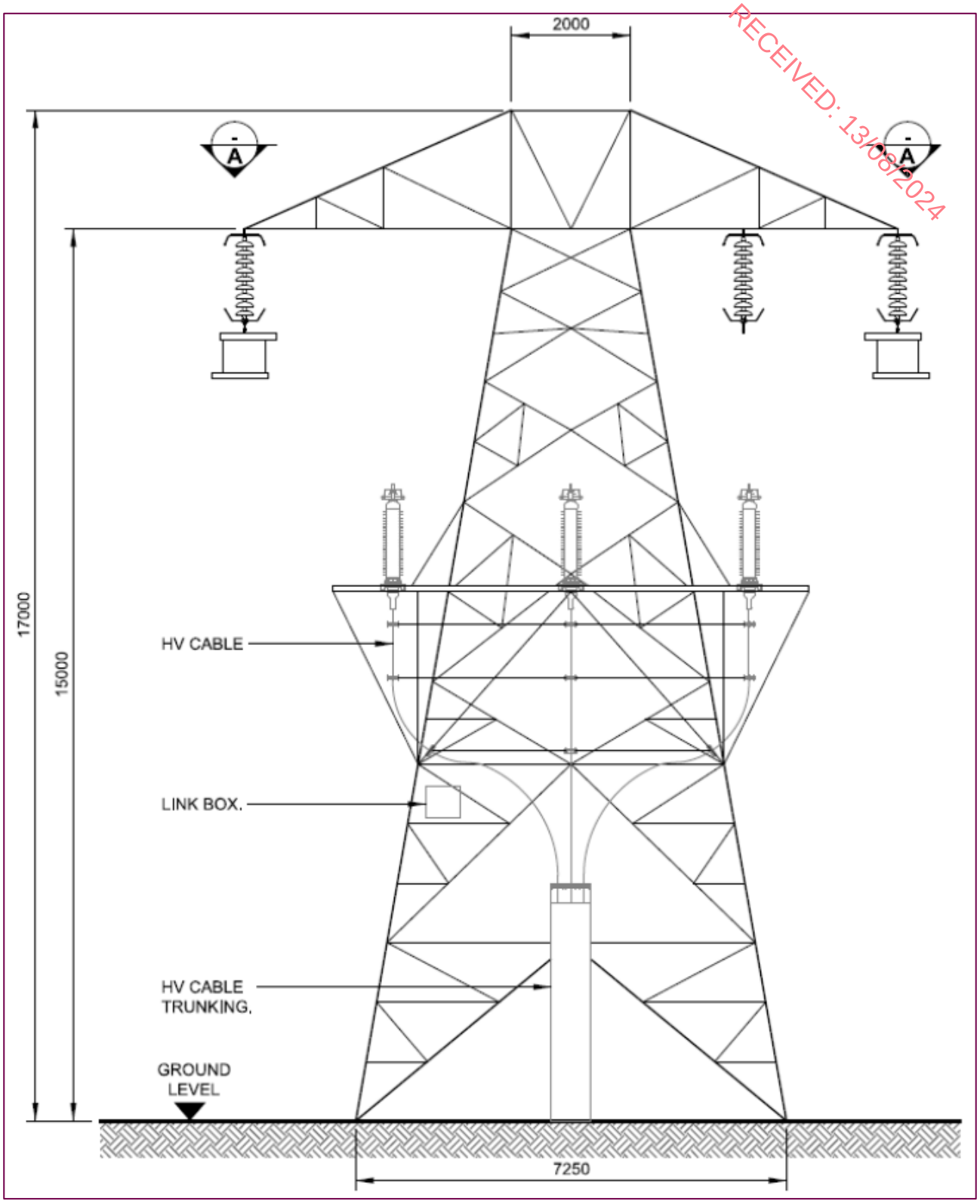

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Figure 4.11: Example Single Circuit L/C Interface Tower (ESB Networks standard version) (Volume II, Appendix 4.13, 110KV Grid Substation and Transmission Line Report)

An Eirgrid 220kV overhead line also crosses the site. It is not proposed to make any alteration to the 220kV line and the Project will not impact the line with development below the line, located and designed in accordance with Eirgrid transmission line clearance policies.

4.2.4.7 Solar Photovoltaics

Solar photovoltaic (PV) arrays are located on the roof top of each of the six Data Centre buildings. The solar PV arrays will provide a minimum 500kW peak per building provided as part of 30% renewable energy target for operational energy target.

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4.2.4.8 Heat Recovery and District Heating

Two of the gas turbines associated with Data Centre 5 are proposed to have waste heat thermal boilers installed within their exhaust flues in order to recover the medium to high grade heat from the turbines. Each turbine as a nominal electrical output rating of 5MWe, the available maximum heat output is assumed at 10MWth per turbine, with a total capacity of 20MWth possible when both turbines are available and running. Both of these turbines will be prioritized in terms of running whenever possible.

The heat from the thermal boilers will then be pumped via heat exchangers to the perimeter of the Data Centre campus, to enable district heating pipework to be connected to the identified uses.

An average electrical load of the site associated with ICT (information and communications technology) and cooling, when fully operational, is likely to max out at 220MW, however typically Data Centres don't achieve 100% utilisation of the power, more normally they max out at 70-80% so in this case with all phases completed an annual power demand from the onsite generation of around 140MW. It is acknowledged that this load is unlikely to be present on the first operational day, with a phased approach being employed by the Data Centre developer, this will have to be taken into account in any detailed district heating assessment.

Having established the quantum and form of the heat that can be made available to the local area, a heat mapping assessment (Volume II, Appendix 4.10) has been developed to identify where the heat could be best used in existing facilities, significant facilities that have recently received planning and areas of development that again would benefit from using a connection to a district heating system.

4.2.5 Ancillary Buildings

In addition to the 6 Data Centre buildings, other ancillary structures are located within the site boundary. The site security hut is located at the entrance of the site. The site administration workshop and water treatment plant is located in the north west portion of the site, adjacent to the main entrance. The AGI and DH buildings are located in the north of the site adjacent to the site boundary.

Figures 4.12 – 4.14 provide CGIs of these ancillary buildings.

Figure 4.12: CGI of Security Hut

Figure 4.13: CGI of District Heating Building and AGI Compound

Figure 4.14: CGI of Administration Workshop and Water Treatment Plant

4.2.6 Drainage and Water Supply

4.2.6.1 Surface Water Drainage

Below ground drainage are to be separate foul and surface water systems. Currently there is no known public surface water connections available to the development.

The surface water drainage design aims to collect and attenuate, as far as practically possible, all surface water within a series of swales and ponds, which will discharge (at three locations) into the Bluebell River (subject to regulatory approval) at a rate no greater than greenfield runoff.

Some of the surface water ponds will also act as water retention ponds to use the water for fire fighting purposes. Most of the ponds will be dry detention basins. All roads will drain into swales and carparking bays will be designed with a permeable surface to allow for surface water to be cleansed and attenuated within the subbase.

Ancillary buildings such as the Admin Workshop and Security Hut will incorporate green roofs.

Figure 4.15 below is an extract from drawing number 2232-DOB-ZZ-ZZ-DR-C-0200 Proposed Surface Water Drainage (provided in Volume III), illustrating the proposed surface water drainage as relative to Data Centre 5; surface water drainage extends across the entire Project site.

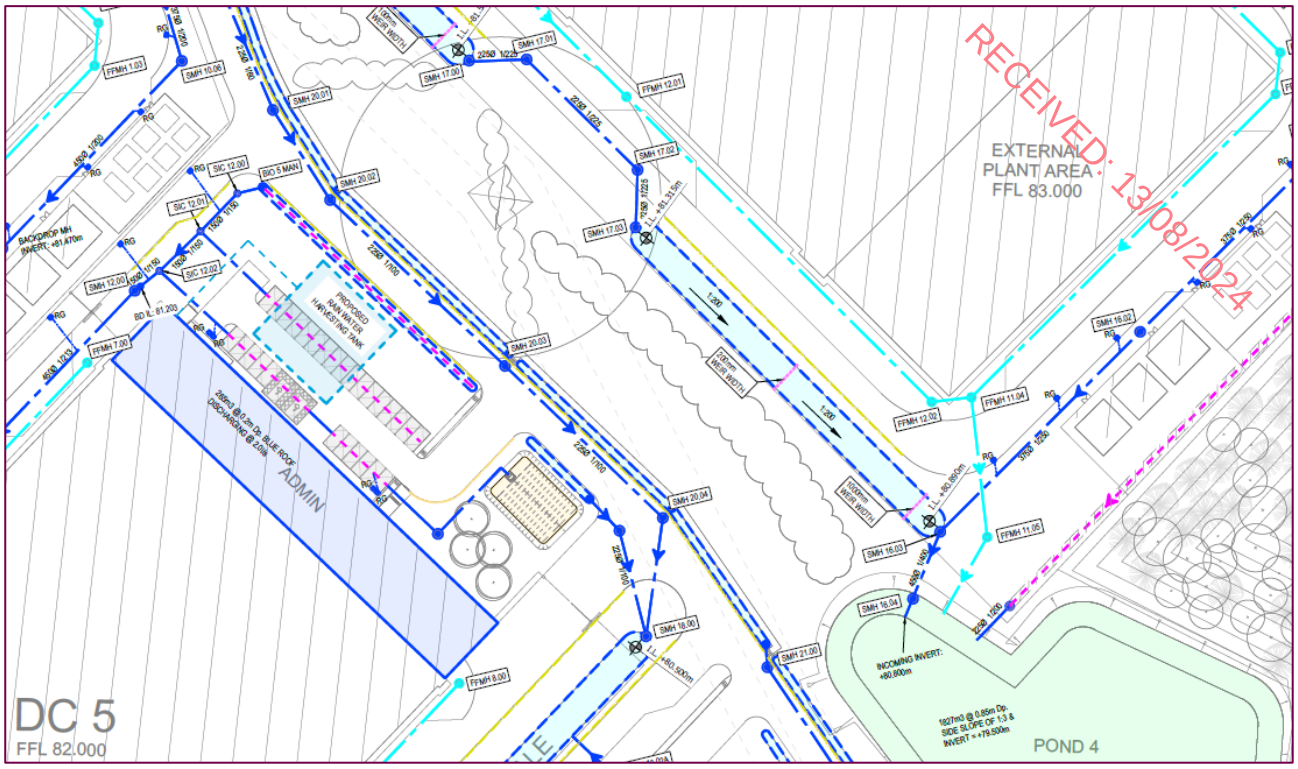

Figure 4.15: Proposed Surface Water Drainage

Detailed proposed surface water drainage design drawings for the Project site are included in Volume III.

4.2.6.2 Foul Water Drainage

The proposed foul strategy will be to provide a new foul drainage network to collect effluent from the new the Project via a local piped network. Each Data Centre building shall be served by its own local foul drainage network which conveys flows to a main gravity line discharging to a pumping station located on the site.

There are two proposed foul drainage catchments on the proposed site. Data Centres 1,2 and 3 and the adjacent Substation (Catchment 1) shall discharge to a pumping station located to the west of the site while Data Centres 4, 5 and 6 and the AGI building (Catchment 2) shall discharge to a pumping station at the Eastern portion of the site.

Foul effluent will be pumped via two separate rising mains (one from each pumping station), crossing agricultural lands located south of the Bluebell Stream to discharge to the main public foul drainage network which is located along the L2030 via a stand-off manhole.

The proposed foul network has been designed in accordance with the principles and methods set out in Irish Water's Code of Practice for Wastewater Infrastructure IW-CDS-5030-03 (Revision 1 – December 2017), IS EN 752 Drain & Sewer Systems outside Buildings, IS EN 12056 Gravity Drainage Systems inside Buildings and the Building Regulations Technical Guidance Document Part H Drainage & Wastewater.

The proposed foul network shall convey effluent generated on the site as follows:

- Domestic activities on the site from the estimated workforce of approximately 400 persons.
- The network will receive an amount of "blow-down" water generated by the cooling system processes within each data centre. This volume of water is generated primarily during peak summer weather periods. A full breakdown of the expected blow-down water generated by this process is included in Appendix H as part of the foul drainage calculations.
- The foul system has been designed to facilitate a potential discharge generated by the activation of a sprinkler system in each data hall. The available foul pump station storage has been sized based on the water runoff from a fire event (400m3 per data hall).

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4.2.6.3 Water Supply for Cooling

The proposed cooling system for the Data Centre buildings is based on direct air cooling, which will be used for over 90% of the year. During the remaining period, water may be needed to trim the cooling temperatures within the data halls by use of adiabatic cooling techniques.

At peak, during usually a couple of weeks in the summer, elevated amounts of water are required. To mitigate this demand, it is intended to provide significant amounts of underground tanked water storage to each building to provide for at least 48 hours of peak day cooling requirement.

Rainwater harvesting with extensive underground harvesting tanks of approximately 100m3 per Data Centre building are proposed to avoid reliance on mains supply water for mechanical cooling. Blue roofs are proposed for the administration wings of each Data Centre block which will collect up to two-thirds of precipitation on each Data Centre building roof.

A minimum of 1 year water storage is provided on site for the adiabatic cooling top-up and storage top-up from on-site ponds if required.

4.2.7 Telecommunications and Data Connections

The Project site is comprehensively served from a fibre and telecoms perspective, providing the opportunity for a straightforward and secure fibre and telecoms connection, whilst also limiting the works and associated impacts of the same.

It is proposed there will be three telecommunications points of entry to the site. These locations will be 1) at the main site entrance, 2) at the emergency site entrance located to the south corner of the site via the M7 Business Park and lastly, 3) via a connection opposite the Osberstown Business Park.

4.2.8 Site Access Overview

The main site access (vehicular and pedestrian) will be via a new access onto the R409 road with a secondary emergency access provided from the M7 Business Park to the south. As part of the R409 improvement works, a new footpath, cycleway and bus layby is proposed to the southern side of the R409. This access will be extended across the R409 bridge over the M7 motorway and link up to the existing footway to the eastern side of the bridge. Figure 4.16 below illustrates the proposed access arrangement on the R409 road.

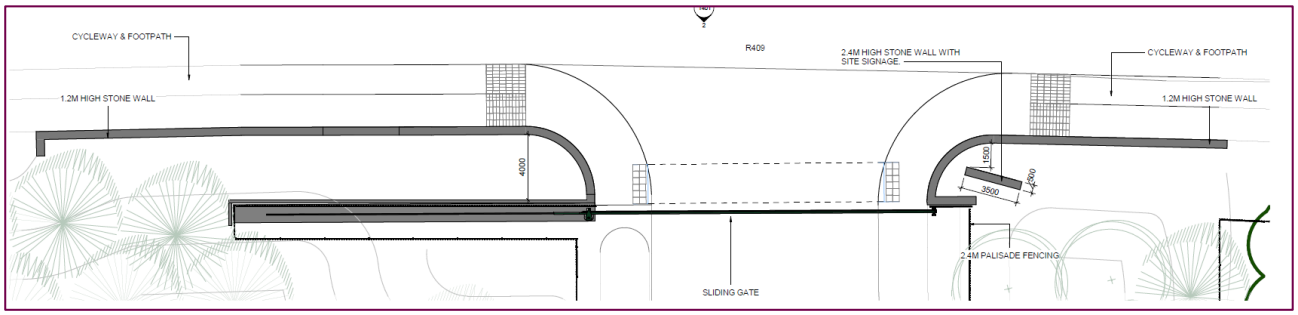

Figure 4.16: Proposed Site Access onto R409

4.2.8.1 Proposed R409 Works

The R409 along the northern boundary of the site has no existing pedestrian or cyclist infrastructure. Footways are provided on both sides of the R409 approximately 100m east of the M7 boundary of the site, which then connects to a network of pedestrian and cycle ways travelling along the R409 and R445 Millennium Park Road towards the town of Naas and surrounding commercial areas respectively.

Engagement with KCC resulted in proposals for an extension of the existing pedestrian and cyclist infrastructure along the south side of the R409 from the east of the M7 bridge crossing; these works comprised of the following

- Transition of the existing cycle path and footpath to a single 2.0m wide ‘off-road’ shared surface

- The 2.0m shared surface crossing the bridge structure shall transition to a separated 1.8m off road cycle path and 2.0m footpath on the west side of the bridge once clear of the existing traffic barrier restrictions. This arrangement shall continue along the R409 for the extent of the Project boundary.
- Allowance for a 3.0m wide bus stop carriageway where the proposed cycle track shall transition to a 1.8m 'on-road' arrangement for the extent of the bus stop as indicated below.
- Shared surface shall be proposed at the main site entrance to facilitate all Vulnerable Road Users (VRU's) travelling to and from the site.
- Public lighting.
- New roadside drainage to be provided along the southern section of the road where new kerbs are to be installed.

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Figures 4.18 – 4.20 illustrate the extent of the proposed R409 works.

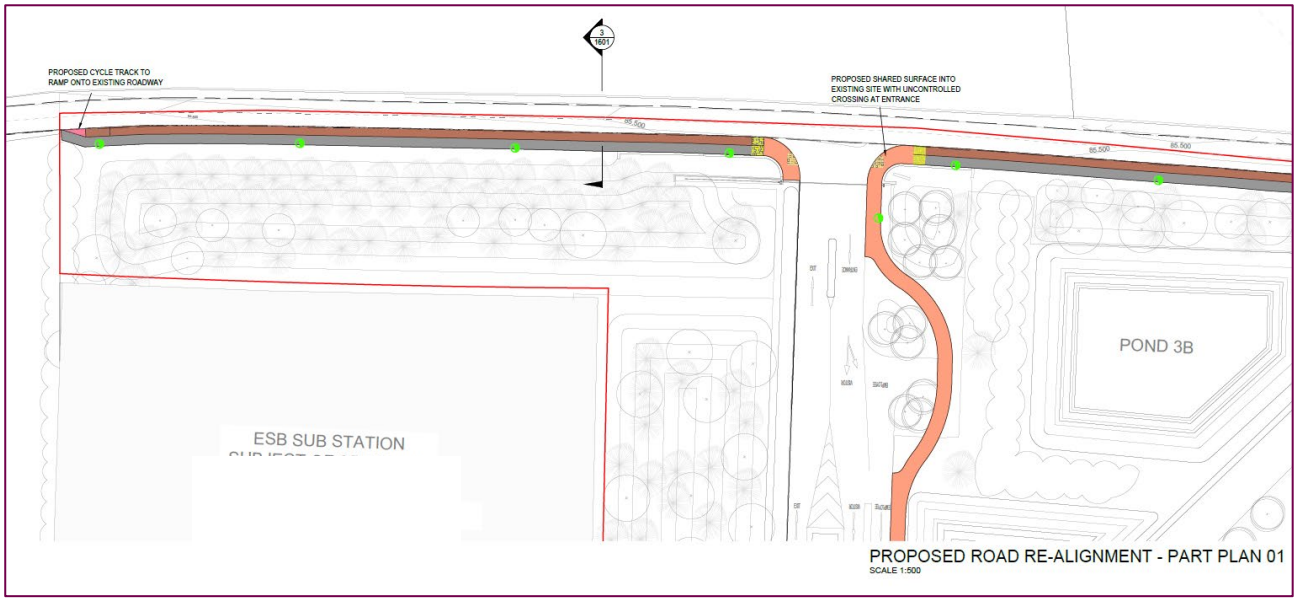

Figure 4.17: Extent of Proposed R409 Works

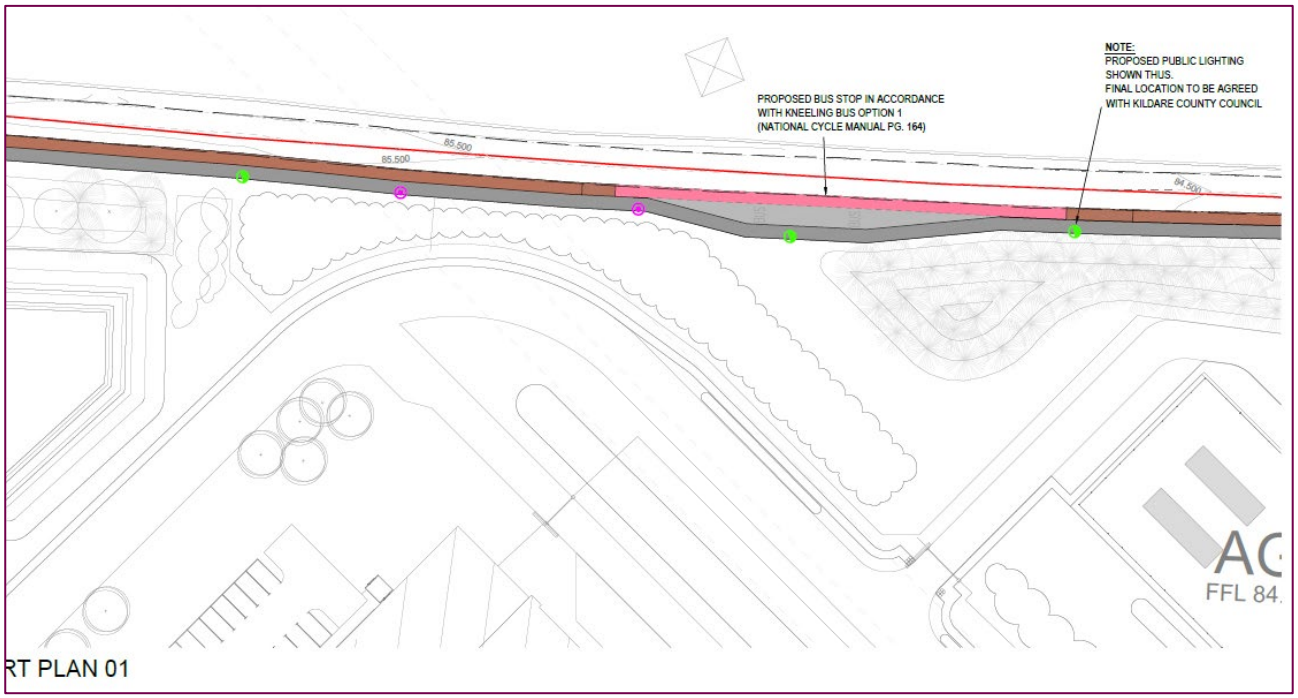

Figure 4.18: Extent of Proposed R409 Works

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Figure 4.19: Extent of Proposed R409 Works

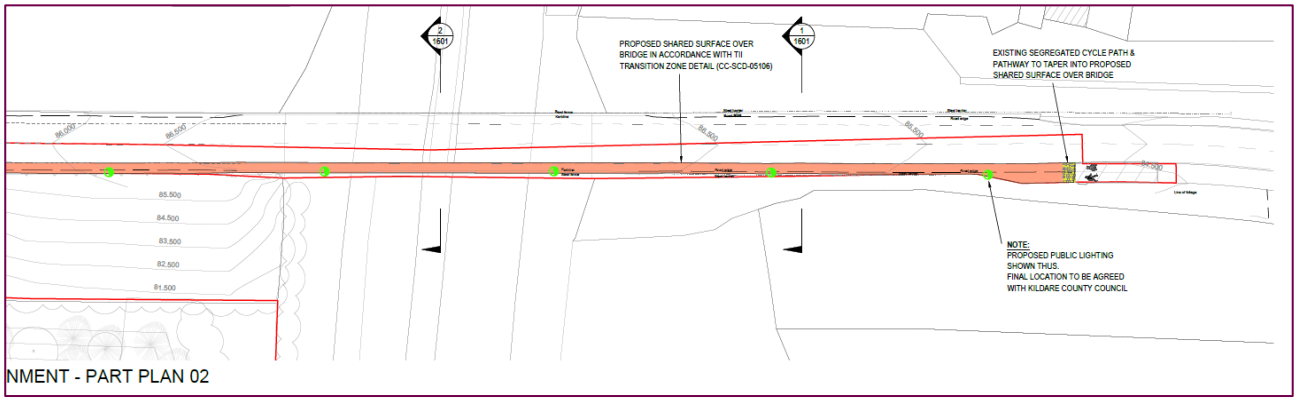

Figure 4.20: Extent of Proposed R409 Works

4.2.8.2 Internal Access Roads

The internal roads within the development are to remain private and will be maintained by the Data Centre management company. The internal road network is comprised of a 7.5m wide main campus road with 5.5m one-way roads provided around each Data Centre Building.

Autotrack analysis has been undertaken for the site access road and the internal roads. Road arrangements have been provided at the security entrance so that there is no queuing of vehicles onto the R409 and so that any rejected traffic (including HGV's) can safely turn and exist the site without blocking or causing a road safety issue on the R409.

Internal access road with separate pedestrian footpath, provide a safe and uncomplicated access to building within the site. Car parking is located to the front of the Data Centre building for all visitors and staff arriving by car; separate pedestrian and cycle access is also provided for each Data Centre building.

A separate vehicular access to the rear of each Data Centre will be provided for HGV's and service vehicles only. This will be accessed through additional gates.

An emergency entrance is located to the south east corner of the site entered through the M7 Business Park. This connection will be over the existing Bluebell Stream and will be provided with a security gate which will be permanently closed except in emergency circumstances. A turning head has been provided for security to be able to patrol this part of the site. This access has been designed to accommodate the manoeuvring of all relevant permanent and maintenance vehicles including cranes.

4.2.8.3 Car Parking

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Car parking has been provided based on the staffing levels anticipated for each Data Centre and the administration building.

A total of 210 no. car parking spaces, comprising of 63 electric car charging spaces and 14 disabled car parking spaces, are proposed.

Of the 210 total, each of the 6 Data Centre buildings will have 30 car parking spaces (total) and the administration building will also have 30 car parking spaces.

A total number of 104 bicycle spaces (16 per each of the 6 Data Centre buildings and 8 for the administration workshop) are also proposed.

Figure 4.21 below illustrates the proposed car parking arrangements for Data Centre 1 as an example; this is replicated for each of the remaining Data Centres.

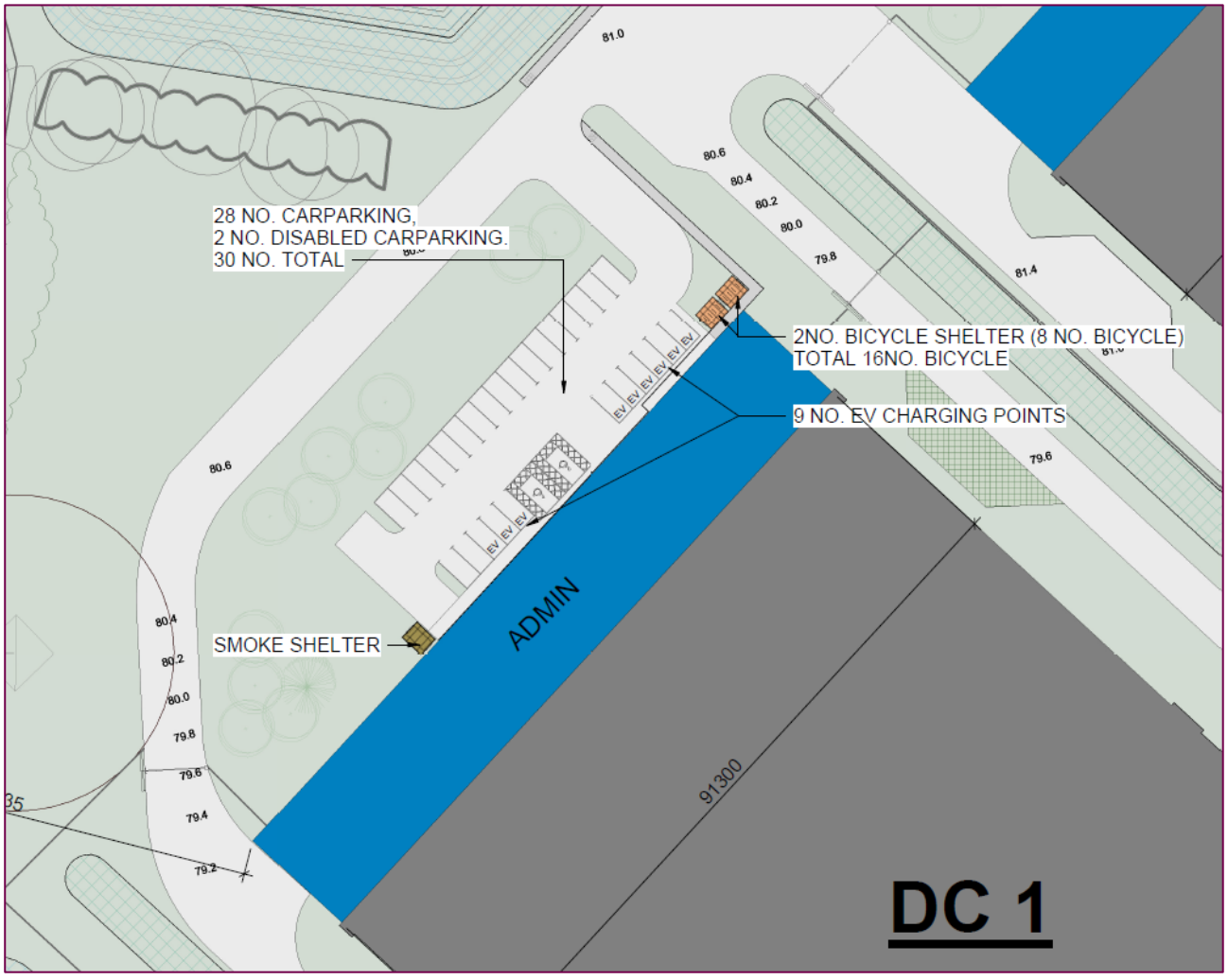

Figure 4.21: Proposed Car Parking Arrangement

4.2.8.4 Sustainable Travel Provision

Bicycle shelters will be located in the vicinity of each Data Centre and at the Admin Workshop Area. A total of 104 bicycle spaces are provided throughout the site; this figure is in line with consultation undertaken with KCC Roads Planning department.

Cycle provision is proposed as follows:

- 16 adjacent to the entrance of each Data Centre

- 8 adjacent to the entrance of the Admin Workshop

A Mobility Management Plan (MMP) and Transport Assessment have been prepared in support of the Project and are provided in Volume II, Appendix 4.2 L and 12.1 respectively.

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4.2.8.5 Temporary Construction Access

A temporary construction entrance will be created on the R409, approximately 120m west of the Osberstown industrial park entrance (to the north of the R409). This entrance will be used for the construction of Phases 1 and 2 of the Project. The access has been designed to accommodate vehicles up to and including larger cranes with sightlines drawn at 160m due to the R409 stated as an 80km/h road.

The proposed temporary access will provide direct access to the construction compound which will be located within the site boundary, in the north east corner of the site.

Upon completion of Phase 1 and 2 construction works, the temporary access will be closed and the proposed landscaping works implemented to provide screening at the location of the Project.

A Construction Traffic Management Plan is provided in Volume II, Appendix 4.6.

4.2.9 Lighting and Security

The Project will operate as a 'Dark Site' where minimal lighting is only used when required in order to avoid *light spill* beyond the site boundary and disturbance of wildlife.

New external lighting will be provided to the following areas:

- Internal site access roads
- Car parks (at Data Centres and ancillary buildings)
- Site security lighting (including emergency escape lighting)

Impact of proposed lighting is minimised by the use of the following: luminaires with good optical distribution, use of glare shields, selecting suitable luminaire height, dimmable light source, good lighting control and by switching the light off for a period (post curfew).

Lighting systems in areas covered by CCTV cameras will be designed and installed to facilitate high-definition images recorded by the video surveillance system. Perimeter lighting will be provided along the full boundary of the site. This will be triggered by movement detections covering the complete perimeter.

A Lighting Assessment Report is provided in Volume II, Appendix 4.4. A separate lighting assessment, relevant to proposed works on the R409, as outlined in section 4.2.8.1, is provided in Sabre Electrical Lighting Design for R409, Volume II, Appendix 4.2 I.

4.3 External Boundary Treatments and Landscaping

The existing external boundary trees and hedgerows will be retained, protected and augmented with additional native tree and hedge planting where necessary.

Around the eastern boundary of the site to the M7, there will be a 30m wide landscape buffer provided. On other boundaries a minimum 10m buffer will be provided, which will allow for earth mounding and native, screen woodland planting to be provided to help integrate the development into the landscape, mitigate visual effects and increase site biodiversity. The principal elements of the landscape design approach will include the following measures:

- Provision of temporary fencing during construction in accordance with BS5837: 2012 for the protection of all trees, hedgerows and vegetation to the perimeter of the site;
- Retention and utilisation of subsoil and topsoil for the creation of landscape mounding, up to 6.5m high, to
- the site boundary with the M7 and for reinstatement of disturbed landscape areas;
- Provision of security fencing, approx. 2.4m high with native hedge planting to boundaries;
- Provision of mixed, native woodland planting, including evergreen and deciduous tree species, planted to the perimeter landscape buffer and mounding

- Internal landscape areas will include SuDS features include detention/attenuation basins, swales, biofiltration planters and permeable paving integrated with suitable landscape planting and seeding including native grassland meadows; and,
- Planting and grassland management will follow the All-Ireland Pollinator Plan and Guidance documents, helping to increase site biodiversity, with a maintenance programme for the woodland screen planting to ensure establishment.

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Figure 4.22 below provides an example of the landscape treatment for eastern portion and (part of) the eastern site boundary with the M7, adjacent to Data Centres 4 and 6.

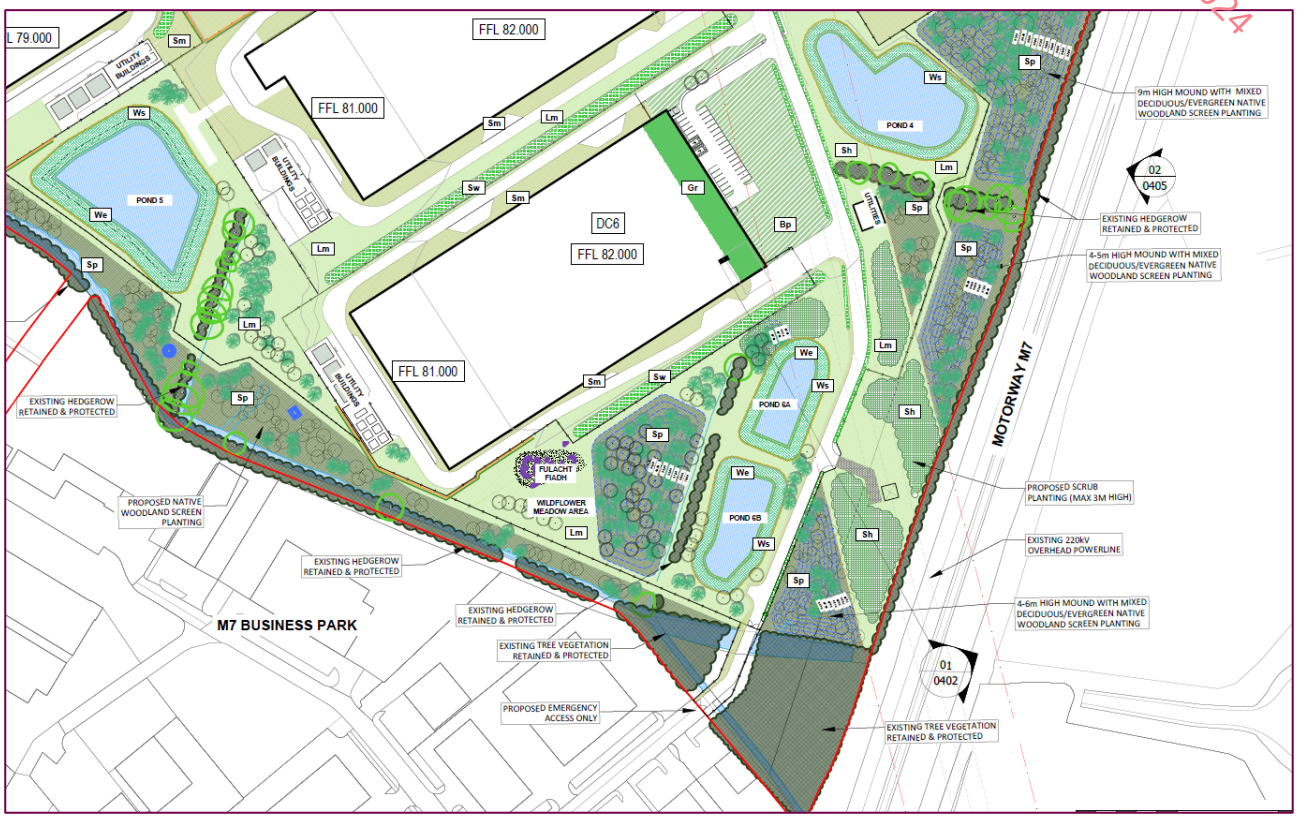

Figure 4.22: Landscape Treatment Within Eastern Portion of the Site

Figure 4.23 below illustrates a cross section of the proposed landscape treatment, including earth mound and structural screen woodland planting, relative to the eastern boundary with the M7.

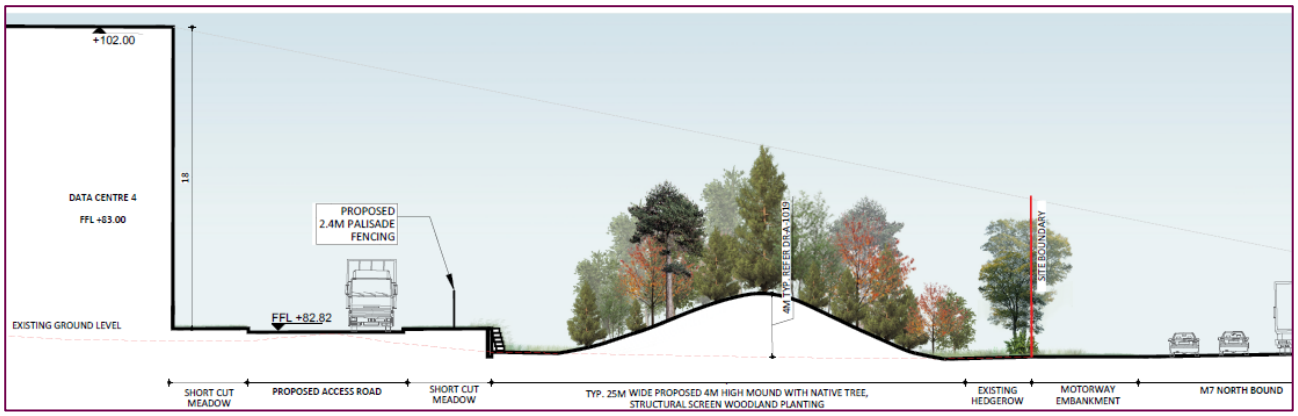

Figure 4.23: Cross Section of Landscape Treatment to Eastern Boundary

Figure 4.24 provides an elevational view of the proposed landscape treatment, looking westwards from outside of the site, from the M7.

Figure 4.24: Elevational View of Eastern Boundary Landscape Treatment

A Landscape Statement and Tree Survey and Arboricultural Impact Assessment Report are provided in Volume II, Appendix 11.1 and 11.2 respectively.

4.4 Construction Phase Overview

A number of technical documents are provided as appendices in Volume II in respect of the construction phase of the Project including the following:

- Appendix 4.1 Data Centre Application - Architectural Design Statement
- Appendix 4.2 Data Centre Application - Planning Engineering Report
- Appendix 4.3 Cut and Fill Analysis Report
- Appendix 4.5 Construction Environmental Management Plan
- Appendix 4.6 Construction Traffic Management Plan
- Appendix 4.7 Resource and Waste Management Plan
- Appendix 4.11 Substation Application – Architectural Design Statement
- Appendix 4.12 Substation Application – Planning Engineering Report
- Appendix 4.13 110kV Grid Substation and Transmission Line Report

4.4.1 Project Phasing

Site phasing is proposed for the construction of the Data Centres and ancillary buildings over 3 Phases, with individual elements constructed as summarised:

- Existing trees/hedgerows that are to be retained will be protected
- Prior to the commencement of any work, or any materials being brought on site, existing trees to be retained are to be protected with temporary fencing.
- Phase 1 includes Data Centre 1 and 2, the AGI compound, District Heating building, Admin Workshop, Water Treatment Plant, Security House and the main road network through the site.
- Phase 1 also includes Pond 1, 2, 3A and 3B and landscaping surrounding Data Centre 1 and 2, AGI compound and planting along the boundaries of the site.
- The GIS substation located in the north of the site and partial undergrounding of EirGrid's 110kV overhead lines will also be completed in Phase 1.
- Phase 2 will include the construction of Data Centre 3 and 5 and the District Heating Building.
- Phase 2 also includes landscaping surrounding Data Centre 3 and 5 and their roads. Pond 5 will also be constructed in Phase 2.
- Phase 3 will include Data Centre 4 and 6, their roads and surrounding landscaping.
- Phase 3 will also include ponds 4, 6A and 6B

Figure 4.25 illustrates the relevant construction phases of the Project.

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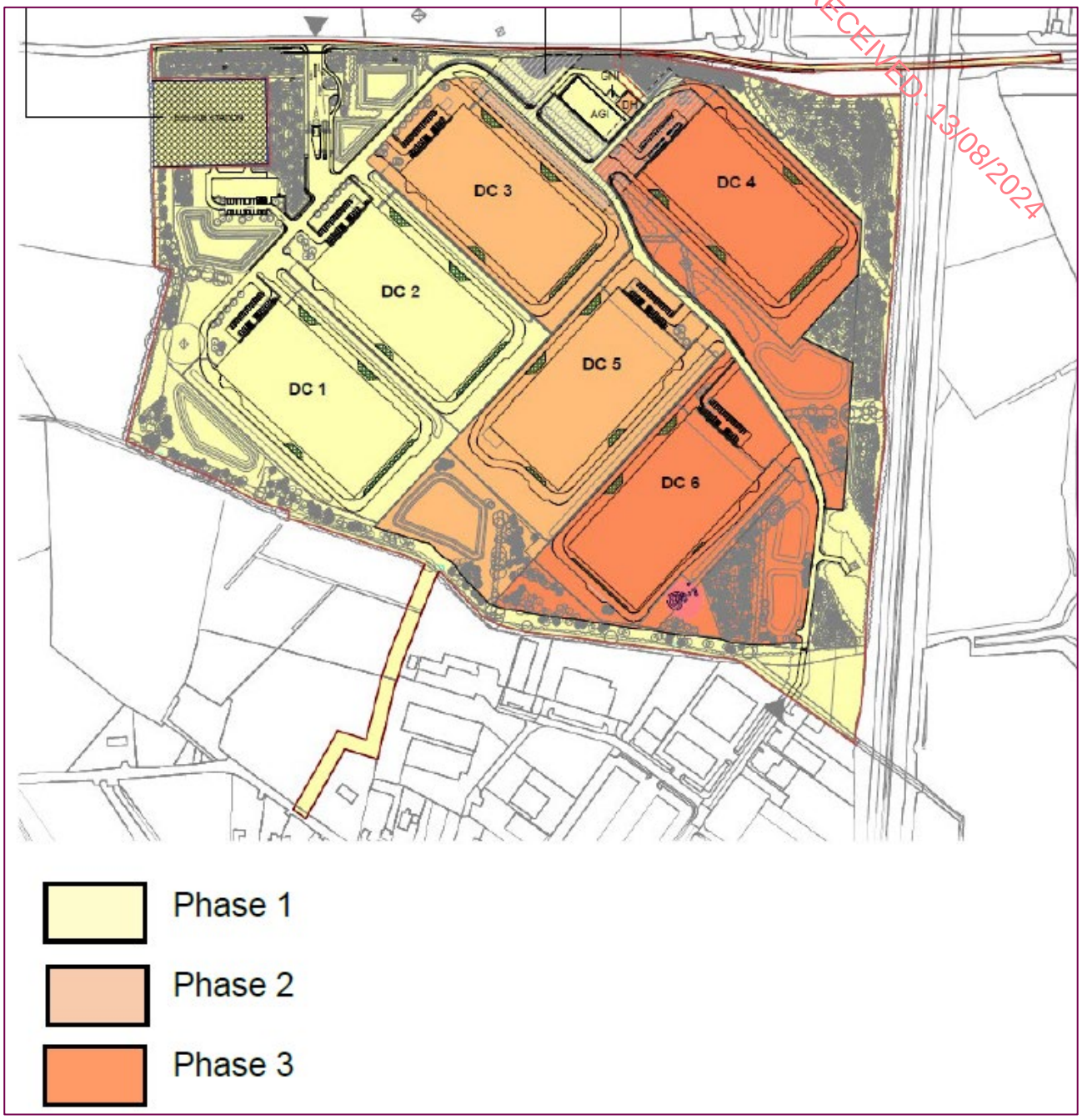

Figure 4.25: Project Construction Phasing

The proposed construction programme is an estimated 8 years and 9 months. Table 4.1 below provides an indicative construction phase programme for key milestones. A commencement date of January 2025 has been presented, serving as an indicative start date in order to illustrate the construction milestones. A final commencement date will be subject to the timescales for the Project in obtaining all necessary consents.

Table 4.1: Construction Key Milestones (Indicative)

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Phases	Construction Programme	Start Date	End Date
HERBATA DATA CAMPUS OVERALL CONSTRUCTION PROGRAMMEME		08/01/2025	27/03/2033
Phase 1	Enabling Works Overall Construction Programme	08/01/2025	27/07/2025
	ESB Substation Overall Construction Programme	01/06/2025	28/03/2026
	AGI Building Overall Construction Programme	01/06/2025	28/07/2026
	DC 1 Overall Construction Programme	01/06/2025	17/07/2027
	R409 Road Improvement works that include the cycle lane, pedestrian walkway to both sides of the road.	08/12/2026	17/07/2027
	DC 2 Overall Construction Programme	16/07/2026	01/09/2028
Phase 2	DC 3 Overall Construction Programme	31/08/2027	16/10/2029
	DC 5 Overall Construction Programme	15/10/2028	30/11/2030
Phase 3	Construct Secondary Construction Compound around the site and remove the existing construction carpark	05/10/2030	30/01/2031
	DC 6 Overall Construction Programme	27/11/2029	13/07/2032
	DC 4 Overall Construction Programme	11/01/2031	27/08/2033
	Site Wide Works Overall Construction Programme	01/03/2032	27/09/2033

4.4.2 Construction Phase – Access, Compound and Car Parking

The proposed temporary access from the R409 will provide direct access to the construction compound which will be located within the site boundary, in the north east corner of the site. Figure 4.26 below indicates the location of the construction phase welfare facilities, site parking and material storage.

The construction compound for Phases 1 and 2 will be located within the site boundary, in the north east corner of the site; an average of 350 construction parking spaces will be required to be available for site during peak construction periods. The GIS substation will be constructed as part of Phase 1 as it is a critical element in the operation of the Data Centre buildings.

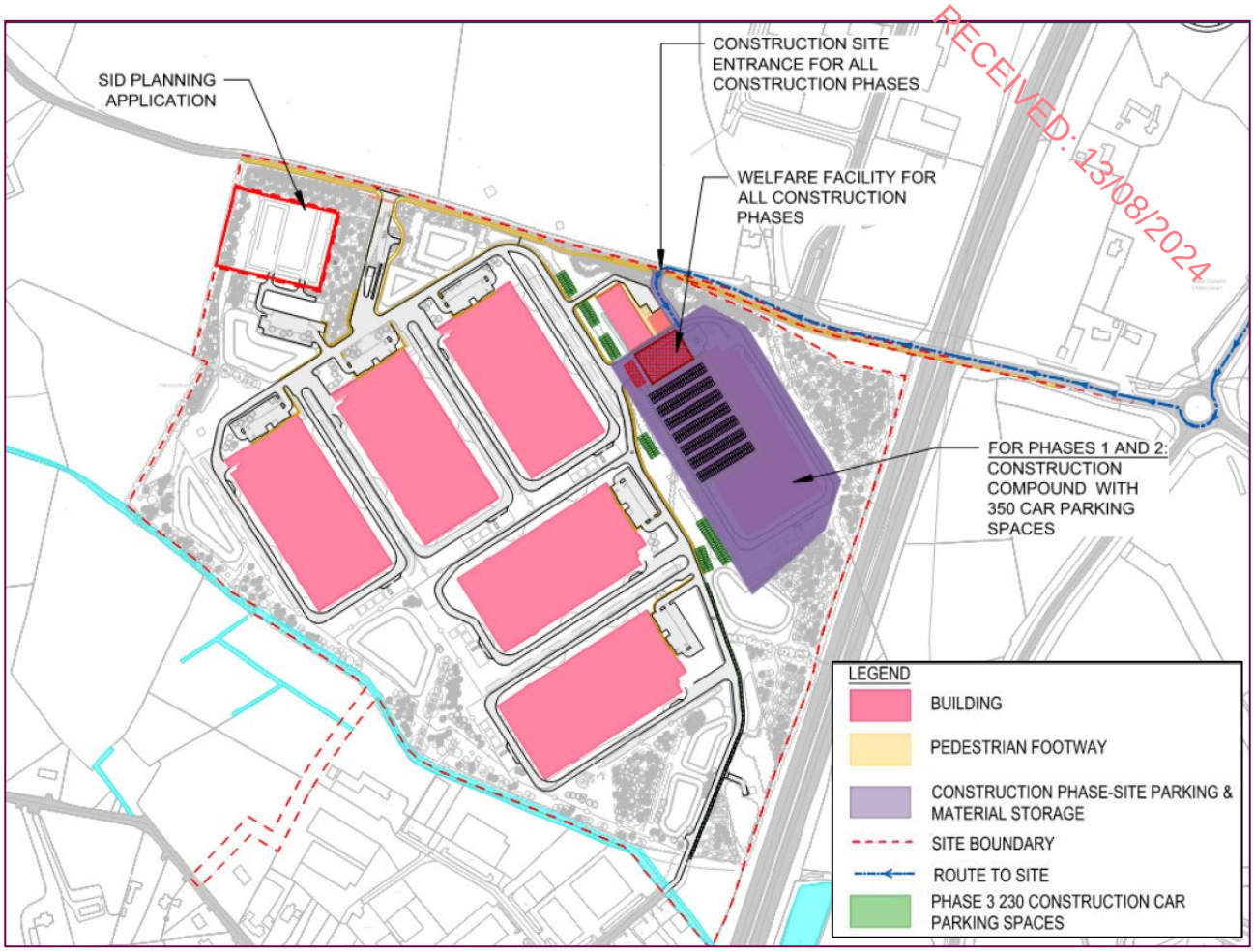

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Figure 4.26: Construction Phase Layout

During Phase 3, the welfare facility shall remain in place whilst to accommodate the construction of Data Centre 4, construction car parking shall be distributed over the site in strategic locations, in order to avoid disrupting the operations of the Data Centre buildings constructed in Phases 1 and 2.

A reduced number of 230 construction parking spaces will be provided during Phase 3 with a reduced requirement for material storage space and no earthworks.

4.4.3 Site Preparation and Earthworks

The existing dwellings and agricultural buildings, on this site will require demolition. Demolition will be undertaken using mechanical plant and craneage. During 10-week process licensed waste carriers will deliver and collect waste skips. Following completion of soft internal strip, the dwelling will be demolished and crushed to be reused in the piling phase reducing the number of vehicles accessing the site. Any additional waste will be loaded into tipper lorries and removed from site.

The site will then be cut and filled to levels and the site compound is to be erected with the temporary compound area noted in Section 4.4.2. The site will then be cut and filled to levels and the site compound is to be erected

Site access roads, gate and layby areas are to be installed to allow access to the site and the site compound.

4.4.4 Vegetation Clearance

Clearance of vegetation on site shall be undertaken strictly in line with the provisions of the Tree Survey and Arboricultural Impact Assessment Report, associated Tree Removal, Retention and Protection Plans and mitigation measures contained within Chapter 5 of the EIAR. The felling of and pruning of trees will be undertaken by professional tree surgeons working to BS 3998 (2010) Tree Work – Recommendations.

Timber grade material from the felled trees will be processed into planks, beams, hurleys etc. All lower grade woody material arising from the clearance works should be disposed of at an appropriate green waste facility or recycled for use on the project (woodchip mulch for new planting areas for example).

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4.4.5 Substation and 110kV Relocation Works

The GIS substation located in the north of the site and partial undergrounding of EirGrid's 110kV overhead lines will be subject of a separate Strategic Infrastructure Development (SID) planning application to An Bord Pleanála as it involves changes to electricity transmission. The GIS substation will be constructed as part of Phase 1 as it is a critical element in the operation of the Data Centre buildings.

4.4.6 Material Delivery and Storage

An onsite holding area will be provided to prevent construction vehicles waiting on R409 Road or blocking the private road from access by the other businesses using this access. All deliveries will be met on site by a representative of the delivery initiating organisation to ensure the vehicle is removed from the road and unloaded / loaded in an efficient manner in compliance with the agreed delivery protocols.

In all cases, access/egress for delivery and removal of materials will be planned, scheduled, and coordinated by the Contractor and all vehicle movement both on and around the site will be controlled by competent and certified banksman. A 'booking in' system will be implemented for all deliveries to ensure traffic movements are fully controlled.

Plant and materials will be stored in designated areas inside the boundary of the site in accordance with the manufacturer's instructions and delivered to site on a *just-in-time* basis to keep storage to the lowest levels reasonably possible. Storage of materials on site during Phase 3 will be kept to a minimum.

A Construction Traffic Management Plan is provided in Volume II, Appendix 4.6.

4.5 Data Centre Block Construction Overview

Each Data Centre will generally be constructed in line with the following methodology:

4.5.1 Piling and Excavation

The pile mat is to be constructed by the demolition contractor having reused the crushed materials from the demolition process. Additional imported hardcore is to be required and laid down to create a piling mat. Bored piles are to be installed for the foundations to support the new buildings.

The ground floor concrete base will allow construction to proceed with no new excavation required.

4.5.2 Sub-structure

Several cranes will be installed at the beginning of this phase which will not require temporary weekend road closure of the R409 and are to be erected during construction operation times.

The ground floor slab and core will be formed of concrete and therefore, concrete mixer trucks will be the primary vehicle accessing the site during this stage of construction. Lorries will be off loaded from a loading area within the site. A banksman will control the movement of vehicles, pedestrians, and cyclists when lorries are accessing and egressing the site.

4.5.3 Super-Structure

The frame will be built using standard hot rolled steel girders tied into steel columns and the flooring will be metal deck slab with concrete. The girders will be brought by lorry to the site and loaded from the loading area in the site. The metal decks will also be brought to site by lorry.

Using large, remanufactured components, the number of vehicles accessing the site will be reduced significantly.

4.5.4 Cladding

The design of the façade requires external access to all elevations. The strategy will be to have a minimum reliance on the crane to enable the crane to be servicing the construction of the steel and concrete slabs. The only crane dependent activity will be to lift large façade panels in position. The deliveries will be made out of hours as there will be no immediate demand for the supplies.

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4.5.5 Fit Out, Testing and Commissioning

Typical procurement routes using off the shelf materials and construction in situ will not suit the delivery programme of this project. Components with a precise fit and finish will be manufactured off site to ensure the quality and programme sequencing objectives are achieved.

This will reduce the number of small vehicle and ad-hoc deliveries required. Bathrooms, balconies and railing and mechanical, electrical, and plumbing equipment are all expected to be manufactured and assembled offsite and brought to the site to be installed as a complete unit.

4.5.6 Electrical Supply

As detailed in Section 4.2.4, the Project is intended to use on site gas turbines for the majority of the power generation requirements, a direct connection to the grid will also be provided. The connection will primarily be for export purposes with infrequent import of power in a limited quantity.

The existing 110kV transmission line which extends across the site to the northwest corner will be rerouted underground to allow for the development of a GIS Substation on site.

4.6 Landscaping and Ecological Mitigation

There are several natural features on the site, including existing hedgerows and trees which will be retained where possible. The Bluebell Stream runs along the south of the site, along with existing shrubbery and trees and a 10 m riparian buffer zone is proposed here to protect the existing ecology.

The Project provides for a setback of the building line of approximately 51m from the motorway at the external plant yard of Data Centre 4. However, the actual building stands at approximately 77m from the site boundary. This is consistent with existing development in the area and fully protects potential development of the motorway network. To block views from the motorway, several high mounds are proposed ranging from 2-4 m in height. These will have native woodland planting to act as visual and noise buffers from the motorway. A 40m landscaped zone is proposed along the eastern boundary to aid in screening the development from the M7 Motorway. The retention of existing hedgerows, high mounds and native woodland planting are also proposed along the northern boundary to create a buffer from the R409.

Bat houses and bat boxes are proposed throughout the site to protect and preserve existing bat populations in the area. Demolition of the agricultural buildings to the centre of the site which have been confirmed as a bat roost, shall be undertaken as set out in Section 4.4.3 and in line with mitigation measures as set out in Chapter 5 of the EIAR. Typical bat house designs are illustrated in Figure 4.27 below.

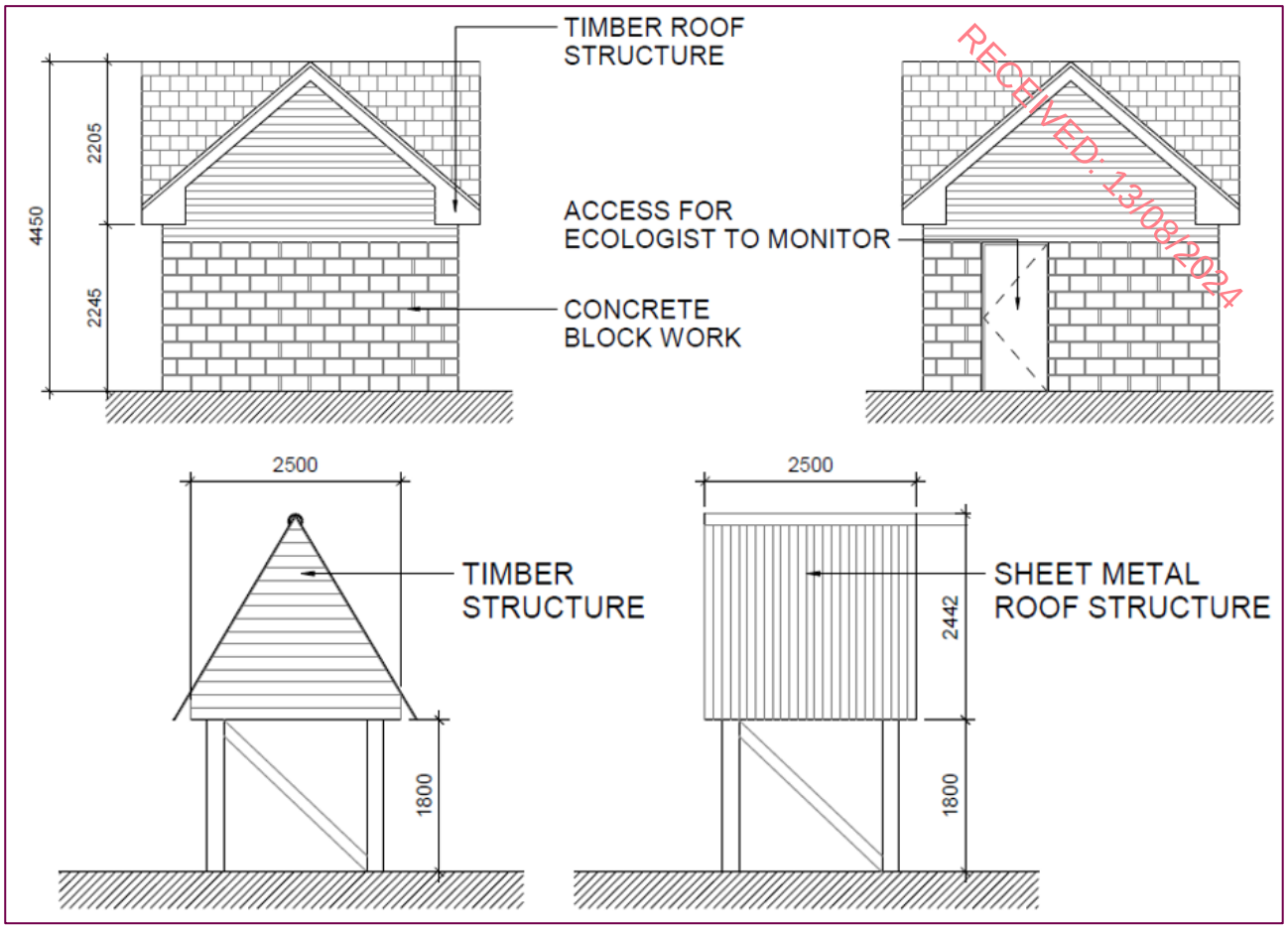

Figure 4.27: Typical Bat House Designs (Elevations) (Extract from Drawing 22217-RKD-ZZ-ZZ-DR-A-1402, Volume III)

Clearance of vegetation on site shall also be undertaken strictly in line with the provisions of the Tree Survey and Arboricultural Impact Assessment Report, associated Tree Removal, Retention and Protection Plans.

The site will operate as a 'Dark Site' where minimal lighting is only used when required so as to not disturb any wildlife on the site. A Lighting Assessment Report is provided in Volume II, Appendix 4.4. A separate lighting assessment, relevant to proposed works on the R409, as outlined in section 4.2.8.1, is provided in Volume II, Appendix 4.2 I.

4.7 Decommissioning

Planning consent for the Project is being sought on the basis that the development will be permanent. In the event that the Project would be required to be decommissioned, all associated structures and materials would be recovered and items recycled with the site returned to its original use as far as conceivably possible. Decommissioning impacts will be the same or lesser than the impact of construction as assessed within the EIAR.

4.8 Need for the Project

4.8.1 Data Centre Need

There continues to be a significant need for Data Centres in Ireland to support both business and social activities, with many large, United States based clients headquartered in Dublin for their European operations. The Irish Government *Statement on The Role of Data Centres in Irelands Enterprise Strategy* (July 2022) sets out how the *twin transitions* of digitisation and decarbonisation of the economy and society will be achieved and the necessary role Data Centres will play as *core digital infrastructure… indispensable…in our economy and society.* The Statement recognises that Data Centres are intrinsic part of almost all aspects of our lives.

Whilst *demand* and *need* are clearly apparent, it is acknowledged that concerns existing around power security in Ireland and a general requirement to reduce the use of resources, (including both power and water), with potentially, neither being available for new Data Centre developments.

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Herbata Ltd have appointed an experienced team of architectural, civil, electrical, and mechanical consultants, along with planning and environmental consultants to assist in achieving the vision of a world class Data Centre campus meeting the challenges of demand for the service whilst addressing the issue of energy sustainability. The Project seeks to become Ireland's first non-power grid dependent Data Centre campus utilising renewable, efficient technologies to support an IT load of 180MW.

Herbata Ltd have identified the opportunity in the market and have secured the subject site which is considered suitable to meet these needs and challenges.

4.8.2 Harnessing Digital – The Digital Ireland Framework

In February 2022, the Irish Government published *Harnessing Digital – The Digital Ireland Framework* which sets out pathway to support Ireland's ambition to be *a digital leader at the heart of European and global digital developments.* The Framework recognises the power of digital to deal with challenges such as climate, inclusivity and enhanced productivity.

The Framework contends that Ireland will play a key role in advancing the goal of *successful transformation of Europe by 2030 and for the Union to be digitally sovereign in an open and connected works.* Furthermore, the Framework recognises the strong capabilities and presence of global enterprises within Ireland already and the unique role the country has as a bridge between the United States and European Union.

Whilst emphasising the benefits and opportunities of the digital transition, the Framework also recognises the need for a *strong, coherent and stable digital regulatory framework.*

The Framework seeks alignment with the EU's Digital Decade to 2030, referencing the four dimensions of the *Digital Compass* which are as follows:

1. Digital Transformation of Business
2. Digital Infrastructure
3. Skills
4. Digitisation of Public Services

The Framework recognises the role of Data Centres as '*a core infrastructure enabler of a technology-rich, innovative economy, which makes Ireland a location of choice for a broad range of sectors and value-added activities, such as business collaboration, online commerce, banking, and supply chain management.'*

4.8.3 Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy

In July 2022, the Irish Government published the *Statement on The Role of Data Centres in Irelands Enterprise Strategy* which sets out how the *twin transitions* of digitisation and decarbonisation of the economy and society, will be achieved in respect of Data Centres.

The Statement recognises the critical nature of Data Centres in all aspects of the economy and society, stating that they are *core digital infrastructure and play an indispensable role …* and *provide the foundation for almost all aspects of our social and work lives, including video calling, messaging and apps, retail, banking, travel, media and public services delivery such as healthcare and welfare.*

Whilst recognising the significance of Data Centres, the Statement also recognises the limitations around capacity for further Data Centre development with regards to the energy sector and need to decarbonise the same.

The Project represents delivery of digital infrastructure which is an essential part in the realisation of the ambitions set out at European and national level, to achieve Irelands digital transition.

4.8.4 Business Environment

Ireland's positioning for attracting Data Centres in the face of internal competition is largely focused on the key requirements of the sector namely: skilled workforce; climate; advanced infrastructure and renewable energy sources. Ireland meets the industries requirements.

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4.8.5 Proximity to Key Markets

Ireland as a Member State of the European Union is subject to all the privileges of EU membership and the only native English-speaking country in the EU. Ireland, therefore, provides access to the largest single marketplace in the world. Ireland is also strategically located between the US and Europe, which makes it an ideal connection point for communications and data transmission. Equally, many multinational organisations require access to multiple platforms from multiple providers for their day-to-day operations to function successfully. The ability to access these quickly and securely provides significant advantages.

4.8.6 Availability of Infrastructure

Ireland has one of the most robust, reliable and stable grid systems in Europe. It has a predictable repeatable load profile for a developed country, showing a reduction by night and peaks during the working day. Eirgrid's All-Island Generation Capacity Statement report to 2026 indicates that during the day the average load factor is approximately 4.4 GW. The same report highlighted that there is currently capacity on the system for more than 10 GW with further capacity increases being facilitated initially under EirGrid's 'Grid25' plan.

In addition, Ireland has an abundance of renewable energy sources including wind, to meet energy demands of Data Centres which are increasingly looking to renewable energy sources for their operations. Another key factor in Ireland's favour is the broad array of choices for transatlantic connectivity, as well as direct access to the UK and Europe.

The Hibernia Atlantic provides high capacity subsea cable access from Ireland to the US, while the Emerald express, the largest low latency network across the Atlantic, links Ireland to Long Island/New York. Connectivity from Ireland to the UK and Europe is currently supported by 14 undersea fibre cables plus the new Arctic Fibre and the Ireland France Subsea Cable. Arctic Fibre has a new cable from Prudhoe Bay (Alaska) to Europe and 'tee's in from this cable into Ireland via Cork. This cable connects Japan – Alaska – Canada – Western Europe with the shortest direct route. (Shorter routes give lower latencies, meaning higher speeds).

The IFSC project connects France to Cork directly, made available to Dublin via multiple redundant routes. This route bypasses London providing direct connection to Europe improving transmission speed and overcoming Brexit related data transfer issues.

4.9 Naas Local Area Plan 2012 - 2027

Chapter 2 of the EIAR (Section 2.3.1) sets out the rationale for the selection of the subject site for the Project, in the context of the LAP zoning and related Policies and Objectives.

The subject site is zoned for development of a Data Centre within the Naas LAP 2021 – 2027; the site is zoned P(1) – Data Centre in the Naas LAP 2021 - 2027. The Plan seeks to provide for Data Centre development and their associated infrastructure only, for Land Use Zoning Objective 'P'.

Notably, the LAP states that *The Council will not consider any alternative use on these lands, other than those associated with Data Centres.* The only use therefore, considered by the Naas LAP to be 'Permitted in Principle' in lands zoned 'P', is Data Centres.

The Project represents the realisation of the zoning and related Policies and Objectives, of the Naas LAP.

4.10 Employment Generation

The Project represents significant development and investment within Naas town and the immediate environs. The *Naas LAP 2021 – 2027* designates Naas a "Key Town" and an important employment centre within the County and more widely.

The need to generate new employment within the town and in particular in sectors such as IT is identified:

"EDO 1.1 Encourage economic development and employment growth in Naas in accordance with its designation as a Key Town, while adhering to the overall Economic Development Strategy of the Plan.

EDO 1.2 Promote enterprise and employment development in the Northwest Quadrant, focusing on high-tech manufacturing, research and development, ICT, food science and production, large scale offices, public administration, banking, tourism and bloodstock, within a high quality campus/park type development."

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The Project will generate approximately 225 jobs in the ICT sector directly and support employment in the sector more widely; in this regard the need for the Project is supported.

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HERBATA DATA CENTRE, NAAS

EIAR
VOLUME I MAIN TEXT – CHAPTER 5 BIODIVERSITY

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5 BIODIVERSITY

5.1 Introduction

An Ecological Impact Assessment (EcIA) has been undertaken of all areas within the Project site, as described within Chapter 3 of the EIAR. The scope of this EcIA is to identify ecological constraints within the study area, by means of the following:

- Identifying the Zone of Influence (ZoI) of the Project on the natural environment;
- Establishing the baseline with regard to terrestrial and aquatic habitats, flora and fauna (volant and non-volant mammals, invertebrates, avifauna etc.) within the ZoI of the Project;
- Ascertaining the potential impacts upon all ecological receptors within the development footprint and the ZoI to include, but not be limited to, species protected under the European and National Legislation, including the EU Habitats and Birds Directives and Irish Wildlife Acts (1976 to 2012, as amended); and,
- Presenting measures to avoid or minimise potential damage to any sensitive ecological receptors supported within the receiving environment.

The professional judgement expressed herein is the true and bona fide opinion of our professional ecologist. The information prepared and provided is accurate at the time of issue of this report and has been prepared and provided in accordance with the CIEEM Code of Professional Conduct (CIEEM 2022).

This Chapter is supported by Volume II Technical Appendices:

- Appendix 5.1: National Biodiversity Data Centre Records ; and
- Appendix 5.2: Ecological Survey for Bats.

This Chapter is supported by the following Figures, within Volume III:

- Figure 5.1: Biodiversity Study Area;
- Figure 5.2: Designated Sites and Features of Natural Heritage Importance; and
- Figure 5.3: Extended Phase 1 Habitat Survey.
- Figure 5.4: Protected Species.

5.2 Assessment Methodology

5.2.1 Ecological Impact Assessment

EcIA is the process of identifying, quantifying and evaluating the potential effects of a project on ecological features based on objective assessment of the best information available (CIEEM 2018). An ecological feature is defined as a species, habitat or ecosystem that has the potential to be affected by a project.

The aim of the EcIA, detailed within this chapter of the EIAR, is therefore to describe the existing ecological features; to identify the potential impacts associated with the Project during construction, operation and decommissioning; to evaluate the likely significance of effects on the ecological features; to apply the mitigation hierarchy to avoid, mitigate and compensate for ecological impacts; and to highlight potential opportunities for ecological enhancement (CIEEM 2018).

The EcIA has been written in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) *Guidelines for Ecological Impact Assessment in the UK and Ireland* (CIEEM 2018).

5.2.2 Relevant Guidance and Legislation

The EcIA has been undertaken in accordance with the British Standard (BS) 42020:2013; guidelines produced by the CIEEM (CIEEM 2018); experience of 'best practice' in ecological assessment; and criteria set out within this sub-section.

5.2.2.1 International Directives

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Council Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC) (The Habitats Directive)

The main aim of the Directive is to promote the maintenance of biodiversity through the conservation of natural habitats and wild species listed on the Annexes of the Directive. Member States are required to take measures to maintain or restore, at favourable conservation status, biodiversity whilst taking account of economic, social, cultural requirements and regional and local characteristics.

It gives effect to site and species protection measures through establishment of the Natura 2000 network and designation of European Sites including Special Areas of Conservation (SAC) and Special Protected Areas (SPA). It also establishes a list of species (other than birds) whose habitats must be protected to secure their survival. These priority species and habitats are subject to a higher level of protection.

The Directive also requires appropriate assessment of any plan or project not directly connected with or necessary to the management of a European Site, but likely to have significant effects upon a European site, either individually or in combination with other plans or projects.

Council Directive on the Conservation of Wild Birds (2009/147/EC) (The Birds Directive)

The Directive provides a framework for the conservation and management of, and human interactions with, wild birds in Europe. It makes provisions for the maintenance of the wild bird populations across their natural range; conserves the habitats for rare or vulnerable species listed in Annex I and of migratory species through the classification of SPAs and provides protection for all wild birds.

5.2.2.2 Irish Legislation

Statutory Instrument No. 355/2015 European Communities (Birds and Natural Habitats) (Amendment) Regulations 2015 provides that the following shall be construed together as one:

- Wildlife Act 1976;
- Wildlife (Amendment) Acts of 2000, 2010 and 2012;
- European Communities (Birds and Natural Habitats) (Restrictions of the Use of Poison Bait) Regulations 2010;
- European Communities (Birds and Natural Habitats) Regulations 2011;
- European Communities (Birds and Natural Habitats) (Amendment) Regulations of 2013, 2015; and
- Wildlife Amendment Bill 2016.

European Communities (Birds and Natural Habitats) Regulations 2011 to 2015

The Regulations give effect to requirements relating to the designation of protected sites under the Birds Directive and Habitats Directive. The Regulations provide for the protection and management of European Sites and place obligations on all public authorities to have regard to the requirements of the Habitats Directive beyond the realms of planning related consents issued under the Planning and Development Act 2000, as amended. The Regulations also provide for the protection of species of European importance.

Wildlife Acts 1976 to 2012

The Acts provide for *inter alia* the protection of wildlife. The Acts prohibit the intentional killing, taking or injuring of certain wild birds or wild animals; or the intentional destruction, uprooting or picking of certain wild plants.

Wildlife Amendment Bill 2016

The purpose of the Bill is to provide for the implementation of a reconfiguration of the Raised Bog Natural Heritage Area Network arising from (i) the proposals from the Review of Raised Bog Natural Heritage Area

Network published in January 2014; (ii) an assessment of the effects on the environment of the proposals arising from the Review and, if required, any other screening for an assessment or as the case may be, assessment, including public consultation undertaken and (iii) observations or submissions received during the course of public consultation.

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The Wildlife Amendment Bill is currently at Committee Stage.

Taken as a whole, nature conservation legislation is of key importance in undertaking EcIA for the Project as it shapes planning policy.

5.2.2.3 Planning Policy

Kildare County Development Plan 2023-2029

An overarching theme of the development plan in relation to Biodiversity is to ensure that there are no detrimental impacts to the natural heritage and biodiversity of the County.

Policies set out in respect of natural heritage and biodiversity, as set out within Chapter 12: Biodiversity and Green Infrastructure, include a range of provisions to protect and conserve Natura 2000 sites, Natural Heritage Areas (NHA) and proposed NHAs (pNHA), species and habitats listed within the local Biodiversity Action Plan (BAP), ecological buffer zones, nature development areas and river corridors in addition to peatlands, woodlands and other habitats of higher ecological value.

5.2.3 Study Area

The study area, which encompasses the areas which are to be affected by the Project in addition to surrounding areas of terrestrial habitat, are generally characterised by the presence of a semi-improved and improved agricultural grasslands in addition to areas of wet grassland, scrub, amenity grassland, gardens and hardstanding. The ecological study area and extent is illustrated in Figure 5.1 Biodiversity Study Area (Volume III).

On a precautionary basis the assessed ZoI extends beyond the study area (the Project site) to include European and Nationally designated sites within 15km of the study area and ecological receptors to be potentially affected by the biophysical changes caused by the Project. In addition, sites which are hydrologically linked to the proposals are also considered. The designated sites and ecological receptors within the ZoI of the Project are presented and discussed below.

5.2.4 Baseline

5.2.4.1 Desk Study

The National Biodiversity Data Centre (NBDC) is a national organisation that collates, manages, analyses and disseminates data on Ireland's biodiversity. It is funded by the Heritage Council and the Department of Arts, Heritage and the Gaeltacht. The NBDC provides access to all validated biodiversity data through Biodiversity Maps, the on-line biodiversity data portal.

Biodiversity records and full species accounts can be viewed and scrutinised through an interactive Biodiversity Maps portal (http://maps.biodiversityireland.ie/#/Home). This is a tool that can be used to help make a preliminary assessment of biodiversity issues when considering site-specific projects.

The chosen search area using the NBDC search tool was customised in order to captures all records within a minimum 1km distance of the Project site and is illustrated at Appendix 5.1. The principal purpose of this task is to capture any records of protected species or species of natural heritage importance in close proximity to the Project site boundary. The ZoI of the Project for protected species, does not extend further than this.

NPWS GIS habitat data files were used to overlie the site to determine the presence of features of ecological significance.

5.2.4.2 Habitat Survey

Extended Phase 1 Habitat Survey was conducted of the site in October 2022 and June 2023 and covered the entirety of the study area. The survey was undertaken in line with the Heritage Council's *Best Practice*

Guidance for Habitat Survey and Mapping (Heritage Council, 2011). Ecological value is based upon CIEEM and NRA guidelines (CIEEM, 2018; NRA, 2009).

The survey was extended to include further information on the potential of the habitats identified to support species protected by law or of natural heritage importance. All habitats were mapped and categorised in accordance with the Heritage Council *Guide to Habitats in Ireland* (Fossitt, 2000). A search was undertaken for protected and invasive flora species. Aerial photographs were used as an aid to mapping habitats.

It should be noted that whilst every effort has been made to provide a comprehensive description of the site of the Project no survey can consist of a complete characterisation and prediction of the ecological environment.

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5.2.4.3 Otter Survey

An otter *Lutra lutra* survey was carried in October 2023 and June 2023 in order to establish the presence of otter dens and/or otter foraging areas. The site and a buffer of at least 200m, from watercourses, woodlands and scrub, was surveyed for the presence of otter activity including:

- Holts
- Couches
- Spraints
- Otter paths
- Slides
- Paw prints

5.2.4.4 Preliminary Ecological Appraisal for Bats

A Preliminary Ecological Appraisal for Bats (PEAB) comprising of a desk study and site walkover has been completed for the Project. The aim of the site walkover was to observe, assess and record the potential suitability of the site to support bat roosting habitat, commuting habitat and/or foraging habitat. Habitat features were classified as negligible, low, moderate or high in accordance with Bat Conservation Trust (BCT) Good Practice Guidelines (Collins 2016).

5.2.4.5 Preliminary Roost Assessment of Structures

A Preliminary Roost Assessment (PRA) of structures within the site was carried out during daylight hours in October 2022. This survey was undertaken in accordance with Collins (2016). An external inspection survey of structures was undertaken from ground level to look for potential and actual bat entry/exit points, evidence of bat roosts and signs of bat related activity in order to determine the presence or likely presence of bats.

5.2.4.6 Tree Climbing PRF Inspection Survey

A Tree Climbing PRF Inspection Survey was carried out by two suitability qualified bat surveyors using tree-climbing equipment, ladders, a torch and endoscope in May and July 2023. The aim of the survey was to allow closer inspection of PRFs identified during the ground level PRA of trees. The survey aims to look for evidence of bats including live or dead bats, droppings, staining, odour and/or other physical characteristics and where necessary to reclassify PRFs in accordance with Collins (2016). Survey results were compared with information and records from the *Bat Roosts in Trees: A Guide to Identification and Assessment for Tree-Care and Ecology Professionals* (Andrews 2018) to aid in the classification and identification of PRFs.

5.2.4.7 Bat Activity Surveys

Bat Activity Surveys were carried out to determine the assemblage of bat species within the site; the nature of bat behaviour; and the spatial distribution of bat activity within the site. Walked transects were surveyed to record and determine the level of bat activity within the site of the Project. The location of transects was determined by site access, health and safety considerations and suitable habitat features for bats.

5.2.4.8 Emergence Survey of Structures

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An emergence survey of the structures was carried out to watch, listen and record bats exiting or entering potential roosts. A single dusk survey was carried out in June 2023 in accordance with the Bat Conservation Trust Best Practice Guidelines (Collins 2016) and BCT Interim Guidance Note: Use of night vision aids for bat emergence surveys (BCT 2022). The document states: "*The 4th edition of the survey guidelines will therefore transition away from the standard use of dawn surveys, particularly as a method for presence/absence surveys, in favour of dusk surveys supported by NVAs*".

Night Vision Aids (NVAs) including high spec Canon XA11 Compact Full HD Camcorders aided by two Nightfox XB5 850NM Infrared LED Flashlights per camcorder were used to record bats. LED infrared illuminator security spot lamps were also positioned at buildings to provide extra infrared illumination, if required. Elekon Batlogger M bat detectors with real time full spectrum recording, an integrated Global Positioning System (GPS) and temperature logger were paired with each camcorder and used to record bat echolocation calls. A Pulsar Axion XM30S handheld thermal imaging monocular was also used by the bat surveyor as a complementary survey aid to provide additional data to the video and acoustic data. The NVA equipment was deployed and monitored by two surveyors during the course of the survey. The video recordings were analysed using VLC video player software at 1 – 1.5x speed and slowed down to <0.5x speed when required.

Further details on all bat surveys including survey dates and weather conditions are set out within the accompanying Ecological Survey for Bats (see Appendix 5.2, Volume II).

5.2.5 Assessment Criteria and Assignment of Significance

The information gathered from desk study and the suite of targeted ecological surveys was used to prepare an EcIA for the Project. The EcIA has been undertaken in accordance with the following guidelines which were used to derive valuation and assessment criteria as set out in Tables 5.1 and 5.2.

Section 3.7.3 of the Environmental Protection Agency's (EPA) *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (2022) note that "*where more specific definitions exist within a specialised factor or topic e.g. biodiversity, these should be used in preference to these generalised definitions*". The EcIA has been undertaken following the methodology set out in *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine* (CIEEM, 2018); and with reference to the National Roads Authority *'Guidelines for Assessment of Ecological Impacts of National Road Schemes*' (NRA, 2009); *EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (EPA 2022); and *BS 42020:2013 Biodiversity: Code of practice for planning and development* (BSI, 2013).

EcIA is based upon a source-pathway-receptor model, where the source is defined as the individual elements of the Project that have the potential to affect identified ecological features. The pathway is defined as the means or route by which a source can affect the ecological features. An ecological receptor is the feature of interest, being a species, habitat or ecologically functioning unit of natural heritage importance. Each element can exist independently however an effect is created where there is a linkage between the source, pathway and feature. A significant effect is defined in CIEEM (2018) as:

> "*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*".
>
> and
>
> "*an effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project. A significant effect is a positive or negative ecological effect that should be given weight in judging whether to authorise a project: it can influence whether permission is given or refused and, if given, whether the effect is important enough to warrant conditions, restrictions or further requirements such as monitoring*".

BS 42020:2013 states that if an effect is sufficiently important to be given weight in the planning balance or to warrant the imposition of a planning condition, e.g. to provide or guarantee necessary mitigation measures, it is likely to be "significant" in that context at the level under consideration. The converse is also true: insignificant effects would not warrant a refusal of permission or the imposition of conditions.

Likely significant effects are predicted on the basis of the Project as described in Chapter 3 of the EIAR. Table 5.1 includes a geographic frame of reference and criteria for valuing ecological features. Table 5.2 sets out criteria for predicting magnitudes of effect. These tables have been prepared with due regard to CIEEM, EPA and NRA guidelines.

Significant impacts are moderate or major effects which require counterbalancing mitigation measures to offset their adverse effects. Beneficial effects do not require mitigation measures as their effects are welcomed.

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Table 5.1: Ecological Valuation Criteria for Ecological Features

Value	Criteria
International	• 'European Sites' including Special Areas of Conservation (SAC) & Special Protection Areas (SPA) • Sites that satisfy the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive) • Features essential to maintaining the coherence of the Natura 2000 Network • Sites containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive • Resident or regularly occurring populations (assessed to be important at the international level) of the following: • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive • Ramsar Sites • World Heritage Sites • Sites hosting significant populations of species under the Bonn Convention • Sites hosting significant populations of species under the Berne Convention
National	• Wildlife Refuge for species protected under the Wildlife Acts • Resident or regularly occurring populations (assessed to be important at the national level) of the following: • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive • Natural Heritage Areas (NHA) or proposed NHA (pNHA) • National Nature Reserves (NNR) • Marine Nature Reserve (MNR)
County	• Sites listed as part of the Ecological Network in the County Development Plan (CDP) • Areas subject to a Tree Preservation Order in a CDP • Resident or regularly occurring populations (assessed to be important at the County level) of the following • Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive • Species of animal and plants listed in Annex II and/or IV of the Habitats Directive • Species protected under the Wildlife Acts (1976-2018) and/or • Species listed on the relevant Red Data list • Sites containing areas of the habitat types listed in Annex I of the Habitats Directive that occur outside of designated International (SAC/SPA/Ramsar) or National (NHA/pNHA) sites • Regionally important populations of species or viable areas of semi-natural habitats or natural heritage features identified in a Biodiversity Action Plan (BAP) prepared for an administrative area, if this have been prepared • Sites containing natural habitat types with high biodiversity in a regional context and a high degree of naturalness, or populations of species that are uncommon within the County
Local	• Locally important populations of a priority or protected species; or habitats or features of natural heritage importance identified in a BAP, if this has been prepared • Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality • Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value
Site	• Sites containing small areas of semi-natural habitat that are of limited local importance for wildlife

Table 5.2: Magnitudes of Effect upon Ecological Features

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Impact Significance	Magnitude of Effect	Criteria
Significant negative effect	Major adverse	• Loss of, permanent damage to or adverse impact on any part of a site of international or national importance; • Loss of a substantial part or key feature of a site of regional importance; • Loss of favourable conservation status (FCS) of a legally protected species; • Loss of or moderate damage to a population of nationally rare or scarce species.
	Moderate adverse	• Temporary disturbance to a site of international or national importance, but no permanent damage; • Loss of or permanent damage to any part of a site of regional importance; • Loss of a key feature of local importance; • A substantial reduction in the numbers of legally protected species such that there is no loss of FCS but the population is significantly more vulnerable; • Reduction in the amount of habitat available for a nationally rare or scarce species, or species that are notable at a regional or county level.
	Minor adverse	• Temporary disturbance to a site of regional value, but no permanent damage; • Loss of, or permanent damage to, a feature with some ecological value in a local context but that has no nature conservation designation; • A minor impact on legally protected species but no significant habitat loss or reduction in FCS; • A minor impact on populations of nationally rare or scarce species or species that are notable at a regional or county level.
No Significant Effect	Negligible	• No impacts on sites of international, national or county importance; • Temporary disturbance or damage to a small part of a feature of local importance; • Loss of or damage to land of negligible nature conservation value; • No reduction in the population of legally protected, nationally rare, nationally scarce or notable (regional level) species on the site or its immediate vicinity. • Beneficial and adverse impacts balance such that resulting impact has no overall affect upon feature.
Significant positive effect	Minor beneficial	• A small but clear and measurable gain in general wildlife interest, e.g. small-scale new habitats of wildlife value created where none existed before or where the new habitats exceeds in area that habitats lost.
	Moderate beneficial	• Larger new scale habitats (e.g. net gains over 1 ha in area) created leading to significant measurable gains in relation to the objectives of biodiversity action plans.
	Major beneficial	• Major gains in new habitats (net gains of at least 10 ha) of high significance for biodiversity being those habitats, or habitats supporting viable species populations, of national or international importance cited in Annexes I and II of the habitats Directive or Annex I of the Birds Directive.

5.2.6 Habitats Directive Appraisals

A Screening for Appropriate Assessment has been prepared by RPS in support of the Project to assist the competent authority in fulfilling its duties in accordance with Part XAB of the Planning and Development Acts 2000 to 2015 which transposes certain aspects of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC. These documents accompany the EIAR.

Impacts upon European Sites are also discussed within this chapter of the EIAR.

5.3 Baseline Scenario

5.3.1 Designated Sites and Features of Natural Heritage Importance

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The study area is located within proximity to a number of sites designated on account of their natural heritage importance. This includes the Grand Canal pNHA and the Liffey at Osberstown pNHA. These sites are illustrated at Figure 5.2 Designated Sites and Features of Natural Heritage Importance (Volume III). A number of further sites are significantly spatially separated from the Project or are hydrologically linked to the proposals.

Table 5.3 below provides descriptive details of designated sites and features of natural heritage importance located within the site of the Project; within immediate proximity to the site of the proposed Project; or outside the site of the proposed Project but connected to it through an identifiable impact pathway.

Table 5.3: Designated Sites & Features of Natural Heritage Importance

Designated Site/Feature	Distance from Site (km)	Description
Grand Canal pNHA [002104]	0.63	Man-made watercourse with associated riparian habitats, smooth newt *Lissotriton vulgaris* populations, importance for otter and populations of opposite-leaved pondweed *Groenlandia densa.*
Liffey at Osberstown pNHA [001395]	0.8	Steep riverbank with former populations of rare plant species including dark-leaved willow *Salix myrsinifolia* and variegated horsetail *Equisetum variegatum*.
Mouds Bog SAC [002331]	5.1	Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the Rhynchosporion [7150]
Mouds Bog pNHA [000395]	5.1	As above.
South Dublin Bay SAC [000210]	34.7 58 by hydrological connection	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] Embryonic shifting dunes [2110]
North Dublin Bay SAC [000206]	34.7 58 by hydrological connection	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] 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] *Petalophyllum ralfsii* (Petalwort) [1395]
South Dublin Bay and River Tolka Estuary SPA [004024]	34.7 58 by hydrological connection	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Oystercatcher (*Haematopus ostralegus)* [A130] Ringed Plover (*Charadrius hiaticula)* [A137] Grey Plover (*Pluvialis squatarola*) [A141] Knot (*Calidris canutus*) [A143] Sanderling (*Calidris alba*) [A144] Dunlin (*Calidris alpina*) [A149] Bar-tailed Godwit (*Limosa lapponica*) [A157] Redshank (*Tringa totanus*) [A162] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Roseate Tern (*Sterna dougallii*) [A192] Common Tern (*Sterna hirundo*) [A193] Arctic Tern (*Sterna paradisaea*) [A194] Wetland and Waterbirds [A999]

North Bull Island SPA [004006]	34.7 58 by hydrological connection	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Teal (*Anas crecca*) [A052] Pintail (*Anas acuta*) [A054] Shoveler (*Anas clypeata*) [A056] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Knot (*Calidris canutus*) [A143] Sanderling (*Calidris alba*) [A144] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Curlew (*Numenius arquata*) [A160] Redshank (*Tringa totanus*) [A162] Turnstone (*Arenaria interpres*) [A169] Black-headed Gull (*Chroicocephalus ridibundus*) [A179] Wetland and Waterbirds [A999]

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5.3.2 Desk Study

A search of the existing records held by NBDC was undertaken. The search area was customised i.e. a 'user-defined' polygon was drawn capturing all records within approximately 1km^2 of the site. The output data (species list) was refined to include those afforded protection under national and international legislation. Also presented are species which have been assessed following International Union for the Conservation of Nature (IUCN) categories and criteria, and guidelines for their application.

This user-defined polygon and refined output species list are presented in Appendix 5.1, Volume II.

Records returned include:

- A number of records of common frog *Rana temporaria* the most recent of which being from 2019.
- A range of earthworm and other annelid species.
- A range of crustacean species, including the Annex II species White-clawed crayfish *Austropotamobius pallipes* returned from within the River Liffey, downstream of the Project.
- A wide range of flowering plants, none of which were noted to be of conservation importance, in addition to a range of non-native invasive species.
- A range of records of butterflies including marsh fritillary *Euphydryas aurinia* of which 22 records were held, the most recent being from 2010, in addition to other species of conservation concern including dark green fritillary *Argynnis aglaja,* dingy skipper *Erynnis tages,* grayling *Hipparchia semele,* large heath *Coenonympha tullia,* small heath *Coenonympha pamphilus* and wall *Lasiommata megera*, all of which were historical recorded over 30 years old.
- A wide range of further insects of which only a small number were listed as being of conservation concern, with the majority of these records being over 25 years old.
- A limited range of common and widespread liverwort species.
- A range of molluscs including a number of invasive mollusc species;
- Records of otter, the most recent of which being from 2017;
- Low numbers of records for a limited range of bats species including soprano pipistrelle *Pipistrellus pygmaeus,* common pipistrelle *Pipistrellus pipistrellus,* Natterer's bat *Myotis nattereri,* Daubenton's bat *Myotis daubentoniid,* brown long-eared *Plecotus auritus* and Leisler's bat *Nyctalus leisleri*.
- A large number of records of hedgehog *Erinaceus europaeus,* the most recent of which from 2021.
- Records of badger *Meles meles* the most recent of which from 2016.

- Records of a range of non-native mammal species including mink *Mustela vison,* muntjac *Muntiacus reevesi,* hazel dormouse *Muscardinus avellanarius,* grey squirrel *Sciurus carolinensis* and greater white-toothed shrew *Crocidura russula,* among others.
- A large number of bird records including a number of species of conservation concern including barn owl *Tyto alba,* curlew *Numenius arquata,* lapwing *Vanellus vanellus* and yellowhammer *Emberiza citrinella* among a further range of amber and red listed species.

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5.3.3 Habitats

All habitats recorded within the site are described individually below and are illustrated on the accompanying Figure 5.3: Extended Phase 1 Habitat Survey (Volume III).

5.3.3.1 Improved Agricultural Grassland

The vast majority of the site is comprised of improved agricultural grassland which has been subject to some reseeding and nutrient enrichment. These fields are subject to sheep grazing and are species poor.

Species present within this habitat include perennial rye-grass *Lolium perenne,* red fescue *Festuca rubra,* crested dog's-tail *Cynosurus cristatus,* Yorkshire fog *Holcus lanatus,* smooth meadow-grass *Poa pratensis,* white clover *Trifolium repens,* red clover *Trifoilium pratense,* broad-leaved dock *Rumex obtusifolius,* common sorrel *Rumex acetosa,* creeping thistle *Cirsium arvense,* spear thistle *Cirsium vulgare,* dandelion *Taraxacum officinale agg.,* creeping buttercup *Ranunculus repens,* meadow buttercup *Ranunculus acris,* common field speedwell *Veronica persica* and ragwort *Senecio jacobaea*.

Small patches of this habitat (less than 40m^2), in the south-west of the site, support relatively dense yellow rattle *Rhinanthus minor*, which is not present in any other areas of the site and is present within areas of habitat which are otherwise fairly species poor.

This habitat is considered to be of **site-level** ecological value.

5.3.3.2 Amenity Grassland

Small areas of amenity grassland habitat are present within the gardens of residential properties along the northern boundary of the Project site, these are subject to regular mowing and are species-poor, dominated by perennial rye-grass with red fescue, white clover an a limited range of typical species.

This habitat is considered to be of **site-level** ecological value.

5.3.3.3 Dry Neutral Grassland

A large proportion of the site is comprised of semi-improved neutral grasslands which are dry and sheep grazed. They appear to have been subject to some limited agricultural improvement, including nutrient enrichment and reseeding. These areas are however generally less improved than those areas of improved agricultural grassland which comprise the majority of the remainder of the site with a higher variability in the dominant grass species and a higher proportion of forbs within the sward. The vast majority of these areas remain species poor.

Species present include perennial rye-grass, red fescue, crested dog's-tail, Yorkshire fog, smooth meadow grass, sweet vernal grass *Anthoxanthum odoratum,* cock's-foot *Dactylis glomerata,* false oat-grass *Arhennatherum elatius,* timothy *Phleum pratense,* meadow foxtail *Alopecurus pratensis,* creeping bent *Agrostis stolonifera,* common bent *Agrostis capillaris,* soft rush *Juncus effusus,* hard rush *Juncus inflexus,* field wood-rush *Luzula campestre,* creeping buttercup, meadow buttercup, common field speedwell, germander speedwell *Veronica chamaedrys,* creeping thistle, spear thistle, white clover, red clover, daisy, broad-leaved dock, common sorrel, daisy *Bellis perennis,* bird's-foot trefoil *Lotus corniculatus,* meadow vetchling *Lathyrus pratensis,* dandelion, common nettle *Urtica dioica,* silverweed *Argentina anserina,* field horsetail *Equisetum arvense* and lesser stitchwort *Stellaria graminea*.

This habitat is considered to be of **site-level** ecological value.

5.3.3.4 Dry Meadows and Grassy Verges

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Areas of unmanaged grasslands not subject to grazing are present in small areas around the site including the margins of the site along roads and around the farmyard. These are typically rank and species poor.

Species present within these areas include a limited range of those recorded within adjacent agricultural grasslands including dominant false oat-grass, spear thistle, creeping thistle, broadleaved dock and areas of tall ruderal vegetation generally comprised of common nettle.

These habitats are considered to be of **site-level** ecological value.

5.3.3.5 Wet Grassland

Relatively small areas of the site inclusive of fields in the east and south of the site support wetter grasslands which have been subject to minimal agricultural improvement and are sheep grazed at a lower intensity. As such these areas are characterised by an abundance of rushes largely absent from other grasslands within the site. These areas are more species rich than other grasslands within the site.

Species present include perennial rye-grass, red fescue, Yorkshire fog, tufted hair-grass *Deschampsia cespitosa,* cock's-foot, false oat-grass, wavy hair-grass *Deschampsia flexuosa,* meadow foxtail, creeping bent, common quaking -grass *Briza media,* soft rush, sharp-flowered rush *Juncus acutiflorus,* hard rush, common sedge *Carex nigra,* oval sedge *Carex 11anicula,* creeping buttercup, meadow buttercup, germander speedwell, marsh thistle *Cirsium palustre,* creeping thistle, common nettle, meadowsweet *Filipendula ulmaria,* cleavers *Galium aparine,* greater bird's-foot trefoil *Lotus pedunculatus*, meadow vetchling, white clover, common sorrel, broadleaved dock, silverweed, field horsetail, lesser stitchwort, marsh woundwort *Stachys palustris,* common spotted orchid *Dactylorhiza 11anicul,* wild angelica *Angelica sylvestris,* yellow flag iris *Iris pseudacorus,* floating sweet-grass *Glyceria fluitans* and greater tussock-sedge *Carex 11aniculate*.

These areas are considered to be of relatively high ecological value in the context of the site and are considered to be of importance at the **local level**.

5.3.3.6 Large Sedge Swamps

Two relatively large areas of tall sedge swamp habitat are present in the south and south-east of the site and are characterised by dominant greater tussock-sedge, with other vegetation being extremely limited in these areas including occasional purple moor grass *Molinia caerulea*.

These habitats are species poor but likely to be uncommon in a local context and are therefore considered to be of ecological value at the **local level**.

5.3.3.7 Tilled Land

A relatively small proportion of the site, inclusive of half a field in the south-west of the site, is managed as an annual crop, including as game cover. This area was not recently tilled at the time of the most recent survey and had been reseeded with a cereal crop but has been extensively recolonised by redshank *Persicaria maculosa* and marsh woundwort *Stachys palustris*.

This habitat is considered to be of **site level** ecological value.

5.3.3.8 Scattered Trees / Orchard

A derelict former kitchen garden is present to the west of farm buildings in the centre of the site. This area supports scattered trees with underlying rank grassland, tall ruderal vegetation and bramble *Rubus fruticosus* scrub.

Trees species include apple *Malus domestica,* damson *Prunus domestica subsp. Insititia*, plum *Prunus domestica,* pear *Pyrus communis,* hazel *Corylus avellana* and self-sown grey willow *Salix cinerea,* silver birch *Betula pendula,* sycamore *Acer pseudoplatanus* and ash *Fraxinus excelsior*.

This habitat is likely to be uncommon in the local context and is considered to be of ecological importance at the **local level**.

5.3.3.9 Scrub

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The site supports a number of areas of scrub which are unmanaged and are dominated by bramble with occasional scattered immature trees including hawthorn *Crataegus monogyna,* blackthorn *Prunus spinosa,* gorse *Ulex europaeus,* birch and ash.

These areas are of limited intrinsic ecological value and are considered to be of ecological importance at the **site level**.

5.3.3.10 Buildings

The site supports a range of buildings including a number of farm buildings and derelict dwellings in the central area of the site, in addition to a number of dwellings and associated outbuildings along the northern site boundary.

These features are considered to be of **negligible** intrinsic ecological value.

Several of these buildings have potential to support roosting bats and support nesting birds, namely swallows *Hirundo rustica*. The characteristics of each building and an assessment of their potential to support individual bats is set out within the accompanying Ecological Survey for Bats (Appendix 5.2, Volume II).

5.3.3.11 Hardstanding

Areas of hardstanding are present within the site and are inclusive of areas of farm tracks, farmyard, access roads and car parking around dwellings.

These areas are largely devoid of vegetation and are considered to be of **negligible** ecological value.

5.3.3.12 Drainage Ditches

The site supports a number of seasonally wet drainage ditches, along the margins of agricultural fields and in association with adjacent hedgerows. These features are shallow, slow flowing and dry out on a regular basis. These features support fairly minimal aquatic vegetation including reedmace *Typha latiifolia,* yellow flag iris and floating sweet-grass.

These features are considered to be of **site-level** ecological importance.

5.3.3.13 Lowland River

A single minor watercourse, the Bluebell Stream, is present along the southern boundary of the Project site. This watercourse is fairly narrow (less than 2m wide) and supports slow flowing conditions with a fairly uniform U-shaped channel and is well vegetated at the margins. For much of its length, within the survey area, the watercourse was assessed as having characteristics of a well-fed field drain. The watercourse is culverted under the M7 to the east of the Project site boundary.

Significant lengths of the watercourse are entirely covered by vegetation including common reed *Phragmites australis,* reed canary-grass *Phalaris arundinacea,* lesser water parsnip *Berula erecta* and floating sweet-grass.

This feature is considered to be of relatively higher ecological value in the context of the site and is likely to be of ecological importance at the **local level**.

5.3.3.14 Amenity Planting

Gardens, present along the northern boundary of the Project site, support areas of amenity planting inclusive of a range of native and non-native vegetation which is subject to regular management. This includes flower beds and borders and wide bands of non-native scrub and trees.

These areas are considered to be of fairly minimal ecological value and of importance at the **site level**.

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5.3.3.15 Hedgerows

The site supports a large number of hedgerows, delineating the boundaries of agricultural fields and residential properties.

These features are of variable composition with the vast majority being comprised of native species and subject to minimal management.

Hawthorn is the primary species with the vast majority of the hedgerows being predominately comprised of this species. Other species include oak *Quercus robur,* sessile oak *Quercus petraea,* holm oak *Quercus ilex,* hazel, blackthorn, elder *Sambucus nigra,* grey willow, crack willow *Salix fragilis,* alder *Alnus glutinosa,* aspen *Populus tremula,* silver birch *Betula pendula,* Scot's pine *Pinus sylvestris,* Monterey pine *Pinus radiata,* ash, wild cherry *Prunus avium,* horse chestnut *Aesculus hippocastanum,* holly *Ilex aquifolium,* beech *Fagus sylvatica,* elm *Ulmus glabra,* field maple *Acer campestre,* apple *Malus sylvestris,* spindle *Euonymus europaeus* and sycamore.

The vast majority of these features support occasional standard mature trees, typically ash, oak or sycamore.

Some non-native hedgerows are present around residential dwellings along the northern boundary of the Project site and are comprised of leylandii *Cupressus leylandii,* lawson cypress *Chamaecyparis lawsoniana,* sitka spruce *Picea stitchensis* and cherry laurel *Prunus laurocerasus*.

With the exception of non-native hedgerows which are considered to be of low ecological value, the vast majority of hedgerows within the site are of relatively greater ecological value within the context of the site and are considered to be of importance at the **county level**.

5.3.3.16 Treelines

The site supports several lines of continuous mature trees which are representative of the habitat treelines. These features typically support underlying hedgerow vegetation which is not continuous and has been subject to some level of shading.

These features include lines of mature beech, ash, sycamore and oak which typically support underlying hawthorn. A number of trees within these hedgerows are likely to represent veteran trees, limited to a number of mature oak within the central and eastern areas of the site.

These features are considered to be of relatively higher ecological value in the context of the site and are of importance at the **county level**.

5.3.3.17 Scattered Trees

The site supports a number of broadleaved and coniferous scattered trees, planted within areas of agricultural grassland or as part of amenity planting within gardens. These include a number of horse chestnut trees and a number of ornamental cedars *Cedrus atlantica*.

These features are considered to be of **site level** ecological value.

5.3.4 Protected Species

5.3.4.1 Badger

The site was not recorded to support any evidence indicating the presence of badger *Meles meles*. While a large number of mammal burrows are present on site these were attributed to either rabbit *Oryctolagus cuniculus* or fox *Vulpes vulpes*.

No forage signs, latrines or other field signs attributable to badger were recorded within the site. It is therefore considered that the species is not present within the site. The species is therefore not considered further within this assessment.

5.3.4.2 Otter

The watercourse along the southern boundary of the Project site and lengths within 200m to the west of the site were subject to searches for evidence indicating the presence of otter.

No holts, dens, slides, spraint or other signs indicating the presence of otter were recorded during the surveys. While it is likely that the species utilises the Bluebell Stream on at least an occasional basis as part of a wider territory, it is considered that the site is of no particular significance for the species.

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5.3.4.3 Birds

The site was recorded to support a range of common and widespread breeding bird species typical of agricultural land in the wider area.

Species recorded within the site include robin *Erithacus rubecula,* dunnock *Prunella modularis,* wren *Troglodytes troglodytes,* blue tit *Cyanistes caeruleus,* great tit *Parus major,* coal tit *Periparus ater,* long-tailed tit *Aegithalos caudatus,* chaffinch *Fringilla coelebs,* goldfinch *Carduelis carduelis,* bullfinch *Pyrrhula pyrrhula,* goldcrest *Regulus regulus,* willow warbler *Phylloscopus trochilus,* chiffchaff *Phylloscopus collybita,* sedge warbler *Acrocephalus schoenobaenus,* black bird *Turdus merula,* song thrush *Turdus philomelos,* mistle thrush *Turdus viscivorus,* wood pigeon *Columba palumbus,* collared dove *Streptopelia decaocto,* pheasant *Phasianus colchicus,* barn swallow *Hirundo rustica,* starling *Sturnus vulgaris,* magpie *Pica pica,* jackdaw *Corvus monedula,* rook *Corvus frugilegus,* hooded crow *Corvus cornix,* jay *Garrulus glandarius,* herring gull *Larus argentatus,* sparrowhawk *Accipiter nissus* and buzzard *Buteo buteo*.

Farm buildings in the centre of the site were recorded to support numbers of nesting swallow (approximately 5 pairs), while the unoccupied dwelling in the north-east of the site was recorded to support nesting jackdaw.

While habitats within the site including wet grasslands and sedge swamp have some limited potential to support breeding waders such as snipe, repeat visits to the site within the breeding wader season, in association with bat activity surveys, did not record the presence of any waders within the site boundary.

5.3.4.4 White-clawed Crayfish

As set out above, several records of white-clawed crayfish were returned from NBDC from within proximity to the Project. These included on the River Liffey both upstream and downstream of its confluence with the Bluebell Stream.

The Bluebell Stream is considered to offer extremely limited potential for white-clawed crayfish, this is due to its relatively shallow depth which is likely subject to significant flood flows, the fairly uniform U-shaped nature of the channel, the absence of larger substrates within the channel including an absence of boulders, cobbles or artificial substrates which act as refuges for the species, the predominance of fine organic silt comprising the channel bed and the modified nature of the channel which has been culverted under the M7. All of these characteristics are considered to be unfavourable for the species (S. Peay 2002) and it is considered highly unlikely that the species is present within this watercourse.

All other waterbodies on site are drainage ditches which are known to dry up on a regular basis and as such do not represent suitable potential habitat for this species.

It is therefore considered that the species is unlikely to be present on site.

5.3.4.5 Smooth Newt and other Amphibian Species

The single watercourse within the site, being a flowing waterbody, is unsuitable to support smooth newt *Lissotriton vulgaris,* or other amphibian species. Furthermore, drainage ditches within the site are known to dry up on a regular basis, as observed during surveys undertaken of the site in 2022 and 2023. As such it is considered that such features have extremely limited potential to support breeding amphibians and it is therefore considered that smooth newt are absent from the site.

5.3.4.6 Bats

The site has been subject to a range of surveys to establish the baseline situation in respect of bats including ground-based preliminary roost assessment, potential roost-feature surveys, bat activity surveys, and emergence/re-entry surveys of structures and trees. The full extent of these surveys is set out within the accompanying Ecological Survey for Bats (Appendix 5.2, Volume II) and findings illustrated on the accompanying Figure 5.4 Protected Species (Volume III). The findings of these surveys are summarised below.

Activity surveys of the site were undertaken on four separate occasions, in May, mid-June, late-June and early August. These surveys recorded lower activity levels than anticipated, inclusive of four principal species including Leisler's bat, common pipistrelle, soprano pipistrelle and a *Myotis* species. Activity levels were overall fairly low throughout the site and dropped as the season progressed. Brown long-eared were also recorded to forage within the site however no registrations of this species were recorded during activity surveys.

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A total of 20 trees on site were assessed as supporting potential roost features based on a ground-based preliminary assessment. All of these trees were subject to tree-climbing PRF inspection survey on two occasions which determined the following:

- A total of six trees were downgraded to Negligible bat roosting suitability due to a lack of cavity size and shelter.
- Two were downgraded to Low bat roosting suitability due to a lack of cavity size and/or exposure.
- Two trees were upgraded to High bat roosting suitability due to them both supporting larger cavities with suitable characteristics to provide roosting habitat for a larger number of bats such as a maternity colony.
- The remaining 9 trees remained as having Moderate bat roosting suitability with a further cone remaining at Low bat roost suitability.

Two trees, both of which could not be fully inspected during endoscope surveys, due to the depth of the potential roost features or the presence of nesting birds, were subject to emergence surveys using night vision aided infra-red cameras.

No trees within the site were recorded to support roosting bats.

Of the buildings present on site, six were deemed to support features offering potential for roosting bats. These included the disused dwellings and a number of outbuildings within the farm in the centre of the site in addition to the unoccupied bungalow in the north-east of the site and the associated garage. Of these structures one was considered to offer low bat roosting potential while the remainder were classed as moderate. Emergence surveys of these structures recorded the presence of two roosts within a single building within the central farmyard comprising two separate day roosts for a single myotis bat (considered likely to be a Daubenton's bat) within an agricultural storage shed. In addition, several buildings were recorded to support foraging activity.

Both these recorded roosts are considered likely to be of fairly limited conservation significance in the context of the local bat population.

While the site was initially assessed as having potential to support moderate to high bat activity levels, given the supported hedgerows and treelines in association with grazed agricultural grasslands, in addition to a range of structures with potential to support roosting bats, surveys have recorded lower levels of activity than initially expected with correspondingly limited roosting activity record within the site.

5.4 Impact Assessment

5.4.1 Assessment of Construction Effects

5.4.1.1 Designated Sites and Features of Natural Heritage Importance

The Project at the construction stage will involve no works within or in proximity to any site designated on account of its natural heritage interest. Furthermore, the Project site is sufficiently distant from designated sites in the locality to ensure that no indirect effects upon these sites will arise as a result of the proposals.

As set out above the site is hydrologically connected to a number of European sites within Dublin Bay, via the Bluebell Stream and the River Liffey, including the South Dublin Bay SAC and North Dublin Bay SAC and the South Dublin Bay and River Tolka Estuary SPA and North Bull Island SPA.

The Project is located at a distance of 34.7km from each of these European sites (straight-line distance) and is linked to them by a hydrological pathway approximately 58km in length. Proposed works which will take place within 10m of the Bluebell Stream, and thus linked to the sites, will be limited to the proposed temporary open cut watercourse crossing required in order to facilitate the delivery of the foul sewer and fibre cable connection in addition to the installation of a culvert to facilitate delivery of the secondary site access and any associated works.

These works, with potential to directly impact upon the watercourse, are extremely limited and small-scale in nature and will be undertaken in line with best practice measures in dry conditions following fluming of the relevant lengths of watercourse.

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The construction phase will also involve significant earth works to facilitate site levelling and the creation of Sustainable Drainage Systems (SuDS). Such works have potential to result in adverse impacts upon the aquatic environment through the inadvertent release of such materials into the Bluebell Stream. Given that the stream is in places more akin to a large field drain, it is considered highly likely that such released sediments would be deposited quickly and not borne downstream in suspension. Over the 58km pathway separating the site and downstream European sites it is considered that any sediments or pollutants arising as a result of the Project would be subject to deposition or dilution within the large volumes of water within the River Liffey prior to discharge to Dublin Bay itself.

Significant mixing of seawater occurs in Dublin Bay with freshwater flowing in from the surrounding river catchments. The mixing of any polluting materials that nonetheless escape to the marine environment as a result of the Project will be further aided by the tidal currents, wind and wave climate which transport and continue to mix the seawater and freshwater (and any polluting substances) both into and out of the Liffey Estuary, and help it disperse widely and dilute to much lower concentrations throughout Dublin Bay to the point where it cannot be detected above background levels. On this basis any potential minor inputs arising as a result of the Project are highly likely to be undetectable at the point at which any such materials reach any European sites which lie at distances greater than 58km downstream of the Project.

It is considered therefore that such works have no potential to give rise to the release of sediments, pollutants, or other materials sufficient to cause a measurable effect upon the downstream European sites within Dublin Bay. This conclusion is drawn in light of the small-scale nature of the works, the length of the hydrological pathway, the nature of the Liffey catchment which is already subject to significant input of sediments and other materials through agriculture, industry and other diffuse inputs, in addition to the nature of the relevant European sites which are not designated on account of qualifying interests which are known to be sensitive to impacts associated with sedimentation or minute changes in water quality, effects which are nonetheless not anticipated to occur as a result of the Project.

The Project will therefore have no potential to give rise to likely significant construction phase effects upon the South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA and North Bull Island SPA, or any further sites designated on account of their natural heritage interests. Effects are predicted to be **negligible** and **not significant**.

5.4.1.2 Habitats

5.4.1.2.1 Improved Agricultural Grassland

The Project will give rise to the loss of an estimated 20.1ha of improved agricultural grassland, at construction phase. Given the species-poor nature of this habitat it is considered that effects associated with the loss of these areas of habitat would be **negligible** and **not significant**.

5.4.1.2.2 Amenity Grassland

The Project will give rise to the loss of an estimated 0.4ha of amenity grassland of site-level ecological value in order to facilitate the Project, at construction phase. It is considered that effects associated with the loss of these areas of habitat would be **negligible** and **not significant**.

5.4.1.2.3 Dry Neutral Grassland

The Project will give rise to the loss of an estimated 10.1ha of species-poor dry neutral grassland at construction phase. While this habitat is relatively species-poor it is less so than typical agricultural grasslands and the area proposed to be lost is fairly large. As such it is considered that effects associated with the loss of these areas of habitat would be **minor adverse** and **significant**.

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5.4.1.2.4 Dry Meadows and Grassy Verges

The Project, at construction phase, will give rise to the loss of an estimated 0.58ha of dry meadows/grassy verges considered to be of site-level ecological value. It is considered that effects associated with the loss of these areas of habitat would be **negligible** and **not significant**.

5.4.1.2.5 Wet Grassland

The Project, at construction stage, will give rise to the loss of an estimated 2.3ha of wet grassland considered to be of importance at the local level. It is considered that effects associated with the loss of these areas of habitat would be **minor adverse** and **significant**.

5.4.1.2.6 Large Sedge Swamps

The Project will give rise to the loss of an estimated 0.44ha of large sedge swamp considered to be of ecological value at the local level. It is considered that effects associated with the loss of these areas of habitat would be **minor adverse** and **significant**.

5.4.1.2.7 Tilled Land

The Project will give rise to the loss of an estimated 1.16ha of tilled land considered to be of negligible ecological value. Impacts are predicted to be **negligible** and **not significant**.

5.4.1.2.8 Orchard

The Project will give rise to the loss of an estimated 0.22ha of unmanaged former orchard considered to be of ecological importance at the local level. It is considered that effects associated with the loss of these areas of habitat would be **minor adverse** and **significant**.

5.4.1.2.9 Scrub

The Project will give rise to the loss of an estimated 0.46ha of scrub considered to be of ecological importance at the site level. Impacts are predicted to be **negligible** and **not significant**.

5.4.1.2.10 Buildings

The Project will give rise to the loss of a variety of buildings all of which are considered to be of negligible intrinsic ecological importance. Impacts are predicted to be **negligible** and **not significant**.

5.4.1.2.11 Hardstanding

The Project will give rise to the loss of an estimated 0.93ha of hardstanding of negligible ecological value. Impacts are predicted to be **negligible** and **not significant**.

5.4.1.2.12 Drainage Ditches

The site supports a number of seasonally wet drainage ditches considered to be of site-level ecological importance. Effects associated with the loss of approximately 1.7km of these features is considered to be **negligible** and **not significant**.

5.4.1.2.13 Lowland River

A single minor watercourse, the Bluebell Stream, is present along the southern boundary of the Proejct site and is considered to be of relatively higher ecological value in the context of the site and of ecological importance at the local level. This watercourse is to be retained within the Project however some works to the watercourse will be required, including the installation of fibre connection and foul sewer crossing in addition to the installation of a culvert, adjacent to an existing culvert under the M7 Road, to facilitate the construction of secondary site access.

These works are to be undertaken in dry conditions and will involve the temporary damming and fluming of the relevant short sections of watercourse to facilitate the proposed construction. Following completion of these aspects of the works temporary damming will be removed and the watercourse will be returned to its previous condition.

Further indirect effects upon this habitat at construction phase could arise through sedimentation, pollution and other water quality effects arising as a result of habitat clearance, cut and fill and other construction activities taking place within proximity to this watercourse.

Potential construction phase impacts to this habitat are therefore considered to be **minor adverse** and **significant** in the absence of mitigation measures.

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5.4.1.2.14 Amenity Planting

The Project will give rise to the loss of an estimated 0.12ha of amenity planting within gardens in the north of the site considered to be of fairly minimal ecological value and of importance at the site level. Impacts associated with the loss of this habitat are predicted to be **negligible** and **not significant**.

5.4.1.2.15 Hedgerows

The site supports a large number of hedgerows considered to be of importance at the **county level**.

The Project, at construction phase, will give rise to the loss of around 1.3km of hedgerows, not inclusive of continuous treelines, described below. It is considered that such effects would be **moderate adverse** and **significant**.

5.4.1.2.16 Treelines

The site supports several continuous mature treelines considered to be of importance at the county level.

The Project, at construction phase, will give rise to the loss of approximately 1.6km of treelines. It is considered that such effects would be **moderate adverse** and **significant**.

5.4.1.2.17 Scattered Trees

A number of immature horse chestnut trees and ornamental cedars *Cedrus atlantica* are also to be lost as a result of the Project, of site-level ecological value. It is considered that the loss of these features would be **negligible** and **not significant**.

5.4.1.3 Protected Species

5.4.1.3.1 Otter

The Project will give rise to potential minor adverse impacts upon a minor watercourse which was not recorded as likely to be of any particular importance for otter.

It is considered that impacts arising as a result of the Project would be **negligible** and **not significant**.

5.4.1.3.2 Birds

The Project will give rise to the loss of a range of habitats including scrub, orchard, scattered trees, hedgerows and treelines with potential to support nesting birds, including a range of common and widespread species. Furthermore, buildings within the Project site were noted to support nesting starling, jackdaw and swallow.

It is not considered that the loss of habitats required in order to facilitate the Project would have potential to give rise to significant effects upon the local populations of bird species of conservation concern.

In the absence of mitigation, the construction stage of the Project has potential to impact upon nesting bird species, through the destruction of nests or disturbance caused during the proposed demolition of buildings and clearance of scrub, hedgerows, treelines and other vegetation.

Such impacts are considered to be **moderate adverse** and **significant** in the absence of mitigation.

5.4.1.3.3 White-clawed Crayfish

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The Project will involve minor small-scale works to a single minor watercourse which was assessed as offering extremely poor habitat for white-clawed crayfish. It is considered highly unlikely that the species is present within the site.

Proposed works to the Bluebell Stream, limited to the installation of the proposed foul water and fibre connection, in addition to the installation of a culvert to facilitate secondary site access construction, will be undertaken in dry conditions with temporary damming and fluming of the relevant lengths of watercourse.

Given that the species is highly unlikely to be present within the relevant work areas and that the Project will be done in a manner which will not give rise to any significant impacts to the species or its associated habitats, it is not considered that there is significant potential for direct impacts to white-clawed crayfish associated with construction phase of the Project.

The species is known to be present within stretches of the River Liffey which lie approximately 3.2km downstream of the Project. It is considered that potential construction phase impacts to the freshwater environment, such as sedimentation and the inadvertent release of pollutants and contaminants would likely be largely subject to deposition within close proximity to the source. However, there is insufficient information available to conclude that such material would not give rise to measurable effects upon populations of this species which lie relatively close to and downstream of the Project. As the species is known to be sensitive to the effects of sedimentation, it is considered that such potentially measurable effects could give rise to **minor adverse** and **significant** in the absence of mitigation.

5.4.1.3.4 Bats

The Project will involve the loss of a single building, an agricultural shed, which was recorded to support two separate roost features, both used as day roosts by a single myotis bat. It is considered that the loss of these roost features, in the absence of mitigation, would give rise to a **moderate adverse** and **significant** effect.

The Project will also give rise to the loss of a number of trees with potential to support roosting bats. While no bats were recorded within potential roost features in these trees, they may nonetheless support roosting bats at the time of felling. As such, in the absence of mitigation, the proposals have potential to give rise to the loss of bat roosts likely to be of low conservation significance at construction stage, in the absence of mitigation. Such effects would, it is considered be **moderate adverse** and **significant**.

The Project will involve the removal of a relatively large area of grazed pastures and associated hedgerows and treelines which have been recorded to support relatively low numbers of foraging and commuting bats, largely comprising species which are known to be more common and widespread in the area. It is considered that these habitats are likely to be of local importance for this group. In the absence of mitigation the proposals would give rise to a **moderate adverse** and **significant** effect as a result of the loss of these foraging and commuting habitats for bats.

5.4.2 Assessment of Operational Effects

5.4.2.1 Designated Sites and Features of Natural Heritage Importance

The Project, at the operational stage, will be spatially separated from all designated sites of natural heritage importance.

As set out above the site is hydrologically connected to a number of European sites within Dublin Bay, via the Bluebell Stream and the River Liffey, including the South Dublin Bay SAC and North Dublin Bay SAC and the South Dublin Bay and River Tolka Estuary SPA and North Bull Island SPA. The Project is located at a distance of 34.7km from each of these European sites (straight-line distance) and is linked to them by a hydrological pathway approximately 58km in length.

Potential operational phase impacts to the aquatic environment are limited to those associated with pollution and sedimentation arising as a result of contaminated surface water run-off in addition to the inappropriate discharge of foul water into the aquatic environment. As set out above in respect of construction phase effects associated with the Project, it is considered highly likely that such released sediments or pollutants would be deposited quickly and not borne downstream in suspension. Over the 58km pathway separating the site and downstream European sites it is considered that any sediments or pollutants arising as a result of the Project

would be subject to deposition or dilution within the large volumes of water within the River Liffey prior to discharge to Dublin Bay itself.

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Significant mixing of seawater occurs in Dublin Bay with freshwater flowing in from the surrounding river catchments. The mixing of any polluting materials that nonetheless escape to the marine environment as a result of the Project will be further aided by the tidal currents, wind and wave climate which transport and continue to mix the seawater and freshwater (and any polluting substances) both into and out of the Liffey Estuary, and help it disperse widely and dilute to much lower concentrations throughout Dublin Bay, the point where it cannot be detected above background levels. On this basis any potential minor inputs arising as a result of the Project are highly likely to be undetectable at the point at which any such materials reach any European sites which lie at distances greater than 58km downstream of the Project.

It is considered therefore that operational phase effects associated with surface water runoff and foul water have no potential to give rise to a measurable effect upon the downstream European sites within Dublin Bay. This conclusion is drawn in light of the small-scale nature of such potential inputs, the length of the hydrological pathway, the nature of the Liffey catchment which is already subject to significant input of sediments and other materials through agriculture, industry and other diffuse inputs, in addition to the nature of the relevant European sites which are not designated on account of qualifying interests which are known to be sensitive to impacts associated with sedimentation or minute changes in water quality, effects which are nonetheless not anticipated to occur as a result of the operational phase of the Project.

The Project will therefore have no potential to give rise to likely significant operational phase effects upon the South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA and North Bull Island SPA, or any further sites designated on account of their natural heritage interests. Effects are predicted to be **negligible** and **not significant**.

5.4.2.2 Habitats

The Project, which will not involve the loss of habitat or other potential impacts to habitats during operation, has no potential to give rise to any operational impacts upon terrestrial habitats within the site.

The operational phase of the Project, as discussed above, has potential to give rise to adverse impacts to lowland river habitat, limited to the Bluebell Stream, as a result of the inadvertent release of pollutants and sediments within surface water runoff and the inappropriate discharge of foul water from the Project at operational phase.

Impacts associated with such effects are considered to be **minor adverse** and **significant**.

No further operational phase impacts to habitats are considered to arise as a result of the Project.

5.4.2.3 Protected Species

5.4.2.3.1 Birds

The Project at operational phase has no potential to give rise to any impacts to bird populations within the site as no habitats will be lost or modified throughout operational use of the site.

Impacts are therefore considered to be **negligible** and **not significant**.

5.4.2.3.2 White-clawed Crayfish

The operational phase of the Project, as discussed above, has potential to give rise to adverse impacts to lowland river habitat, limited to the Bluebell Stream, as a result of the inadvertent release of pollutants and sediments within surface water run-off and the inappropriate discharge of foul water from the Project at operational phase.

As discussed above, white-clawed crayfish is known to be present within stretches of the River Liffey which lie approximately 3.2km downstream of the Project. It is considered that potential operational phase impacts to the freshwater environment, such as the inadvertent release of pollutants and contaminants would likely be largely subject to deposition within close proximity to the source. However, there is insufficient information available to conclude that such material would not give rise to measurable effects upon populations of this species which lie relatively close to and downstream of the Project. As the species is known to be sensitive to

the effects of sedimentation, it is considered that such potentially measurable effects could give rise to **minor adverse** and **significant** in the absence of mitigation.

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5.4.2.3.3 Bats

The Project will, at operational phase, have limited potential to give rise to adverse impacts to bats with the exception of lighting impacts associated with the proposed design.

The EIAR is supported by a Lighting Assessment Report (see Volume III Technical Appendices) which is inclusive of proposed lighting fixture locations and associated lux plan, showing the resultant light levels which will be present on the site throughout the operational phase.

This lighting design has been sensitively designed to prevent excess lighting associated with the Project and as such proposed lighting levels to areas of retained and proposed vegetation will largely be less than 0.1lux. The site in general will be subject to low levels of artificial lighting.

The site is currently subject to existing artificial lighting associated with the adjacent M7 Business Park and the Osberstown Business Park to the south and north of the site respectively.

It is considered that areas of retained and proposed vegetation, including hedgerows, woodland and scrub planting and SuDS features which will provide opportunities for foraging and commuting bats at the operational phase of the proposals, will not be subject to adverse effects associated with artificial lighting. Furthermore, proposed bat boxes and houses will also not be subject to any adverse effects associated with operational phase lighting.

Impacts upon bats at operational phase are therefore considered to be **negligible** and **not significant**.

5.4.3 Cumulative Effects

5.4.3.1 Other Projects

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

5.4.3.2 Gas Connection

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

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

This GNI connection application will be undertaken following its own environmental assessment procedure and as such will be subject to the same obligations as the Project in respect of the extent of mitigation measures and standard good practice at construction, with a minimal footprint.

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

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

5.4.4 Inter-Relationships

The assessment in this chapter of the potential of the Project to give rise to impacts upon hydrologically linked designated sites is linked to the assessment set out in Chapter 7: Water and Hydrology of the EIAR. Mitigation measures in respect of such potential impacts are largely drawn from the recommendations set out in these chapters.

The proposed landscape planting proposals, as referenced below in respect of mitigation, are drawn from Chapter 11 Landscape and Visual of the EIAR.

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5.5 Mitigation

5.5.1 Designated Sites and Features of Natural Heritage Importance

The Project is considered to have negligible potential to give rise to significant effects upon designated sites of conservation significance. As such no specific mitigation measures are proposed in respect of designated sites.

Mitigation measures set out below in respect of freshwater aquatic habitats will also act to prevent any effects upon downstream European sites which are nonetheless deemed to be below a *de minimis* threshold.

5.5.2 Habitats

The Project will incorporate measures, as set out within the accompanying Landscape Statement and associated plans (see Volume III Technical Appendices) for the protection of retained habitats in addition to the delivery of proposed compensatory planting.

Proposed SuDS features, which will comprise a significant area of the Project site, will be subject to a range of wetland planting, including wet grasslands, marginals and aquatic species which are designed to provide a mosaic of habitats which are either temporarily or permanently wet and will provide significant floral diversity including a range of species of high value for pollinators.

Of the areas proposed for SuDS planting, including dry grassland swales and the margins of wetland ponds, a total of 2.6ha of species rich wet grasslands and wetland planting are proposed within the development. It is considered that this wet grassland planting will fully compensate for losses to areas of wet grassland and tall sedge swamps which will occur at construction phase of the Project as these existing habitats are relatively species poor. In addition, the proposals will also incorporate 1.38ha of biofiltration planting, comprised of a range of non-native species which nonetheless provide some opportunities for pollinators and other native invertebrates.

Proposed SuDS features themselves, which will support variable depths of open water, depending on weather conditions, will provide pond habitat which is not currently present on site and offer potential opportunities for a wide range of aquatic fauna including a wide range of invertebrates, in addition to associated benefits for foraging birds and bats. These features, which are likely to hold some water year-round will fully mitigate for any adverse effects associated with the loss of seasonally dry drainage ditches within the site and represent a significant ecological enhancement of the site post-development.

The Project, as set out above, will give rise to the loss of around 2.9km of hedgerows and treelines in addition to 0.22ha of orchard, comprised of a former kitchen garden, and 0.46ha of scrub largely dominated by bramble. In order to compensate for these losses, the Project is to incorporate large areas of woodland, scrub and hedgerow planting. In total 5.4ha of woodland planting is to be delivered within the Project, described as native mixed structural screen planting and comprised of a range of native species including a proportion of standard trees. A further 0.9ha of native scrub/hedge mix is also proposed for areas where full height woodland is not appropriate, such as in proximity to overhead lines, and will be managed to a maximum of 3m in height. This planting is to be located around the margins of the site, to provide screening of the development from adjacent areas and also providing continuous habitat corridors linking SuDS features and other proposed landscape planting with semi-natural habitats off-site to the south-west.

In addition to woodland and scrub planting the proposals will incorporate 0.639km of native hedgerows planted throughout the site and managed to a maximum height of 3m.

It is considered that proposed woodland, scrub and hedgerow planting will fully mitigate for proposed losses to hedgerows, scrub and orchard habitats within the site over the long term. Some residual short term adverse

effects (minor adverse) are nonetheless predicted associated with the loss of mature hedgerows and treelines and the associated delay in the establishment of compensatory habitats.

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The Project will also incorporate significant areas of species-rich grassland planting including 3.1ha of short-cut floral lawns, comprising a range of native species tolerant to regular mowing to a relatively short height, and 3.4ha of long wildflower meadows which are to be managed through an annual hay cut regime. These habitats will be inclusive of a range of native flora species of value for invertebrates and will, it is considered, fully mitigate for losses of semi-improved neutral agricultural grasslands and dry meadows/grassy verges habitat which will arise as a result of the Project. Furthermore, it is considered that these areas of species-rich meadow will represent a significant enhancement of the site over the current situation.

In addition to proposed native planting a proportion of the proposed buildings will incorporate a total of 0.9ha of green roofs which are to be planted with a non-native sedum blanket and subsequently managed to ensure this habitat is maintained. These areas will provide some opportunities for a range of pollinator species.

Subject to the implementation of this compensatory planting it is envisaged that adverse ecological impacts associated with the loss of various habitats on site required to facilitate the Project, will be largely mitigated. Furthermore, the Project is predicted to deliver biodiversity net gain over the current situation through the provision of a range of species-rich habitats of value for pollinators in addition to wetland habitats, woodland and scrub.

Indirect effects associated with construction phase of the Project were limited to those associated with water quality and habitat deterioration effects arising to lowland river habitat (the Bluebell Stream) through sedimentation and pollution effects associated with nearby earthworks and other construction activities.

In order to mitigate these potential effects upon the freshwater environment a range of mitigation measures are to be implemented within the Project, and are set out within Chapter 7: Water and Hydrology of the EIAR and within the accompanying Construction and Environmental Management Plan (CEMP). Subject to the implementation of these construction phase mitigation measures it is considered that any potential significant adverse effects upon freshwater habitats within the Bluebell Stream, and any downstream watercourses, would be fully mitigated.

In addition to the above construction phase mitigation measures, the proposals will also incorporate a range of design measures to ensure that surface water run-off of the site is maintained consistent with the greenfield run-off rates including a range of SuDS features which will include petrol interceptors. Furthermore, proposals will incorporate the discharging of foul water to the existing Irish Water foul sewer for treatment at Osberstown WwTW. These features will ensure that any potential operational phase effects upon lowland river habitats (the Bluebell Stream) are fully mitigated.

While proposed mitigation measures will fully mitigate for impacts which are predicted to arise to habitats, some residual **minor adverse** and **significant** effects remain in relation to the loss of mature hedgerows and treelines within the site. While proposed compensatory planting will fully mitigate for such losses in the long term, residual short-term adverse effects are associated with the time required for establishment of compensatory planting following loss of mature hedgerow and treeline habitats.

5.5.3 Bats

Demolition of any building with a known bat roost must take place between March - mid- May or September - October inclusive, of any given year, to avoid the bat maternity and hibernation seasons and minimise the impact on bats. A NPWS bat roost derogation/roost exclusion licence will be obtained prior to the commencement of demolition of Structure 1, see accompanying Ecological Survey for Bats (Appendix 5.2, Volume II).

Prior to the demolition of the confirmed bat roost, Structure 1 (S1), and the other structures on site which have roosting suitability (S2-S6), the licenced ecologist will thoroughly search for the presence of roosting bats using an endoscope and torch. If bats are found to be present during demolition, species rescue and translocation will be carried out using gloves, and the bat(s) carefully transported to a nearby artificial bat roost. If a bat(s) is found roosting where it cannot be safely removed by hand, or where there are features with potential to conceal a roosting bat which cannot be sufficiently searched to confidently confirm that roosting bats are absent from the cavity, a bespoke designed bat exclusion device will be fitted around the roost entrance. Details of such measures will be included in the NPWS bat roost derogation licence method statement, as required.

All trees which have been confirmed to have Moderate or High bat roosting suitability will either have a dawn re-entry survey carried out or be inspected using an endoscope by a licenced ecologist immediately prior to felling. If any bats are found and cannot be safely removed by hand, the same measures stated above for structures will be applied.

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4no. bat roost box locations are proposed within the site. These will comprise pole-mounted bat boxes, with two individual bat boxes proposed per location. Poles will be set in concrete or alternatively driven to a depth of at least 1m. Boxes themselves will be manufactured by Greenwood Ecohabitats[1] or similar, and will be erected, two per pole and fastened to the pole with metal straps or banding at a height of 3.5m or higher. These boxes are intended to compensate for the loss of numerous trees with bat roost potential which were not recorded to support bat roosts and to provide additional roosting resources for the local bat population. Greenwood Eco-Habitat artificial bat roost boxes are constructed from Ecostyrocrete and have a high bat uptake rate. The following boxes will be utilised, two per pole:

- 'Half and Half bat box' consist of a two-crevice design, and the other half of the box has the Small Hollow design, providing roosting opportunities for a wide range of bat species, or similar (Four no. total)
- Two crevice bat boxes, or similar. (Four no. total)

In addition to proposed bat box locations the proposals will incorporate three bat house structures. It is proposed that one will be a blockwork structure with floor dimensions of three-by-three metres, with a pitched slate/slate tile roof with 1F felt underlay, bat-access slates and gaps in soffits and facia to facilitate access. The interior of this structure will include layers of spaced plywood or OSB between rafters to provide interior crevices ("squeeze boxes") which will ensure that the structure is suitable for a variety of bat species. A door into this structure will be provided to facilitate access for monitoring and maintenance, as required.

The remaining two bat house structures will utilise a timber design with floor dimensions of approximately 2.5 x 2.5m and significantly raised off the ground. Such structures will utilise interior "squeeze box" features in addition to appropriate access points, including for monitoring. Further details on the design of these structures will be provided in respect of the NPWS derogation license application for the scheme and/or in respect of any relevant planning conditions.

Typical designs for bat houses and bat boxes are illustrated in drawing number 22217-RKD-ZZ-ZZ-DR-A-1402 (Volume III).

An ECoW will provide advice on the exact design and location of artificial bat roosts however the initially proposed locations are shown on the project Landscape Masterplan (BSM-ZZ-ZZ-DR-L-0301) which accompanies the EIAR submission. Proposed artificial bat roost boxes and bat houses are to be located along the southern site boundary to utilise the connectivity of the bluebell stream to the River Liffey, in addition to providing close access to proposed mitigation planting and SUDs features for foraging.

The Lighting Strategy for the Project has been designed in accordance with the Institution of Lighting Professionals (ILP) Guidance Notes for the Reduction of Obtrusive Light (ILP 2011) and Bats and Artificial Lighting in the UK (ILP 2018).

Artificial lighting will only be installed where and when necessary, i.e. when it is needed for safety reasons or to comply with statutory guidelines. There will be no direct illumination of any artificial bat roosts. Lighting will be avoided in areas where existing trees are to be retained and in areas proposed for native woodland buffer planting. Lighting design will aim to use narrow spectrum lights with no UV content; directional downlights illuminating below the horizontal plane; bollard or low level downward directional luminaries; external security lighting should be set on motion-sensors and short (1 minute) timers; and use accessories such as baffles, shields, louvres or adjusting the angle of the lamp where necessary (ILP 2018).

Proposed bat box and house locations will be located within areas of the site which will not be subject to lighting levels greater than 0.1lux associated with the Project. Proposed mitigation planting will in the medium term, provide further attenuation of artificial lighting from off-site sources.

The Project will incorporate significant areas of compensatory planting including areas of woodland, scrub, species rich grassland, hedgerows and SUDs features which are likely to fully mitigate for the loss of foraging habitats currently supported on the site for bats. The site was not considered likely to act as a significant

[1] https://www.greenwoodsecohabitats.co.uk/shop

commuting route for local bat populations given its location between areas of existing development and the M7 road. Connectivity of the site and the wider area will be maintained through the proposed landscape planting regime.

It is considered that the provision of these measures will fully mitigate for the loss of roosts and potential roosts which will occur as a result of the Project. Furthermore these proposals will represent a significant enhancement of the site for roosting bats and will provide opportunities for maternity colonies and individual roosting bats which are not currently supported on the site.

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5.5.4 Birds

The Project has potential to give rise to significant effects upon nesting bird's species which are likely to utilise habitats including scrub, orchard, scattered trees, hedgerows, amenity planting and buildings within the Project site.

In order to avoid any significant impacts upon birds all site clearance, in addition to demolition of buildings, will take place during the period 1st September to 28th February which is outside the breeding season for those bird species that are likely to breed on the site. This will avoid any direct impacts of the Project on breeding birds.

Proposed mitigation planting and SUDs features within the Project design are likely to provide significant opportunities for breeding birds during the operational phase of the Project.

5.6 Summary of Effects & Conclusion

The Project has potential to give rise to a range of significant impacts upon natural heritage and biodiversity receptors.

No significant adverse impacts are predicted to arise to any sites designated on account of natural heritage or conservation interests.

Predicted significant impacts upon habitats are limited to the loss of areas of habitat of local importance including wet grasslands, tall sedge swamps, orchard, hedgerows and treelines within the site and potential water quality and habitat deterioration effects arising through the accidental release of sediments or pollutants into the freshwater environment at construction or operation.

Potential impacts to protected species include impacts to downstream populations of white-clawed crayfish associated with the accidental release of sediments or pollutants into the freshwater environment at construction or operation; the loss of a single building recorded to support a bat roost, impacts to foraging and commuting bats associated with the loss of hedgerows, treelines and other habitats of value for this group; and disturbance to nesting birds.

A summary of the predicted effects and proposed mitigation is set out below at Table 5.4.

Residual effects on natural heritage and biodiversity as a result of the Project are limited to **minor adverse** and **significant** effects associated with the short-term loss of hedgerows and treelines which will occur prior to the establishment of compensatory woodland, scrub and hedgerow planting which will however fully mitigate for such losses in the long term. These effects upon habitats will give rise to associated **minor adverse** and **significant** effects upon foraging and commuting bats, again in the short term.

Table 5.4: Summary Table of Likely Environmental Effects on Natural Heritage and Biodiversity Pre and Post Mitigation

Sensitivity of receptor	Receptor	Description of Effect	Duration	Magnitude	Magnitude of Effect	Significant Not significant	Significant or Not significant Post Mitigation
International level	**Construction phase**	Water quality and habitat deterioration: release of sediments or pollutants into the freshwater environment.	Short term	Negligible	Negligible	Not significant	Not significant
Site level	Designated Sites of Natural Heritage Importance	Loss of habitat.	Short term	Negligible	Negligible	Not significant	Not significant
Site level	Habitats: Improved Grassland	Loss of habitat.	Short term	Negligible	Negligible	Not significant	Not significant
Site level	Habitats: Amenity Grassland	Loss of habitat.	Short term	Minor	Minor adverse	Significant	Not significant
Site level	Habitats: Dry Neutral Grassland	Loss of habitat.	Short term	Negligible	Negligible	Not significant	Not significant
Local level	Habitats: Dry Meadows/Grassy Verges	Loss of habitat.	Short term	Minor	Minor adverse	Significant	Not significant
Local level	Habitats: Wet Grassland	Loss of habitat.	Short term	Minor	Minor adverse	Significant	Not significant
Site level	Habitats: Large sedge swamps	Loss of habitat.	Short term	Negligible	Negligible	Not significant	Not significant
Local level	Habitats: Tilled land	Loss of habitat.	Short term	Minor	Minor adverse	Significant	Not significant
Site level	Habitats: Orchard	Loss of habitat.	Short term	Negligible	Negligible	Not significant	Not significant
Negligible	Habitats: Scrub	Loss of habitat.	Short term	Negligible	Negligible	Not significant	Not significant
Negligible	Habitats: Buildings	Loss of habitat.	Short term	Negligible	Negligible	Not significant	Not significant
Site level	Habitats: Hardstanding	Loss of habitat.	Short term	Negligible	Negligible	Not significant	Not significant

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Local level	Habitats: Drainage ditches	Water quality and habitat deterioration effects.	Short term	Minor	Minor adverse	Significant	Not significant
Site level	Habitats: Lowland river	Loss of habitat.	Short term	Negligible	Negligible	Not significant	Not significant
County level	Habitats: Amenity planting	Loss of habitat.	Short term	Moderate	Moderate adverse	Significant	Significant
County level	Habitats: Hedgerows	Loss of habitat.	Short term	Moderate	Moderate adverse	Significant	Significant
Site level	Habitats: Treelines	Loss of habitat.	Short term	Negligible	Negligible	Not significant	Not significant
National level	Habitats: Scattered trees	Downstream water quality and habitat deterioration effects.	Short term	Minor	Minor adverse	Significant	Not significant
National level	White-clawed crayfish	Loss of roost.	Short term	Moderate	Moderate adverse	Significant	Not significant
National level	Bats	Temporary loss of foraging and commuting habitat.	Medium term	Minor	Minor adverse	Significant	Not Significant
Local level	Bats	Destruction of bird nests or disturbance to nesting birds.	Short term	Moderate	Moderate adverse	Significant	Not significant
International level	Birds	Water quality and habitat deterioration: release of sediments or pollutants into the freshwater environment.	Short term	Negligible	Negligible	Not significant	Not significant
Local level	**Operational phase**	Water quality and habitat deterioration effects.	Short term	Minor	Minor adverse	Significant	Not significant
National level	Designated Sites of Natural Heritage Importance	Downstream water quality and habitat deterioration effects.	Short term	Minor	Minor adverse	Significant	Not significant

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	Habitats: Lowland river						
	White-clawed crayfish						

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5.7 Limitations of the Assessment

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The above EcIA has been undertaken on the basis of findings reached through a range of surveys undertaken in line with relevant industry guidelines. It is not considered that there were any particular limitations to the assessment which took account of the findings of these surveys, which are likely to have significantly affected the outcome of the assessment.

5.8 References

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BSI (2013) *BS 42020:2013 Biodiversity: Code of practice for planning and development*.

CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland, Terrestrial, Freshwater and Coastal and Marine*, Technical Guidance Series, Version 1.1, Chartered Institute of Ecology and Environmental Management, Winchester

CIEEM (2022) *Code of Professional Conduct*, Chartered Institute of Ecology and Environmental Management, Winchester.

Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn), The Bat Conservation Trust, London.

EPA (2022) *Guidelines on the information to be contained in Environmental Impact Assessment Reports*, Environment Protection Agency, Wexford.

Fossitt, J. (2000) *A Guide to Habitats in Ireland*. Heritage Council, Kilkenny.

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NRA (2009) *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*, National Roads Authority, Dublin.

Stephanie Peay (2002) *Guidance on Habitat for White-clawed Crayfish and its Restoration,* English Nature and the Environment Agency, West Yorkshire. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/290346/sw1-067-tr-e-e.pdf (Accessed July 2023).

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EIAR
VOLUME I MAIN TEXT – CHAPTER 6 LANDS AND SOILS

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6 LANDS AND SOILS

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6.1 Introduction

This chapter of the EIAR describes the likely significant effects of the Project in relation to soils, geology and hydrogeology. This chapter provides a description of the Project in the context of soils, geology and hydrogeology, the baseline soils, geology and hydrogeology environments for the Project site and a statement of the likely significant impacts associated with both the construction and operation phases of the development. In addition, a 'do nothing' scenario has also been considered. Mitigation measures are proposed in the form of avoidance, prevention, reduction, offsetting, and reinstatement or remedial measures and recommendations for monitoring are included where appropriate predicted residual effects are described.

6.2 Methodology

This chapter has been prepared having regard to the following guidelines;

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018)
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017)
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports –(EPA, 2022)
- The Assessment has been carried out generally in accordance with the following guidelines:
- Guidelines on the Information to be contained in Environmental Impact Assessment Reports DRAFT (EPA, August 2017);
- Advice Notes for preparing Environmental Impact Statements DRAFT (EPA, September 2015);
- Guidelines on Information to be contained in Environmental Impact Statements (EPA, 2002);
- Advice Notes on Current Practice in the preparation of Environmental Impact Statements (EPA, 2003);
- Guidelines for the preparation of Soils Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013);
- Geology in Environmental Impact Statements, A Guide (IGI, 2002);
- Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA 2009);
- Control of Water Pollution from Construction Sites (CIRIA, 2001); and Environmental Handbook for Building and Civil Engineering Projects (CIRIA, 2000).
- The assessment followed a phased approach as outlined in Chapter 4.4 of the Advice Note (EPA, 2015) and the IGI Guidelines (IGI 2013).

6.2.1 Initial Assessment

An initial assessment was carried out which defined the Project in terms of location, type and scale, established the baseline conditions; established the type of soil/ geological environment; established the activities associated with the Project and; initial assessment and impact determination. These objectives were achieved by way of a geological desk study and baseline data collection. A full list of sources for the desk study together with relevant legislation are included in Section 6.4 and are briefly listed below:

- Ordnance Survey of Ireland maps;
- Geological Survey of Ireland Groundwater and Geotechnical map viewer;
- Environmental Protection Agency Envision Maps; and

- National Monuments Service maps.

Additional information has been compiled through consultation and feedback from the project/EIAR Team. The information obtained from the above listed sources were utilised to establish the baseline conditions for the site.

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6.2.2 Geotechnical and Environmental Investigations

The second phase of the assessment includes the results from a geotechnical investigation which was commissioned by the Applicant and was undertaken in 2022 by IGSL (Report No.: 24330). The site conditions have not changed since the commissioning of this GI and the results are considered to continue to represent the existing conditions. Ground investigations consisted of a combination of: -

- Trial Pits
- Cable percussion (shell and auger) exploratory boreholes
- Dynamic Probing
- Plate Bearing Testing
- Soakaway Testing (to BRE365)
- Resistivity Survey
- Groundwater Monitoring
- Gas Monitoring
- Surveying of Exploratory Hole Locations
- Photographs of U100 samples
- Core photographs
- Laboratory testing
- Standpipe water level readings and
- Variable head permeability test results.

The geotechnical investigation was carried out in accordance with Eurocode 7 – Part 2: Ground Investigation & Testing (EN 1997-2:2007). This has been used together with complementary documents such as Engineers Ireland Specification for Ground Investigation (2nd Ed, 2016), BS 5930 (2015+A1:2020) and BS 1377 (Parts 1 to 9) and the following European Norms:

- EN 1997-2 Eurocode 7: 2007- Geotechnical Design – Part 2: Ground Investigation & Testing
- EN ISO 22475-1:2006 Geotechnical Investigation and Sampling – Sampling Methods & Groundwater Measurements
- EN ISO 14688-2:2017 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 1: Identification and Description
- EN ISO 14688-2:2017 Geotechnical Investigation and Testing – Identification and Classification of Soil, Part 2: Principles for a classification
- EN ISO 14689-1:2017 Geotechnical Investigation and Testing – Identification, description & classification of rock

The boreholes were carried out in December 2022 while the standpipe water level readings were obtained in June 2023.

The second phase also includes a Detailed Assessment and Impact Determination which was carried out and incorporates the full range of site investigations and studies and a full assessment of any potential impacts. The approach adopted is as per the IGI Guidelines (IGI, 2013) and each potential effect of the Project has been described in terms of Quality, Significance, Extent, Probability and Duration in Table 6.3. Table 6.1 below refers to the potential impacts assessed. The classification of impacts/effects in this chapter follows the definitions provided in the Guidelines (EPA, 2017). Where the Initial Impact Determination concluded that the

level of potential impact is capable of measurable and noticeable consequences it is carried into the next assessment phase.

The Site Investigation Report is provided in Volume II, Appendix 4.2B.

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Table 6.1 : Potential Impacts

Activity	Construction Element	Potential Impact Description
Earthworks	Pond Excavation Pond Construction Foundation Construction	Excavation of natural soils and subsoil for roads, foundations, ponds, swales, drainage, etc.
		Airbourne dust arising from soil stockpiles causing nuisance dust on public roads and neighbouring properties
		Imported fill material shall be required as part of works
		Excavation of top soil material
		Excavation of subsoils can serve to reduce the local groundwater levels as the water table naturally lowers to a new equilibrium below the artificial ground level
		Seepage of underlying groundwater
		Discharge of contaminated groundwater to adjacent watercourse
Groundwater Abstraction		Groundwater abstraction associated with temporary dewatering forcing changes in pore water pressures and potential settlement and/ or subsidence in downstream unconsolidated sediments
Groundwater Flow Paths		Groundwater flow paths may be potentially altered due to the construction of sub-surface structures. Groundwater mounding can theoretically occur where large impermeable structures are placed perpendicular to groundwater flow paths
Groundwater Quality		Potentially contaminated water generated within the excavation could impact the Bluebell Stream

6.2.3 Proposed Mitigation Measures

The third phase identifies mitigation measures to address the identified impacts. The development, including all identified mitigation measures (assumed implemented), is then subject to impact assessment, to identify any residual impacts. The Final Impact Assessment presented in Table 6.4 incorporates the outputs from the Detailed Assessment and Impact Determination, Mitigation Measures and Residual Impact Assessment.

The final phase of work was the completion of this chapter and associated figures and appendices which has followed the EPA Guidance Note and Design Team Template.

6.3 Characteristics of the Project

6.3.1 Description of Site

The Project lands are located approximately 3km to the west of Naas town centre in County Kildare. The site is accessed on the Northern side by R409 Regional Road via Naas Town off the M7 motorway to the east or through Caragh village to the West. To the south of the site is the existing Naas M7 Business Park and to the north is the existing Osberstown industrial park. The site is situated adjacent to major infrastructure assets including the M7 Motorway. The subject site currently consists of agricultural lands, residential houses and agricultural buildings to the west of the M7 and Naas town.

There are existing private residential houses and farm buildings located on the site that are to be demolished as part of the Project works. The existing site is predominately a greenfield site being used as agricultural land. The site in level varies between 85.500m AOD and 77.500m AOD, and slopes from its low point in the south of the site along the Bluebell Stream. The Northeast side of the site that corners the R409 and the M7 motorway, slopes in south easterly direction with levels varying from 85.500m to 80.500m. To the south of the site is the Bluebell Stream into which the surface water runoff from the site currently drains.

6.3.2 Difficulties Encountered

No difficulties were encountered during the preparation of this chapter of the EIAR.

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6.3.3 Consultation

Pre-planning discussions were held in April 2023 between representatives from Donnachadh O'Brien & Associates, BSM and David Hall of Kildare County Councils in relation to the proposed Surface Water Strategy, including the provision of a 6.0l/s/ha surface water discharge rate based on the site conditions once a minimum two-stage surface water treatment process was designed and implemented.

In addition, consultation has taken place with Uisce Eireann (UE) through meetings and a Pre-Connection Enquiry. UE issued a Confirmation of Feasibility letter which confirmed that a connection from the Project to the existing wastewater and water supply networks can be facilitated.

6.4 Baseline

6.4.1 Overview

This section describes the baseline environments for land use and soils, to establish the factors which may be directly affected by the Project.

6.4.2 Existing Land Use and Topography

The Project is to be located on an existing greenfield site which is bound to the north by the R409 road, to the east by the M7 Motorway and to the south by the M7 Business Park, with agricultural land to the west. The site is currently used as agricultural land with 3 No. existing domestic properties along the northern boundary.

The site topography in level varies between +85.500m AOD and +77.500 AOD, and slopes generally from North to South. The Northeast corner slopes towards the eastern boundary. The existing Site topography is indicated below in Figure 6.1.

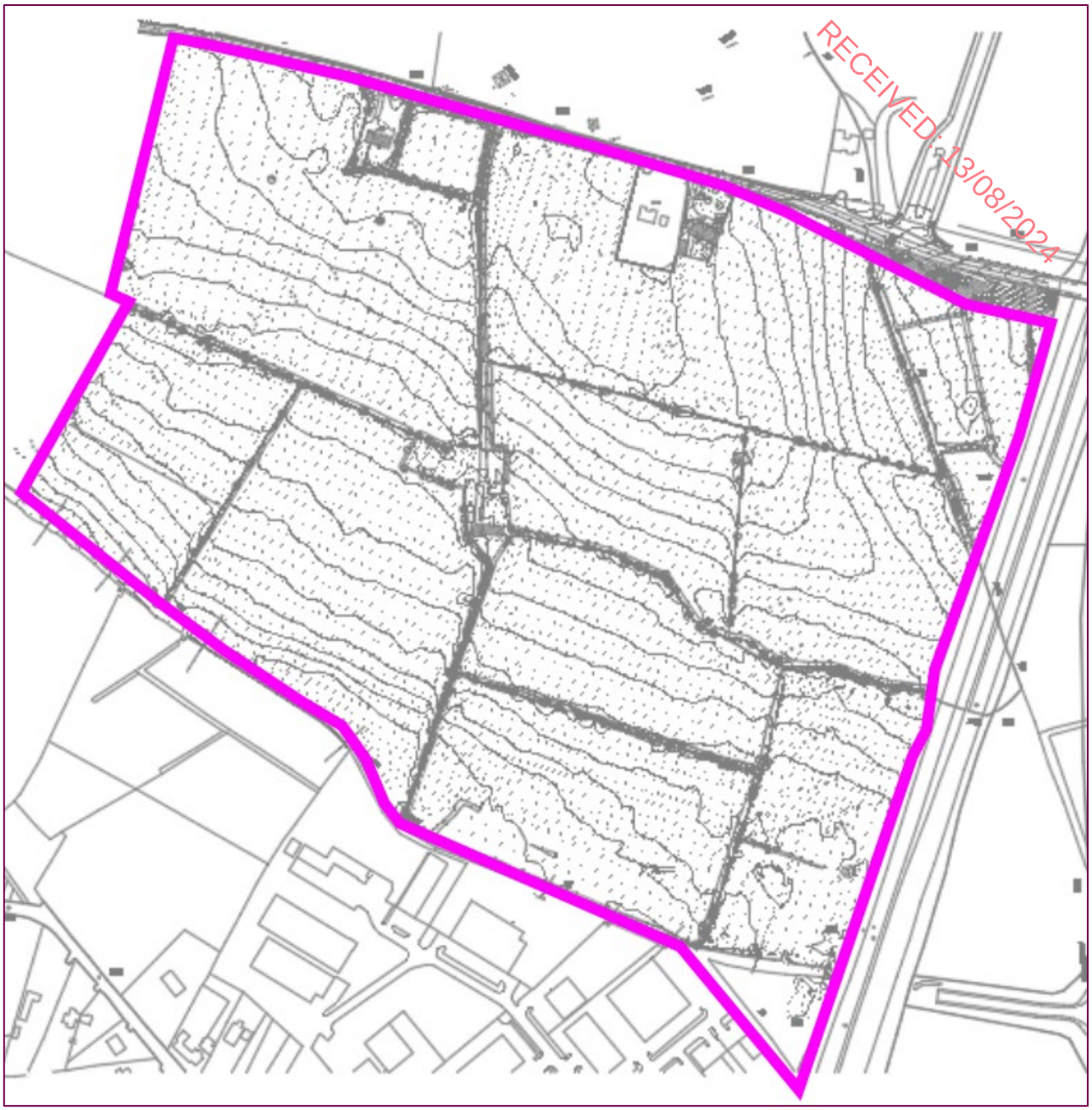

Figure 6.1: Existing Site Topography

6.4.3 History and Land Use

A number of historical maps for the Project location were obtained from Ordnance Survey Ireland (OSI).

- OSI 6-inch mapping series, 1829- 1842,
- OSI 6-inch Cassini series, 1830-1930 and
- OSI 25-inch mapping series, 1888- 1913.

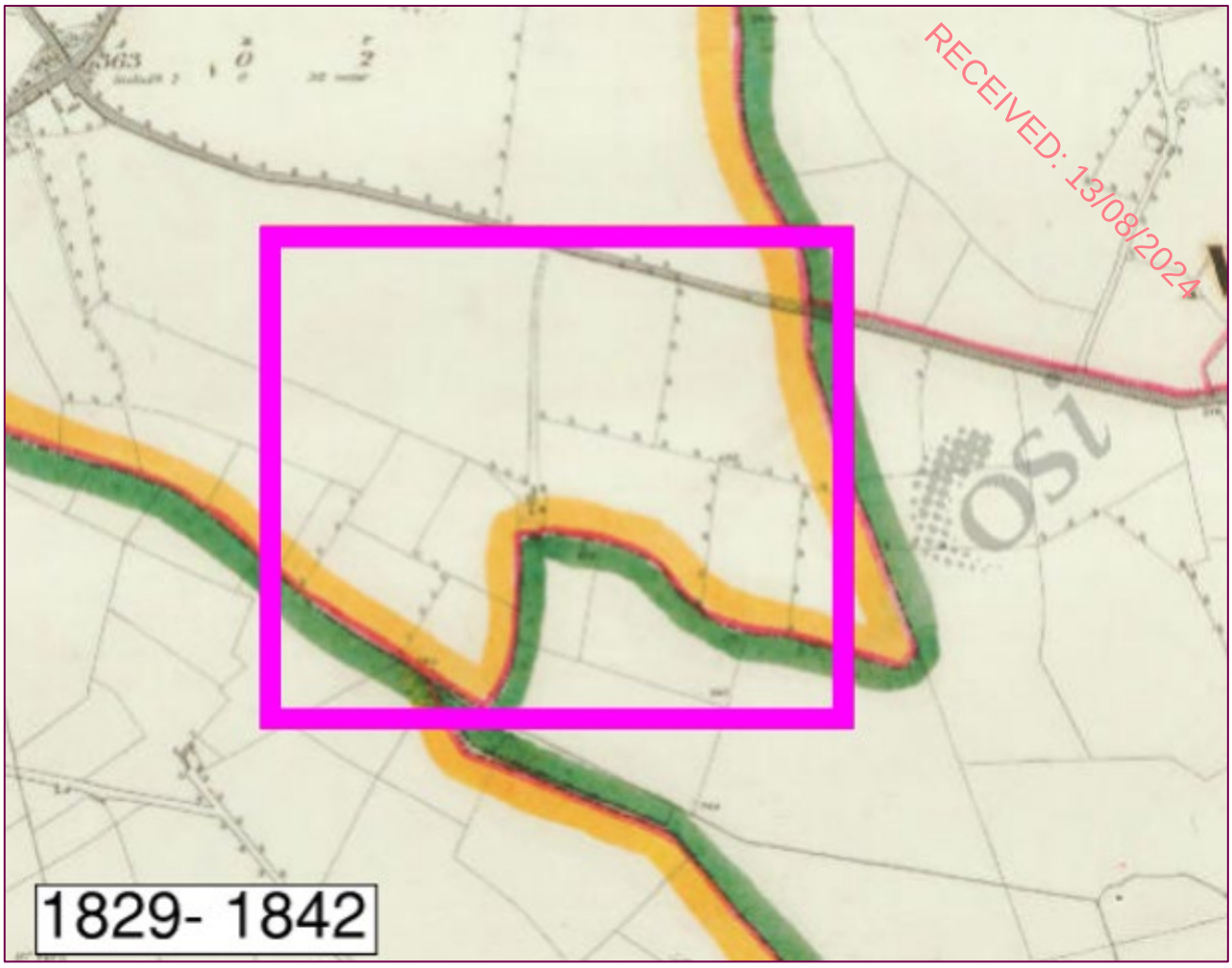

Figure 6.2: OSI 6-inch Mapping Series 1829- 1842

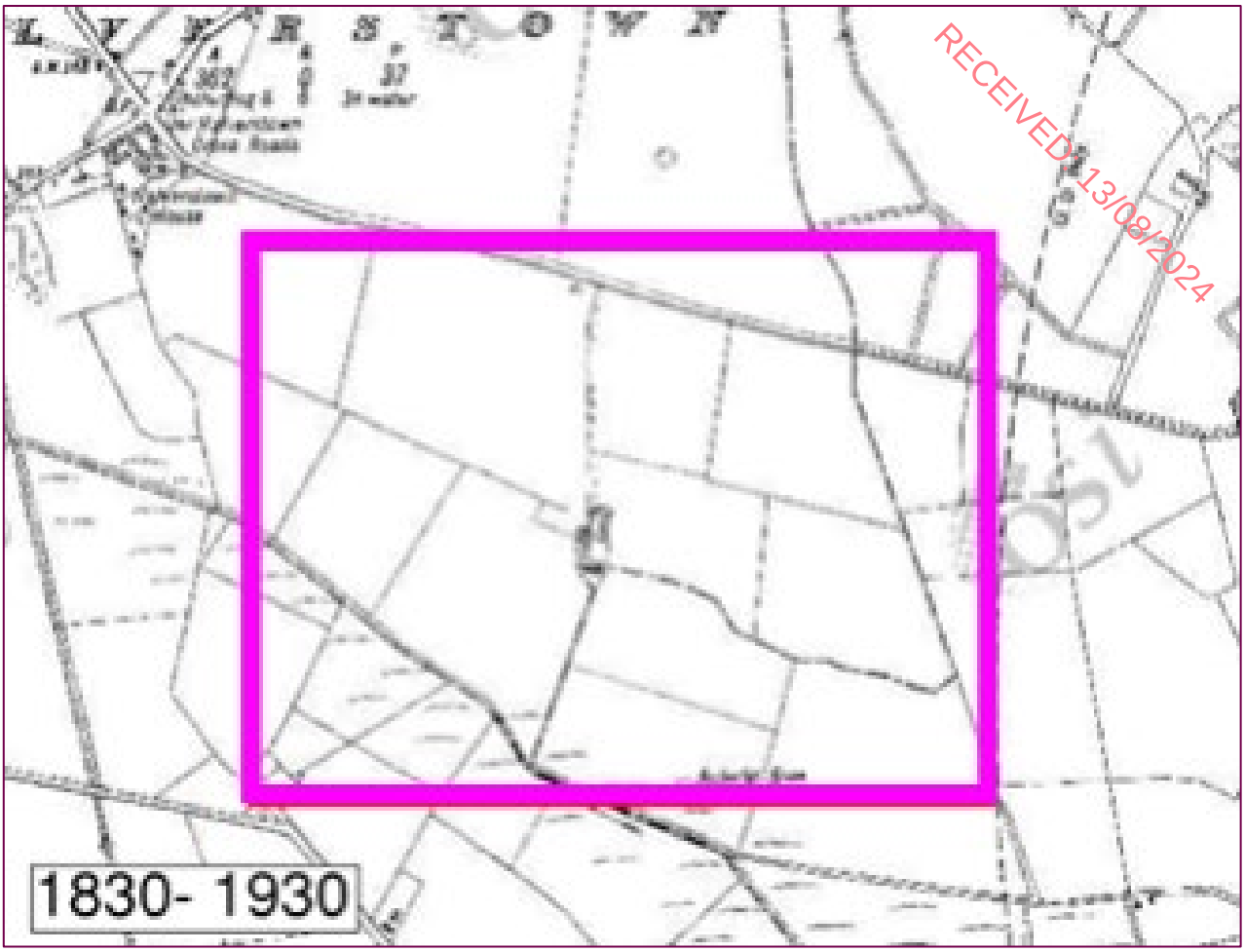

Figure 6.1: OSI 6-inch Cassini Series 1830-1930

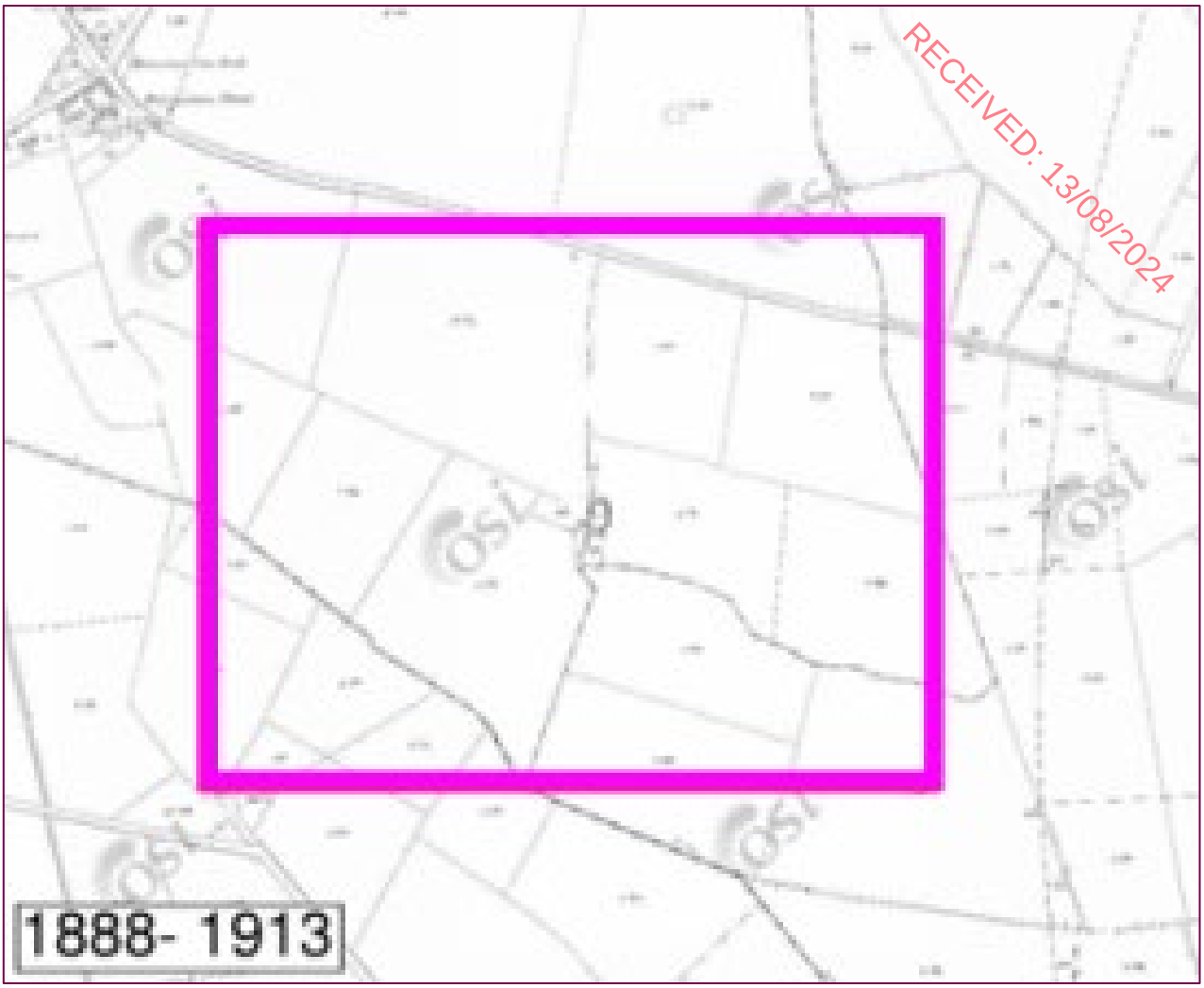

Figure 6.4: OSI 25-inch Mapping Series 1888-1913

Overall, the area appears as undeveloped land in all of the above maps. It is important to note that there is a watercourse (Bluebell Stream) running along the Southern boundary of the site in all three figures above.

6.4.4 Aerial Photography

Aerial Photographs of the site area were obtained from OSI records.

- A colour aerial photograph from 2005 with 1m pixel

Figure 6.5: OSI Aerial Photograph of Site- 2005

Comparing the obtained aerial image to the current site, there have been no major developments within the site. Development of the general area has progressed to the north of the site with the introduction of the Osberstown Business Park and development to the south within the M7 Business Park. In recent years, the M7 motorway has also undergone a road widening scheme increasing each direction of motorway by 1 no. lane. This road widening has not affected the site boundary adjacent to the motorway from 2005.

6.4.5 Geology

6.4.5.1 Quaternary Deposits

GSI Quaternary maps indicate that superficial drift deposits consist predominantly of Till derived from Limestones (TLs) as indicated in Figure 6.6 and Figure 6.7 below. The surrounding superficial deposits within 1km proximity of the site further include Gravels derived from Limestones (GLs), and Alluvium, which runs along the Bluebell Stream bank.

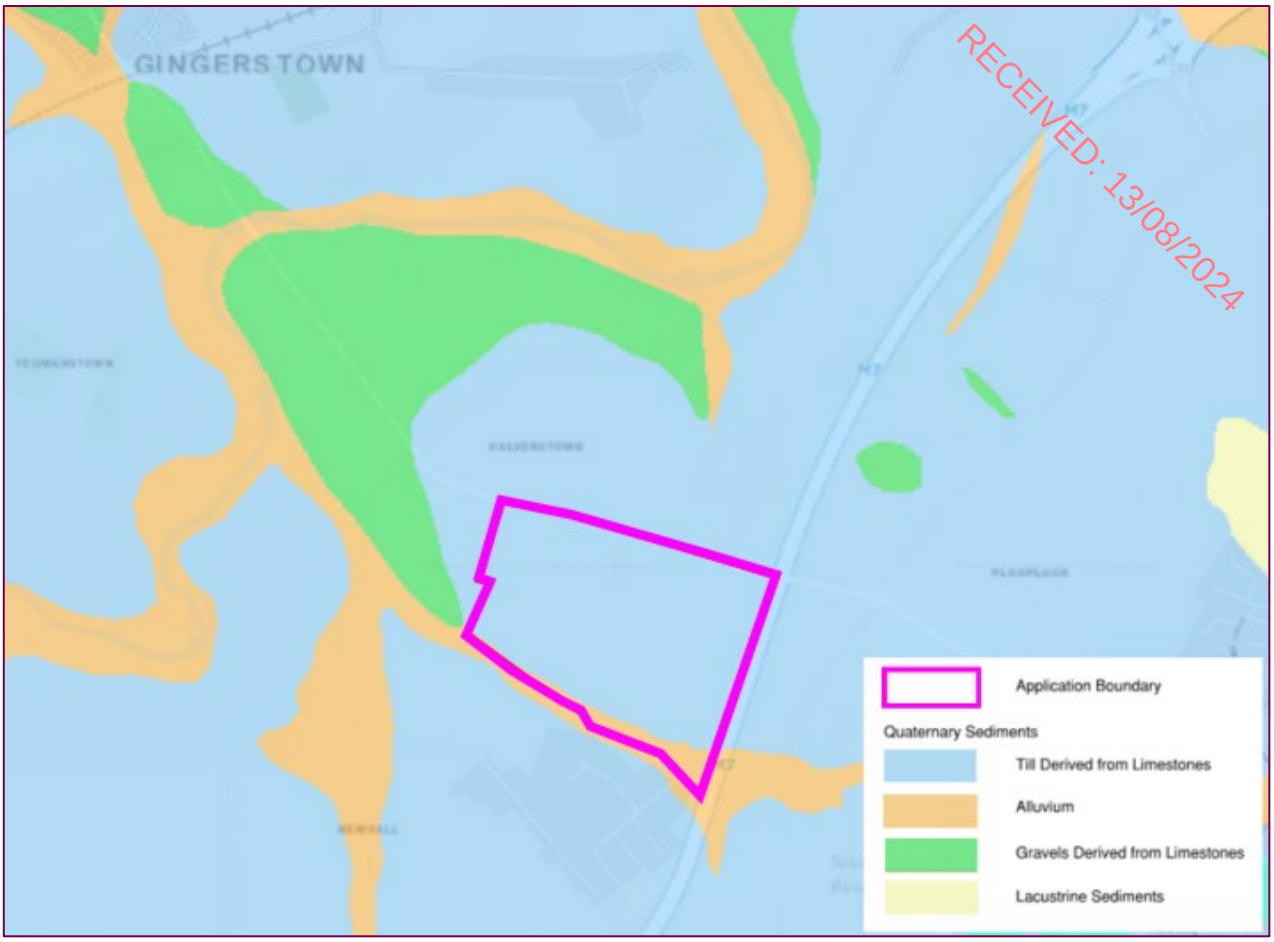

Figure 6.6: Extract from GSI Quaternary Mapping 1

Figure 6.7: Extract from GSI Quaternary Mapping 2

6.4.5.2 Bedrock

Reference to the GSI map for the area in Figure 6.8 indicates that the site is underlain by Carboniferous, Viséan-aged Rickardstown formation. The rock formation consists of cherty often dolomitised limestone. No outcrops were found on site during IGSL's site investigation.

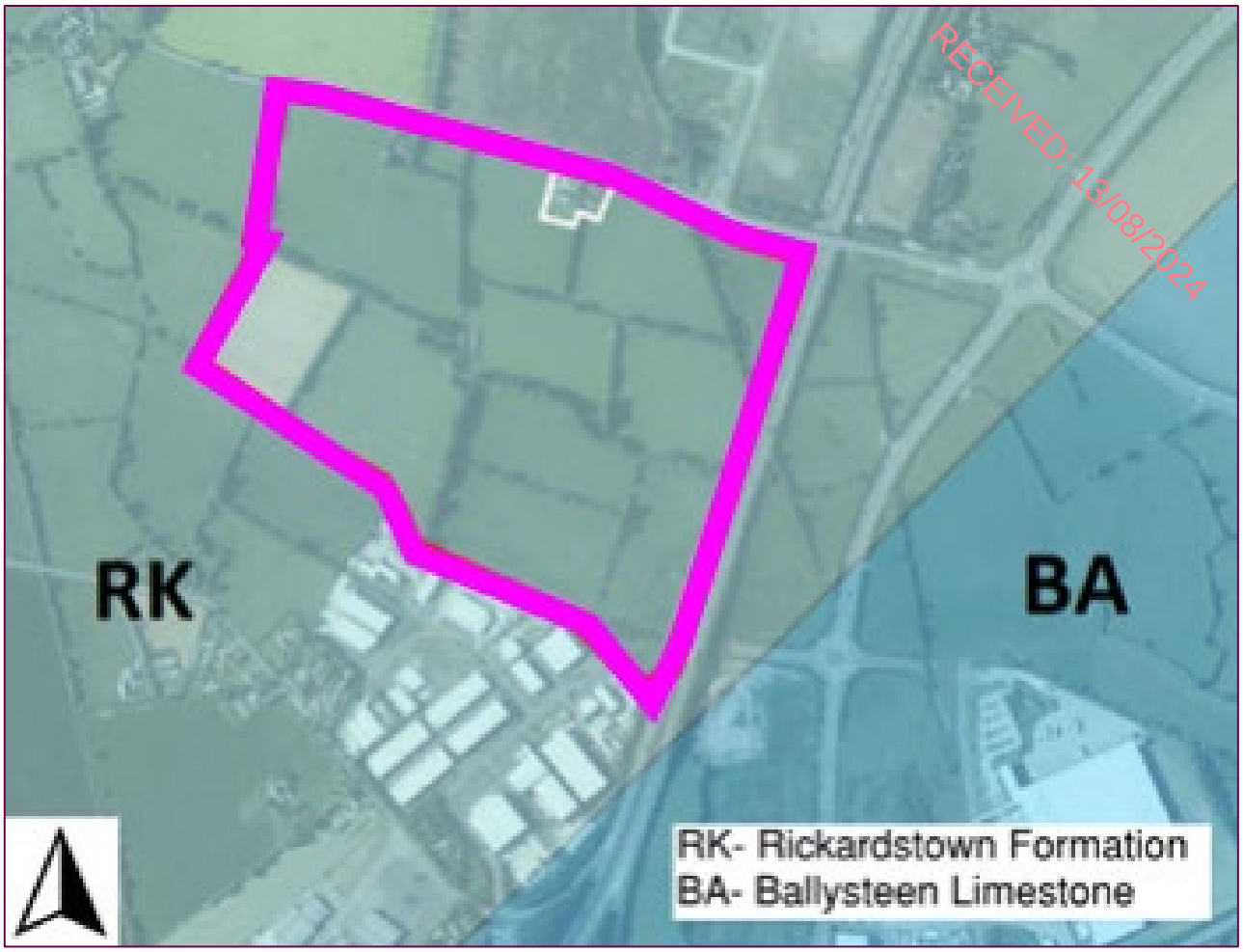

Figure 6.8: Extract from GSI Bedrock Mapping

6.4.5.3 Fluvial Flooding

There are currently OPW Eastern Catchment Flood Risk Assessment and Management Study (CFRAM) maps covering the site which shows that there have been no flood events on the Project lands. The Eastern CFRAMS mapping shows the site outside of the 0.1%, 1% and 10% AEP flood events. Along the Bluebell Stream, there are three recorded nodes, 09BLUE00160J, 09BLUE00105 and 09BLUE000671. A summary of these nodes' various AEP flood levels is outlined below in Figure 6.9.

Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m³/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
09BLUE00204	79.78	N/A	79.94	N/A	80.25	N/A
09BLUE00186al	78.19	0.58	78.83	1.07	80.02	1.84
09BLUE00160J	77.66	N/A	77.87	N/A	78.05	N/A
09BLUE00105	75.94	N/A	76.17	N/A	76.39	N/A
09BLUE00067I	75.10	N/A	75.52	N/A	75.68	N/A
09BLUE00027D	74.59	N/A	74.89	N/A	75.15	N/A
09BLUE00009	74.59	1.08	74.89	1.99	75.14	3.13

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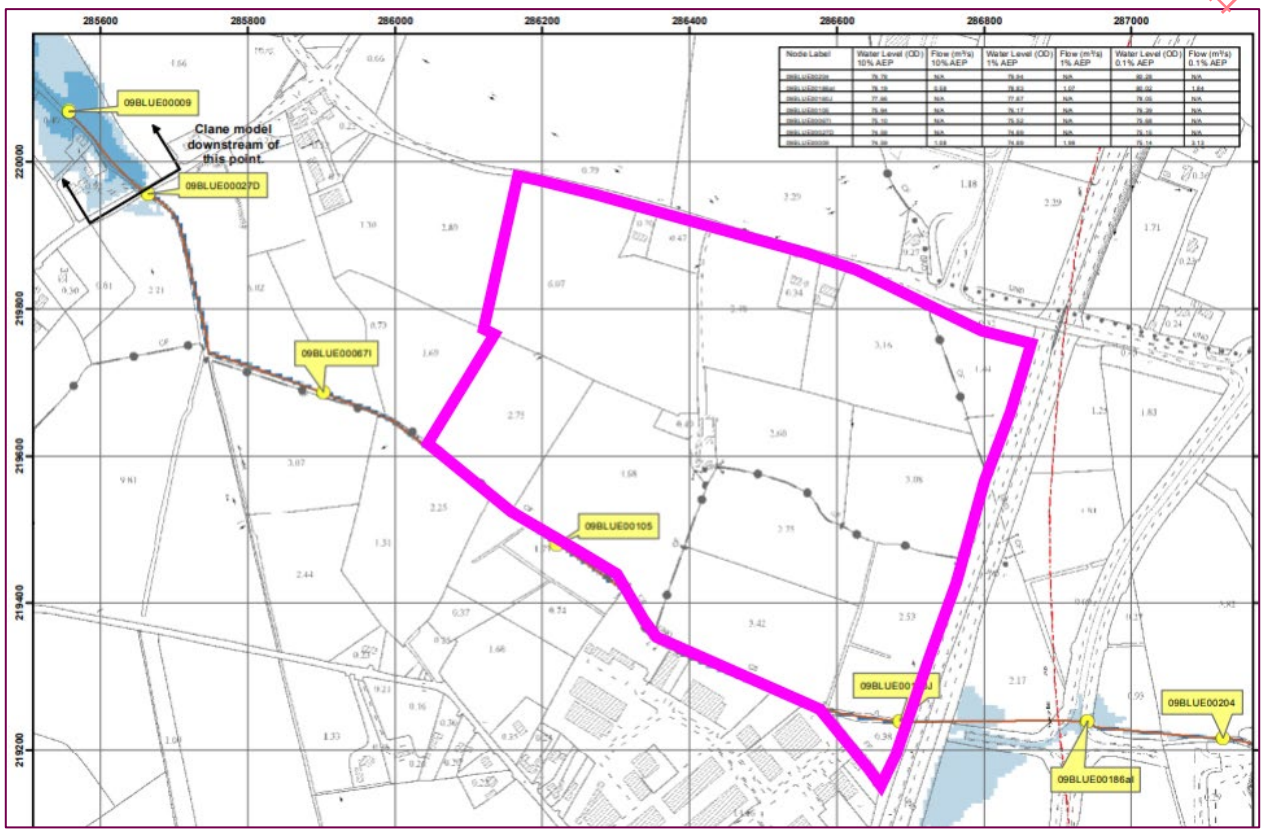

Figure 6.9: Extract from CFRAM Mapping Indicating Site Location and Levels

6.4.5.4 Subsoil Permeability

The Groundwater Subsoil Permeability map classifies how easy water can infiltrate subsoils downwards at any point in the land surface. Permeability across the country is classified as either 'High', 'Moderate' or 'Low'. Figure 6.10 identifies the Site as directly overlying moderate permeability deposits. A small zone of High permeability is located along the southern boundary and to the west of the site. Sections of higher permeability to the south are likely reflecting thinner subsoil associated with gravels.

Figure 6.2:Extract from GSI Subsoil Permeability Mapping

6.4.5.5 Groundwater Vulnerability

The site is located in an area of moderate groundwater vulnerability as indicated as shown in Figure 6.11 below which is an extract from the Geological Survey of Ireland (GSI) groundwater map viewer.

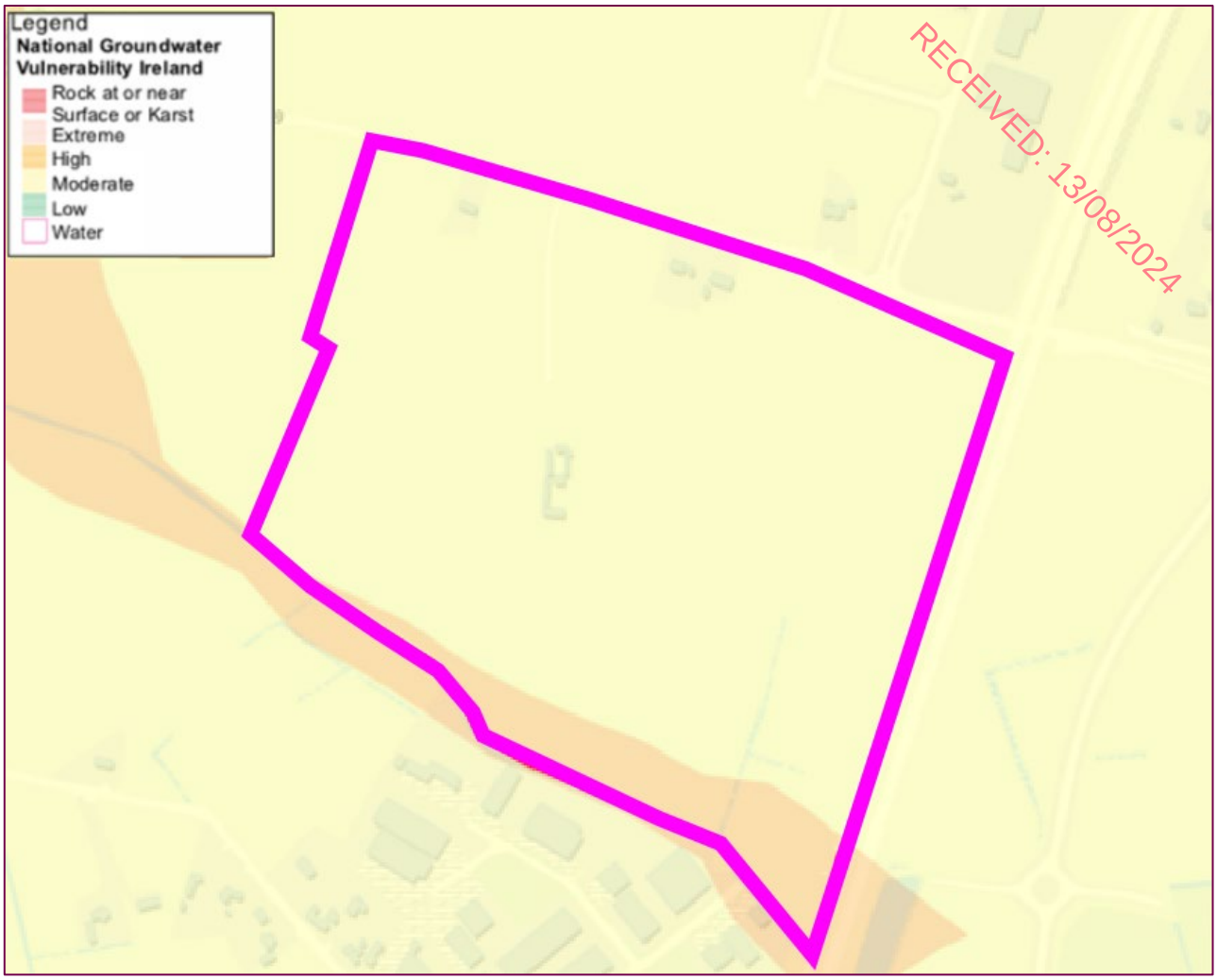

Figure 6.3: Extract from GSI Groundwater Vulnerability Mapping

6.4.5.6 Groundwater Recharge

The GSI groundwater recharge map provides an estimate of the average amount of rainwater that percolates down through the subsoils to the water table over a year. It is a function of the subsoil permeability, groundwater vulnerability and bedrock aquifer type. The majority of the site is located within areas of modearte groundwater recharge. With the north eastern corner be considered to also be moderate , but with wet soils. The average annual recharge for the iste is approximatey 251-300mm/yr with the north each experiencing a rate of 51-100mm/yr.

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Figure 6.12: Extract from GSI Groundwater Recharge Mapping

6.5 Impact Assessment

6.5.1 Do Nothing Scenario

In the 'Do Nothing' scenario, if the construction of the development at the proposed site does not take place, the existing baseline conditions will remain and there would be no resulting additional impacts on the Soils or Geology in the area of the Project site.

6.5.2 Likely Significant Environmental Effects

There are a number of effects on the land, geological and hydrogeological environments that will occur due to the Project as follows: -

- Land use – change of use agricultural to Commercial/ Data Centre Use
- Soil excavation – removal of soil to facilitate the construction the foundations/ Pond Structures and underground services infrastructure.

In line with EIAR guidance, each potential impact for the development should be described in terms of its Quality, Significance, Extent, Probability, and Duration. The potential impacts, mitigation measures and resulting residual impacts have been combined in a Detailed Assessment Table in Table 6.2 presented in Section 6.6.4.1 and are outlined below.

6.5.2.1 Construction Phase

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Below is a summary of the likely potential impacts throughout the Construction Phase:

- Excavated and stripped soil can be disturbed and eroded by site vehicles during the construction phase. Rainfall and wind can also impact on non-vegetated/uncovered areas within the excavation or where soil is stockpiled. This can lead to run-off with high suspended solid content which can impact on water bodies. The potential risk from this indirect impact to water bodies and/or habitats from contaminated water would depend on the magnitude and duration of any water quality impact.
- There is a potential for dust from demolition works, excavations or stockpiles to impact on air quality. This is discussed further in Chapter 8 Air Quality and Climate.
- Construction phase dewatering will likely be required to excavate the foundations/ pond structures and to maintain dry working conditions in the excavation due to rainfall and potential groundwater ingress as the excavation progresses with depth. Pumped surface water shall require treatment as part of the surface water strategy during construction as discussed further in Chapter 13 Material Assets: Built Services.
- Noise and vibration will be generated through the construction phase particularly during excavation work. Given that rock excavation may be required, excavation of the same may require rock breaking via pneumatic hammers attached to large tracked excavators. Noise and vibration impacts are considered in detail in Chapter 9 Noise and Vibration.
- The construction phase which includes the importing or exporting of material to the site (as part of excavation or infilling works) will have implications for traffic in the surrounding road network. These impacts are considered further in Chapter 12 Material Assets Traffic and Transport.
- There is potential for surface water and/or groundwater to become contaminated with pollutants associated with construction activity. Contaminated water arising construction sites may pose a significant short-term risk to groundwater quality for the duration of the construction should it be permitted percolate to the aquifer. The potential sources of contaminants include the following: -
    - Contaminated groundwater within the site from previous site activities,
    - Suspended solids arising from excavation and ground disturbance,
    - Hydrocarbons arising from accidental spillages from construction plant or onsite storage,
    - Cement/concrete arising from construction materials,
    - Wastewater arising from poor on-site toilet and washrooms.

6.5.2.2 Operational Phase

During the Operational Phase of the Project there is limited impact on the geological environment of the area. The site has been designed to mitigate any soil contamination which may occur during the operational phase of the Project.

6.5.2.3 Worst Case Scenario

The “worst-case” scenario is the accidental release of diesel fuel or spillage of other similar hazardous materials occurring on site during the Construction phase, through the failure of secondary containment or a materials handling accident on the site. If this were to occur in an open excavation it could lead to these materials infiltrating through the soil contaminating the soil zone and any underlying groundwater which is an adverse, significant and temporary effect. Appropriate remediation measures would then be required depending on the nature and extent of any contamination caused under such a scenario and may include the excavation and treatment of contaminated soil and associated in-situ remediation techniques.

6.5.3 Summary

Table 6.2 below summarises the identified likely significant effects during the construction phase of the Project before mitigation.

Table 6.2: Summary of Likely Significant Effects during Construction Before Mitigation

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Qual- **Quality**
Sig.- **Significance**
Ext.- **Extents**
Prob.- **Probability**
Dur.- **Duration**
Neg.- **Negligible**
Mod.- **Moderate**
Cert.- **Certain**
Per.- **Permanent**
Reg.- **Regional**

Activity	Construc. Element	Potential Impact Description	Qual.	Sig.	Ext.	Prob.	Dur.	Type
Earthworks	Pond Ex. Pond Construc. Found Construc.	Excavation of natural soils and subsoil for roads, foundations, ponds, swales, drainage, etc.	Neg.	Mod.	Local	Cert.	Per.	Irreversible
		Airbourne dust arising from soil stockpiles causing nuisance dust on public roads and neighbouring properties	Neg.	Slight	Local	Unlikely	Short	Worst Case
		Imported fill material shall be required as part of works	Neg.	Slight	Local	Likely	Per.	Irreversible
		Excavation of top soil material	Pos.	Slight	Local	Likely	Per.	Irreversible
		Excavation of subsoils can serve to reduce the local groundwater levels as the water table naturally lowers to a new equilibrium below the artificial ground level	Neg.	Mod.	Local	Likely	Per.	Worst Case
		Seepage of underlying groundwater	Neg.	Slight	Local	Likely	Short	Worst Case
		Discharge of contaminated groundwater to adjacent watercourse	Neg.	Slight	Local	Likely	Short	Worst Case
Groundwater Abstraction		Groundwater abstraction associated with temporary dewatering forcing changes in pore water pressures and potential settlement and/ or subsidence in downstream unconsolidated sediments	Neg.	Sig.	Local & Reg	Unlikely	Short	Worst Case
Groundwater Flow Paths		Groundwater flow paths may be potentially altered due to the construction of sub-surface structures.	Neg.	Sig.		Likely	Per.	Worst

		Groundwater mounding can theoretically occur where large impermeable structures are placed perpendicular to groundwater flow paths			Local & Reg			Case
Groundwater Quality		Potentially contaminated water generated within the excavation could impact the Bluebell Stream	Neg.	Sig.	Local & Reg	Likely	Short	Worst Case

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6.5.4 Cumulative Effects

6.5.4.1 Other Projects

As identified in Chapter 1 of the EIAR (Section 1.4), there are a number of other projects which have been identified for consideration in terms of their potential for cumulative effects. A number of planning applications (permitted, submitted but undetermined and under construction) have been identified within the locale of the Project site. Many of these projects are associated with the retail and industrial complexes located to the north and south of the Project site. It is not likely that the Project will result in any negative significant cumulative effects on Lands and Soils in combination with these projects.

6.5.4.2 Gas Connection

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

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

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

The works associated with the proposed new pipeline involve the excavation of a trench to install the new pipe, circa 1.2m deep for approximately 10.5km through agricultural lands, road crossings and along footpaths and verges. The excavated materials will be removed from site and disposed of at appropriately licenced waste facilities. Additionally, works through agricultural lands will also require excavation of topsoils and construction of temporary haul roads and hardcore working platforms in a corridor circa 14m in width along the route of the pipe. The topsoils will be stockpiled and reinstated along the route as the works progress, following removal of the temporary haul roads and working areas. The impact of these works on Lands and Soils will be Slightly Negative, localised to the works short term and Temporary in nature and are reversible with reinstatement works.

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

6.6 Mitigation

6.6.1 Incorporated Design Mitigation

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The design of the pond structures and foundations will be such that the depths are of a minimum in relation to fluvial flood levels, thus maintaining the excavations required at a minimum also. This, in addition to a design that has tried to balance the cut and fill required for the development shall serve to reduce the volume of soils to be exported off-site and therefore reduce the quantity of imported materials. The Contractor shall seek to export waste arising from the Construction Phase to licensed facilities as close to the site as possible to minimise the carbon footprint associated with handling of the material.

6.6.2 Construction Phase Mitigation

The following sections describe the mitigation measures which shall be adopted as part of the construction works on site to reduce the potential impacts on the soils, geology and hydrogeological environment.

6.6.2.1 Control of Excavations and Export of Material Arising from the Site

The proposed works shall incorporate, as identified in the Construction Environmental Management Plan (Volume II, Appendix 4.5), the reduce, reuse and recycle approach in relation to the excavation of soil on site. All excavation arisings shall be, where possible, reused on site. Stockpiles have the potential to cause negative impacts on air and water quality, therefore, the effects of soil stripping and stockpiling shall be mitigated through the implementation of an appropriate earthworks handling protocol implemented by the Contractor during the Construction Phases. Stockpiles shall be formed within the boundary of the excavation zone and there shall be no direct link or pathway from this zone to any surface water body. Only local/low level of stockpiling shall occur as the bulk of the material to be excavated shall be paced directly into haulage vehicles for transport off site to an appropriately licensed facility or, where possible, will be reused in other areas of the site as fill. The Contractor shall implement dust suppression measures, vehicle wheel washes, road sweeping and general housekeeping to ensure that the surrounding environment is free of nuisance dirt and dust dirt on roads.

6.6.2.2 Export of Material Arising from Site

Where demolition and construction material, such as excavated material, cannot be reused on site it shall be transported for recovery/disposal at an appropriately licenced facility as outlined in the Construction Environmental Management Plan. Following the geo-environmental sampling and associated laboratory testing, the waste classification completed on the soils has found that all results indicate that the materials are free from asbestos and are classified as a non-hazardous soil waste suitable for disposal at an inert landfill facility. Additional Soil Classification shall be carried out as part of the Construction Phases and waste shall be delivered by the Contractor to licensed Waste facilities which are authorised under the Waste Management Act 1996, as amended, and which hold the appropriate certificate of registration, Waste facility permit or EPA licence.

6.6.2.3 Control of Water During the Construction Phases

The Contractor shall carry out the earthwork and excavation activities such that surfaces, as they are being raised, shall be designed with adequate drainage, falls and profile to control run-off and prevent ponding and flowing silts. The Contractor shall exercise care to ensure that exposed soil surfaces are stable in order to minimise erosion and that all exposed soil surfaces shall be within the main excavation site thus limiting the potential for any offsite impacts. All surface water run-off shall be prevented from directly entering into any water courses whatsoever in accordance with the Construction Environmental Management Plan. During the excavation of the existing site for the pond structures and foundation excavations, surface water shall pond in the excavations. The Contractor shall implement pre-treatment and silt reduction measures on site and shall include a combination of silt fencing, settlement measures (silt traps, silt sacks and settlement tanks) and hydrocarbon interceptors (as outlined in the Construction Environmental Management Plan). Qualitative and

quantitative monitoring shall be implemented, with the client's Environmental Consultant auditing the Contractor's regular sampling and analysis results.

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6.6.2.4 Sources of Fill Material / Aggregates for the Site

The Contractor shall source all imported fill and aggregate for the Project from reputable suppliers and shall ensure the following

- Aggregate Declarations of Performance for the classes of material specified,
- Environmental Management status and the Regulatory and Legal Compliance status of the proposed suppliers.

The Contractor may consider recycled or recovered materials as aggregates for the Project where appropriate.

6.6.2.5 Fuel and other Hazardous Substance Handling, Transport and Storage

The Contractor shall implement the following mitigation measures on site in order to prevent any spillages to ground of fuels and prevent any resulting soil and/or groundwater quality impacts:

- Dedicated bunded refuelling areas,
- Provision of spill kits for hazardous substances,

Diesel/ petrol powered equipment to be placed on suitable drip trays.

6.6.2.6 Construction Environmental Management Plan

A Construction Environmental Management Plan for the Project is provided in Volume II, Appendix 4.5. The Construction Environmental Management Plan sets out the minimum requirements which will be adhered to during the construction phase of the Project to help ensure that construction activities are planned and managed in accordance with the environmental requirements identified within and the relevant guidance and legislation.

The Construction Environmental Management Plan will form part of the Contract Documents for the construction stage to ensure that the Contractor undertakes the works required to implement mitigation measures.

6.6.3 Operational Phase Mitigation

As noted above there is limited impact on the geological environment of the area expected during the operational phase of the development. The site has been designed to mitigate any soil contamination which may occur during the operational phase of the Project. This includes bunding of all chemical and fuel containers, the discharge of waste process water to the foul drainage network, the containment of firefighting water run-off in detention ponds and the provision of oil and fuel interceptors on drainage networks.

6.6.4 Residual Impacts

6.6.4.1 Construction Phase

The predicted impacts of the construction phase are described in Table 6.3 in terms of quality, significance, extent, probability and duration. The relevant mitigation measures are detailed and the residual impacts are determined which take account of the mitigation measures.

The construction impact is assessed to be a slight negative short-term impact which is unavoidable given the nature, requirement and design of the Project.

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Table 6.3: Construction Phase Impact Determination

Qual.- **Quality**
Sig.- **Significance**
Ext.- **Extents**
Prob.- **Probability**
Dur.- **Duration**
Neg.- **Negligible**
Mod.- **Moderate**
Cert.- **Certain**
Per.- **Permanent**
Reg.- **Regional**

Activity	Construc. Element	Potential Impact Description	Qual.	Sig.	Ext.	Prob.	Dur.	Mitigation	Residual Impact
Earthworks	Pond Ex. Pond Construc. Found Construc.	Excavation of natural soils and subsoil for roads, foundations, ponds, swales, drainage, etc.	Neg.	Mod	Local	Cert.	Per.	The minimum amount of space required in order to construct the works have been allowed for. Excavated material, where possible, shall be reused on the site	Moderate Negative
		Airbourne dust arising from soil stockpiles causing nuisance dust on public roads and neighbouring properties	Neg.	Slight	Local	Unlikely	Short	The contractor shall implement dust suppression measures to minimise the generation of dust during dry weather periods. Dust monitoring shall be carried out by the contractor throughout the excavation works. Construction vehicle wheel wash facilities shall be provided on all site exits and the contractor shall implement a road sweeping programme for the duration of the works.	Imperceptible Negative
		Imported fill material shall be required as part of works	Neg.	Slight	Local	Likely	Per.	The contractor shall only source fill material with the requisite declarations of performance to ensure material supplied complies with the relevant project material specifications.	Imperceptible Negative
		Excavation of top soil material	Pos	Slight	Local	Likely	Per.	The contractor shall implement environmental sampling and testing of top soil to assess its potential suitability for landfills in the Republic	Slightly Positive

								of Ireland via comparison against the Landfill Waste Acceptance Criteria Limits.	
		Excavation of subsoils can serve to reduce the local groundwater levels as the water table naturally lowers to a new equilibrium below the artificial ground level	Neg.	Mod.	Local	Likely	Per.	The contractor shall install groundwater monitoring wells which shall be continuously monitored during earthworks on site. The impact of lowering the groundwater levels shall be minimum.	Imperceptible Negative
		Seepage of underlying groundwater	Neg.	Slight	Local	Likely	Short	The contractor shall implement the localised lowering of the water table through pumping of wells	Imperceptible Negative
		Discharge of contaminated groundwater to adjacent watercourse	Neg.	Slight	Local	Likely	Short	The contractor shall design on-site pre-treatment of groundwater prior to its discharge to the adjacent watercourse	Imperceptible Negative
Groundwater Abstraction		Groundwater abstraction associated with temporary dewatering forcing changes in pore water pressures and potential settlement and/ or subsidence in downstream unconsolidated sediments	Neg.	Sig.	Local & Reg	Unlikely	Short	Condition surveys should be completed on neighbouring properties and neighbouring sites and should be monitored during the construction works	Imperceptible Negative
Groundwater Flow Paths		Groundwater flow paths may be potentially altered due to the construction of sub-surface structures. Groundwater mounding can theoretically occur	Neg.	Sig.	Local & Reg	Likely	Per	Local dewatering will be required as the excavations remove overlying low permeability clays which act as a confining layer.	Imperceptible Negative

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		where large impermeable structures are placed perpendicular to groundwater flowpaths							
Groundwater Quality		Potentially contaminated water generated within the excavation could impact the Bluebell Stream	Neg.	Sig.	Local & Reg	Likely	Short	In order to avoid the inadvertent pollution of Surface and groundwater resources, all runoff should be prevented from directly entering watercourses. Best- practices and correct handling and storage of potentially polluting substances should be adhered. Water should be collected in a centralised sump and will be treated prior to discharge; The sump should be lined appropriately to avoid contaminant ingress to the groundwater system should current confining conditions be breached	Imperceptible Negative

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6.6.4.2 Operational Phase

During the Operational Phase of the Project there is a negative permanent imperceptible impact on the local and regional geological environment

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6.7 Interactions

The design team have produced a coordinated design to minimise environmental impacts and to ensure a sustainable and integrated approach to the design of the Project.

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VOLUME I MAIN TEXT – CHAPTER 7 WATER AND HYDROLOGY

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7 WATER AND HYDROLOGY

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7.1 Introduction

This chapter of the EIAR assesses the potential impact of the Project on receiving water quality environment and Water Framework Directive (WFD) compliance. Existing water quality in the vicinity of the Project is established based on available water quality information and WFD monitoring programmes. The likely significant effects on water quality of the implementation of the Project are assessed and measures to reduce, avoid and prevent these likely significant effects are proposed, where they are necessary.

This assessment is based on the Project Description detailed in Chapter 4 and has been prepared at to identify potential water quality issues that may arise from the development and presents mitigation measures that will be implemented to address the potential impacts.

7.2 Methodology

Baseline water quality within the receiving environment has been established through review of national monitoring data used to establish water quality status in the context of the EU Water Framework Directive (WFD) and supporting environmental standards.

An assessment has then been made of the components of the development that have the potential to have a significant impact on water quality using criteria for rating significance and magnitude set out in the National Roads Authority (NRA) publication “Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes” (NRA, 2008).

The significance of impact on surface water quality likely to occur during the construction and operation phases of the development are determined using a predominantly qualitative methodology. The assessment is a consideration of a combination of receptor sensitivity (

Table **7.1**) and the potential magnitude of the impact on the water environment (Table 7.2), in order to determine significance (Table 7.3). The approach to assessing the significance of impacts comprises assigning each impact to one of the four categories of magnitude as outlined in Table 7.2 enables different components to be assessed based upon the same scale.

The significance determination and assessment of the potential likely environmental effects of each component of the Project has been made based on the matrix presented in Table 7.3 and in Table 7.4. To conclude the assessment, mitigation measures are proposed to reduce, avoid and prevent these likely significant effects, where appropriate. This enables a “with mitigation” assessment to be made of any residual impact as a result of the construction and operational phases of the Project and/or in combination with other existing or approved projects in the vicinity of the development.

Table 7.1: Criteria for Rating Receptor Sensitivity (NRA, 2008)

Value (Sensitivity)	Typical Descriptors
Extremely High	***Attribute has a high quality or value on an international scale.*** Examples: Examples: River, Wetland or surface water body ecosystem protected by EU legislation. I.e. designated under the Habitats, Birds, Shellfish, Bathing Water or Freshwater Fish, Drinking Water or Nitrate Directives.
Very High	***Attribute has a high quality or value on a regional or national scale.*** Examples: River, Wetland or surface water body ecosystem protected by national legislation (NHA status), Regional important potable water source supplying >2500 homes, nationally important amenity site for wide range of leisure activities, Quality Class A (Biotic Index Q4, Q5), Flood plain protecting more

	than 50 residential or commercial properties from flooding.
High	***Attribute has a high quality or value on a local scale.*** Examples: Salmon fishery, locally important potable water source supplying >1000 homes, Quality Class B (Biotic Index Q3-4), Flood plain protecting 5 to 50 residential or commercial properties from flooding, Locally important amenity site for wide range of leisure activities.
Medium	***Attribute has a medium quality or value on a local scale.*** Examples: Coarse fishery, Local potable water source supplying >50 homes, Quality Class C (Biotic Index Q3, Q2-3), Flood plain protecting between 1 and 5 residential or commercial properties from flooding.
Low	***Attribute has a low quality or value on a local scale.*** Examples: Locally important amenity site for small range of leisure activities, Local potable water source supplying <50 homes, Quality Class D (Biotic Index Q2, Q1), Flood plain protecting 1 residential or commercial property from flooding. Amenity site used by small numbers of local people.

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Table 7.2: Criteria for Rating the Magnitude of Impact (NRA, 2008)

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute and /or quality and integrity of attribute	Loss or extensive change to a water body or water dependent habitat.
		Increase in predicted peak flood level >100mm.
		Extensive loss of fishery
		Extensive reduction in amenity value
		Potential high risk of pollution to water body from routine run-off
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Increase in predicted peak flood level >50mm
		Partial loss of fishery
		Potential medium risk of pollution to water body from routine run-off
		Partial reduction in amenity value
Minor Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Increase in predicted peak flood level >10mm
		Minor loss of fishery
		Potential low risk of pollution to water body from routine run-off
		Slight reduction in amenity value
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Negligible change in predicted peak flood level. Negligible loss of amenity value. Negligible loss of fishery

Table 7.3: Criteria for Rating the Significance of Environmental Impacts (NRA 2008)

Importance of Attribute	Magnitude of Impact			
	Negligible	Minor	Moderate	Large
Extremely High	Imperceptible	Significant	Profound	Profound
Very High	Imperceptible	Significant Moderate	/Profound Significant	/Profound
High	Imperceptible	Moderate / Slight	Significant Moderate	/Severe / Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight / Moderate

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Table 7.4: Defining Impact Significance (NRA, 2008)

	Attribute Importance				
	Extremely High	**Very High**	**High**	**Medium**	**Low**
Profound	Any permanent impact on attribute	Permanent impact on significant proportion of attribute			
Significant	Temporary impact on significant proportion of attribute	Permanent impact on small proportion of attribute	Permanent impact on significant proportion of attribute		
Moderate	Temporary impact on small proportion of attribute	Temporary impact on significant proportion of attribute	Permanent impact on small proportion of attribute	Permanent impact on significant proportion of attribute	
Slight		Temporary impact on small proportion of attribute	Temporary impact on significant proportion of attribute	Permanent impact on small proportion of attribute	Permanent impact on significant proportion of attribute
Imperceptible			Temporary impact on small proportion of attribute	Temporary impact on significant proportion of attribute	Permanent impact on small proportion of attribute

7.3 Characteristics of the Project

The characteristics of the Project are described in detail in Section 4.2. This chapter will consider these characteristics further in terms of the water environment.

7.4 Baseline

A desk-based assessment of surface water quality in the vicinity of the Project application area was conducted. The sources of the water quality information include:

- Water Framework Directive water body status information arising from the Water Framework Directive monitoring programme. Water Quality in Ireland Report 2013-2018 (2019) supported by water quality information available on the EPAs online Water Framework Directive Application (www.catchments.ie);
- Protected areas datasets including:

- information on Nutrient Sensitive Areas as outlined in the EPA's most recent Urban Waste Water Treatment Report (2021); and
- the existing Register of Protected Areas (under Article 6 of the Water Framework Directive) for water dependent habitats and species in the SAC and SPA networks held by the EPA.

- Water Quality in Ireland – An Indicators Report (2020);

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For the purposes of monitoring and assessing the quality of surface waters, all rivers, lakes, coastal inter-basins, estuaries, and coastal waters (within 1 nautical mile of the shoreline) have been divided into management units called "water bodies". Under the Water Framework Directive (WFD) condition of each water body must be reported to the European Commission in the form of ecological status and chemical status. Ground water bodies are similarly delineated with status identified.

Surface water bodies are grouped into sub-catchments for the purposes of water management, of which there are 583 nationally, which are further grouped into catchment management units of which there are 46 based on the hydrometric areas used by public authorities.

7.4.1 Site Context

As illustrated in Figure 7.1, the Project is located within Liffey_SC_060 sub catchment. The Liffey_100 (IE_EA_09L011200) river water body runs parallel to the Project. The Bluebell Stream which runs along the southern boundary of the Project is part of the Liffey_100 river water body. The WFD status assigned to this river water body is representative of the Bluebell Stream, therefore the assessment of the potential impacts on the Bluebell Stream is based on the WFD Status assigned to this water body and the potential implication for the achievement of the environmental objectives of the Liffey_100 river water body. The Liffey_110 (IE_EA_09L011300) river water body is downstream of the Project.

Figure 7.2 shows the Project in the context of the wider surface water body environment. These river water bodies ultimately discharge into the Liffey Estuary Upper (IE_EA_090_0400).

The Project lies within the 'Naas' and the 'Curragh Gravels East' groundwater bodies (EA-G-027 and EA_G_017). These water bodies have remained at 'good' status since 2007 and achieved 'good' status during the most recent 2013-2018 WFD monitoring cycle for groundwater. All the waterbodies are grouped into the Liffey_SC_050 (09_7) and the Liffey_SC_060 (09_6) sub-catchments, are within the Liffey and Dublin Bay Catchment (Hydrometric Area 09) in the Irish River Basin District.

7.4.2 Baseline Environment

Directive 2000/60/EC establishing a framework for community action in the field of water policy (the Water Framework Directive), and its transposing regulations, establishes a legal framework for the protection, improvement and sustainable management of rivers, lakes, transitional waters (estuaries), coastal waters (to a distance of one nautical mile) and groundwater.

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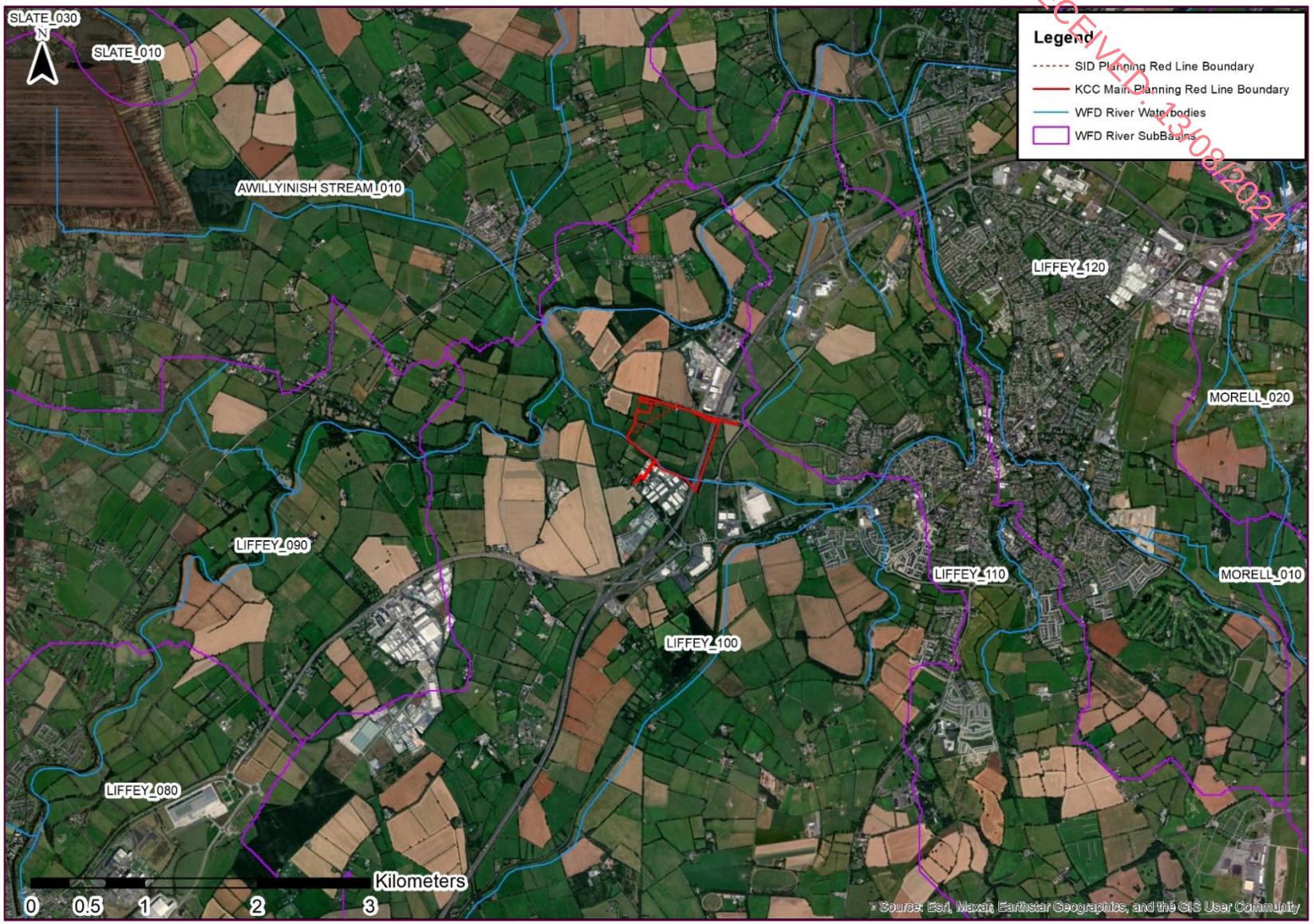

Figure 7.1: Site Location in the Context of the Water Framework Directive River Sub Basins

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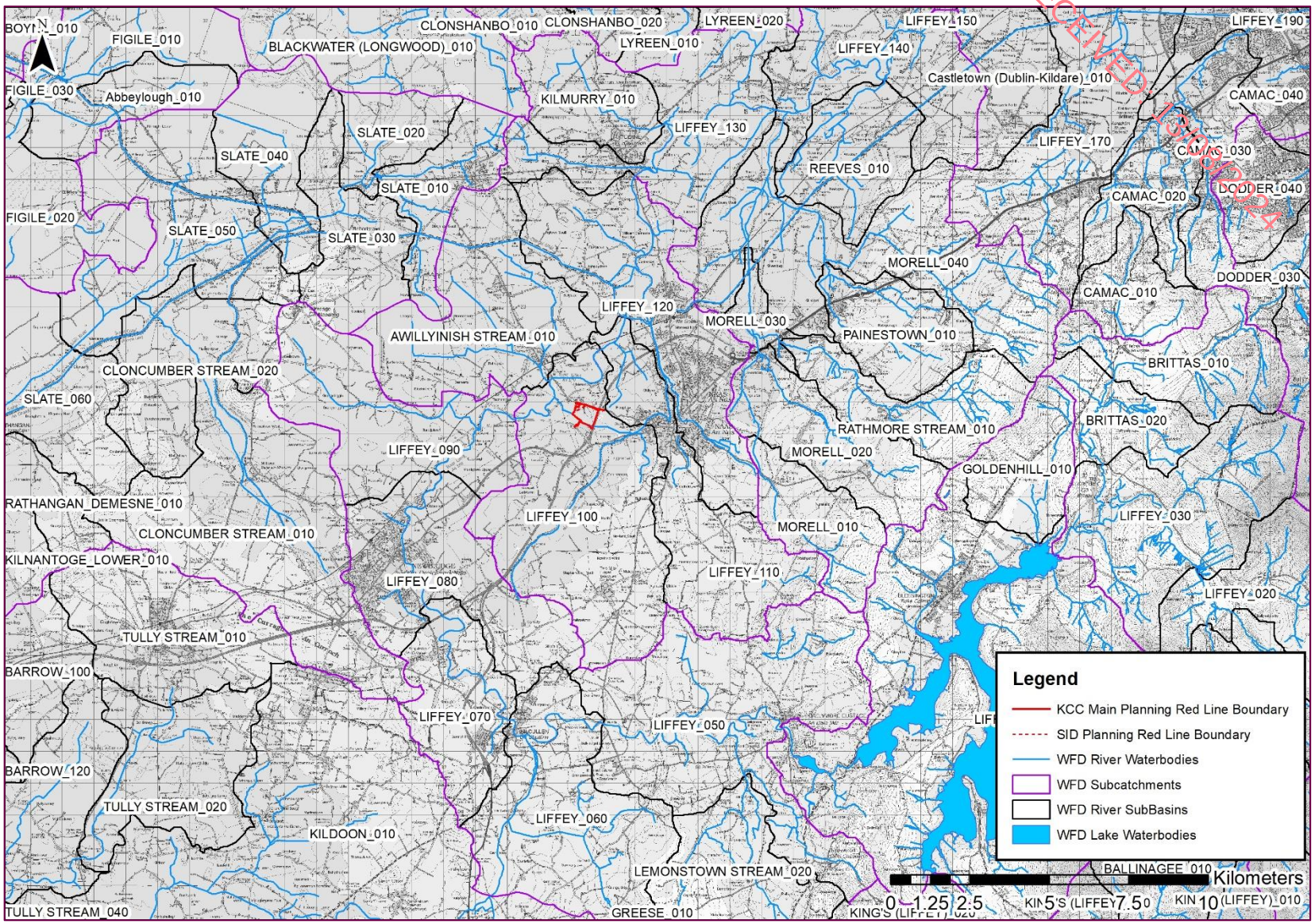

Figure 7.2: Site Location in the Context of the Wider Surface Water Environment

The fundamental objectives of the WFD are to maintain “high status” of surface waters where it exists, prevent deterioration in the existing status of waters, and achieve at least “good status” in relation to all waters by the end of the current river basin management cycle unless a water body is subject to an extended deadline under Article 4(7) of the Directive. A water body must achieve both good ‘ecological status’ and good ‘chemical status’ before it can be considered to be at good overall status.

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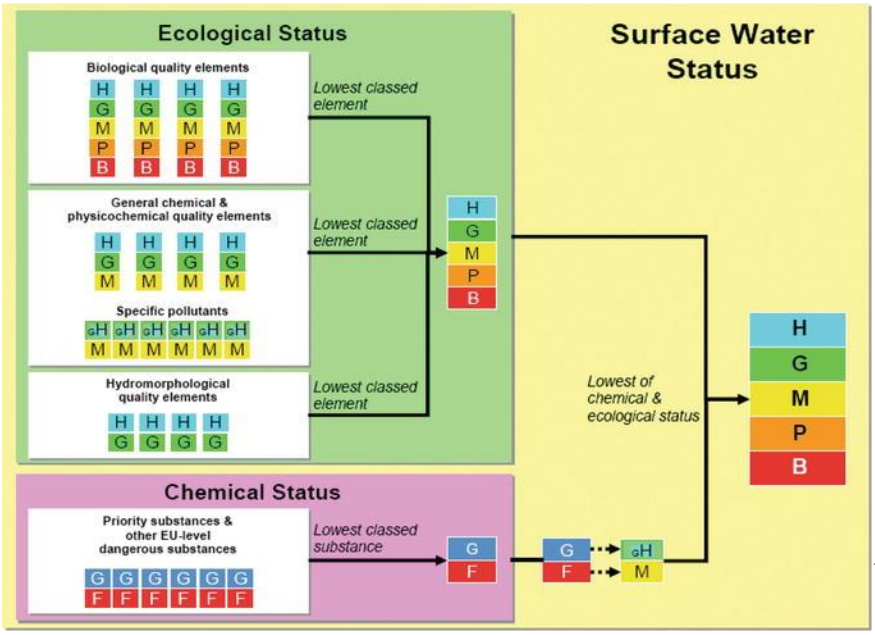
An assessment of the risks to the achievement of these objectives for water bodies has been undertaken by the EPA through the extensive characterisation of water bodies and the key pressures acting upon them. This characterisation process allows the development of a programme of measures to aid the achievement of the WFD objectives.

A Programme of Measures (POMs) outlines the steps that will be taken to meet WFD objectives as applicable to each water body. This Programme is contained within an overarching River Basin Management Plan (RBMP). These measures will require implementation at strategic level but also at regional and local level through the establishment of Regional Integrated Catchment Management Programmes. Whilst none of the water bodies within the Project area have been included amongst those 527 prioritised areas for action in the current Draft River Basin Management Plan for Ireland 2022 - 2027 (DHPLG, 2022), it is noted that measures required to ensure compliance with existing legislation will be implemented during this river basin management cycle.

Environmental Quality Standards (EQSs) for classifying surface water status are established in the European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (SI No. 272 of 2009), as amended. These regulations set standards for biological quality elements, physico-chemical conditions supporting biological elements (including general conditions and specific pollutants), priority substances and priority hazardous substances.



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As shown in Figure **7.3** the ‘ecological status’ of a water body is established according to compliance with the EQSs for biological quality elements, physico-chemical conditions supporting biological elements and relevant pollutants and hydromorphological quality elements. The ‘chemical status’ of a water body is established according to compliance with the EQSs for priority substances and priority hazardous substances.

In addition to achieving good ecological and chemical status, a water body must achieve compliance with standards and objectives specified for protected areas, which include areas designated by the Bathing Water Directive; the Urban Waste Water Treatment Directive; the Shellfish Waters Directive; the Habitats Directive and the Birds Directive. Waters bodies that are compliant with WFD standards, but that contain protected areas that are non-compliant with protected area standards are downgraded to ‘less than good’ status.

Based on monitoring information and data from 2016 to 2021, the current WFD status classification of river water bodies potentially affected by the Project is illustrated in .

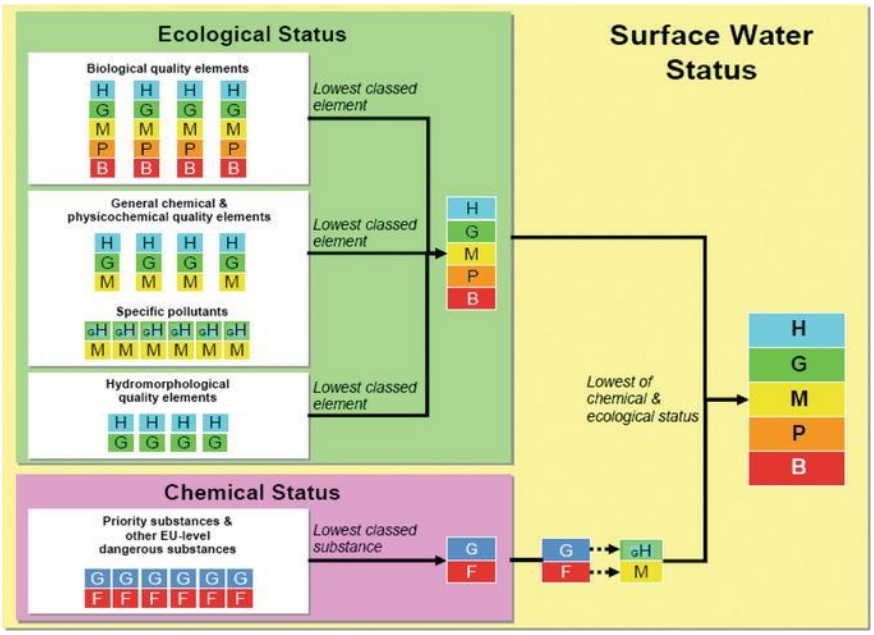

Figure 7.3: Elements of the Water Framework Directive Status

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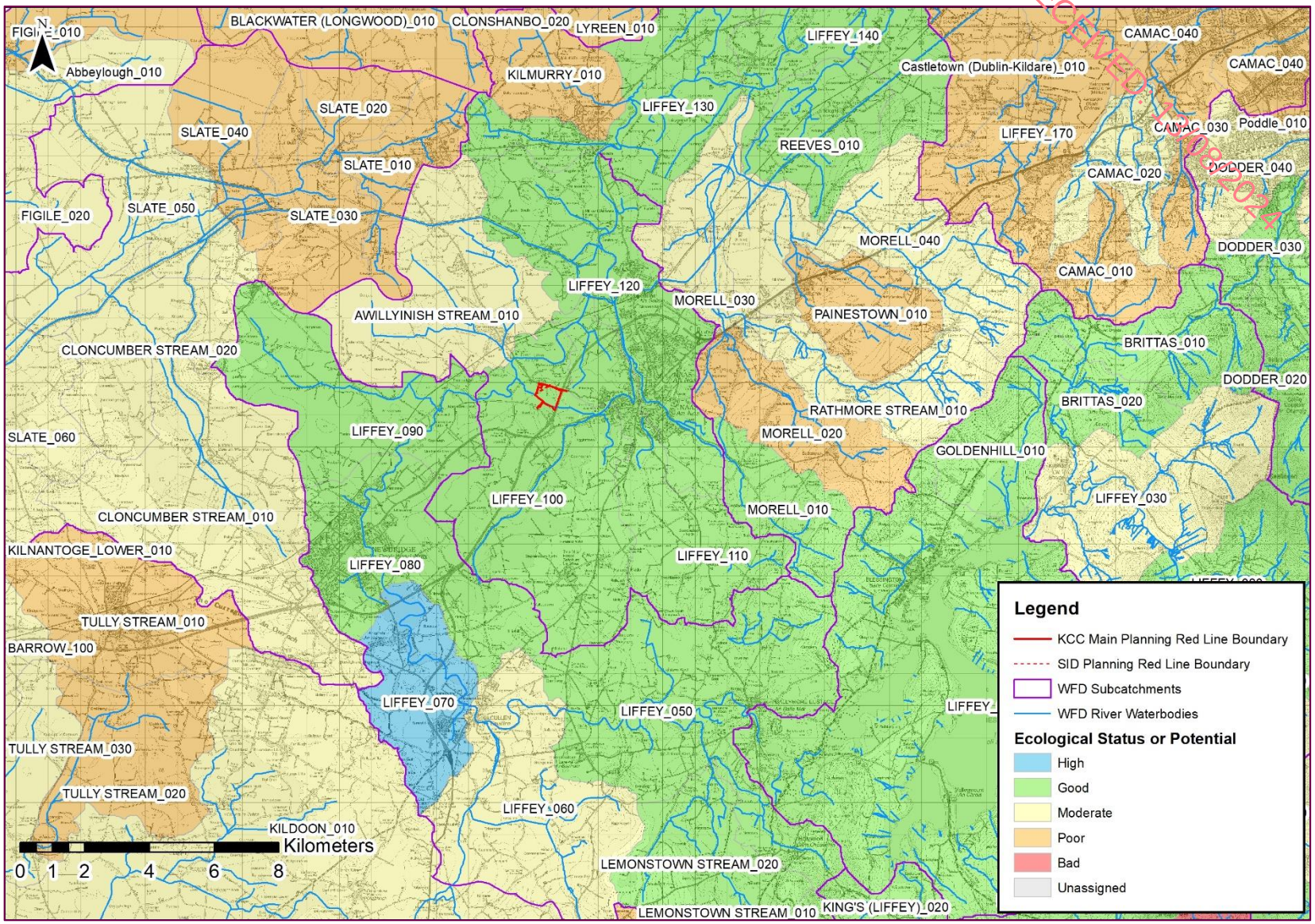

Figure 7.4: Water Framework Directive Water Body Status

The WFD status classification between 2007 and 2021 is shown in Table 7.5 for each of these water bodies. In summary, the Liffey_090 upstream was classified as "good" since 2007, while the Liffey_100, included the Bluebell Stream reach, and the downstream Liffey_110 have been reported as "moderate" status previously until the most recent classification of "good" status in 2016-2021.

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Table 7.5: WFD Status (2007-2018)

WFD Status 2007-2021	***Liffey_090***	***Liffey_100***	***Liffey_110***
	09L011050	***09L011200***	***09L011300***
Overall WFD Water Quality Status (2007-2009)	Good	Moderate	Unassigned
Overall WFD Water Quality Status (2010-2012 - Interim)	Good	Moderate	Unassigned
Overall WFD Water Quality Status (2010-2015)	Good	Moderate	Unassigned
Overall WFD Water Quality Status (2013-2018)	Good	Moderate	Moderate
Overall WFD Water Quality Status (2016-2021)	Good	Good	Good

A further breakdown of the ecological and chemical elements for the 2016-2021 WFD cycles is shown in Table 7.6. The water body in the vicinity of the Project, the Liffey_100 which the Bluebell Stream is part of, has been classified at "moderate" Ecological Status since the 2007 monitoring period until most recently improving to "good" status. There was an improvement in both nitrogen and phosphorus conditions during the previous WFD cycles 2010-2015 to 2013-2018, while they remained unchanged in 2016-2021. Nitrogen conditions improved from "moderate" to "good" and phosphorus conditions from "good" to "high" during the 2010-2015 to 2013-2018 cycles. The Liffey_100 and the downstream Liffey_110 have been assigned "good" status after being previous assigned "moderate" during past monitoring periods.

This assessment of likely significant effects on water quality has been undertaken having regard to the necessity to comply with the WFD and in doing so ensuring that the Project does not prevent the achievement of the WFD objectives for these water bodies in subsequent RBMP cycles. The water quality assessment must therefore demonstrate that the development will not cause deterioration in the status of the affected water body or prevent the improvement in status, where necessary, under the environmental objectives of the WFD.

Table 7.6: WFD Status Breakdown (2016-2021)

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WFD Status 2013-2018			Liffey_090	Liffey_100	Liffey_110
			09L011050	09L011200	09L011300
Ecological Status	Biological Status	Phytoplankton Status	Not Available	Not Available	Not Available
		Angiosperm Status	Not Available	Not Available	Not Available
		Invertebrate Status	Good	Good	Not Available
		Fish Status	Not Available	Not Available	Not Available
	Supporting Chemistry Conditions	Oxygenation Conditions	Not Available	Pass	Pass
		Nutrients Condition	Not Available	Pass	Pass
		Phosphorus conditions	Not Available	High	High
		Nitrogen conditions	Not Available	Good	Good
		Relevant Pollutants	Not Available	Not Available	Not Available
	Hydromorphological Quality Element	Hydrology, Morphology, Continuity	Not Available	Not Available	Not Available
	Ecological Status (2013 – 2018)		**Good**	**Good**	**Good**
Chemical Status	Priority substances and other EU-level dangerous substances		Not Available	Not Available	Not Available
	Chemical Status (2013 – 2018)		Not Available	Not Available	Not Available
Overall WFD Quality Status 2013 - 2018			**Good**	**Good**	**Good**

7.4.3 Protected Areas

A significant proportion of the area of the Liffey and Dublin Bay catchment is protected under existing EU legislation requiring special protection due to the sensitivity to pollution or particular environmental importance. All of the areas requiring special protection in the Irish River Basin District have been identified by EPA, mapped and listed in a national register of protected areas (required under Article 6 of the WFD Directive). The register of protected areas includes:

- Areas designated for the abstraction of water for human consumption (Drinking Water Protected Areas);
- Areas designated for the protection of economically significant aquatic species, i.e. Freshwater Fish and Shellfish;
- Bodies of water designated as recreational waters, including areas designated as bathing waters;
- Nutrient-sensitive areas, including areas identified as Nitrate Vulnerable Zones under the Nitrates Directive or areas designated as sensitive under Urban Waste Water Treatment Directive; as well as

- Areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection including relevant Natura 2000 sites (Special Protection Areas (SPAs); and candidate Special Areas of Conservation (cSACs).

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These protected areas have their own monitoring and assessment requirements to determine their condition. They are often assessed for additional pollutants or requirements relevant to their designation.

7.4.3.1 Nutrient Sensitive Waters

The Urban Waste Water Treatment Regulations 2001, as amended (which transpose the Urban Wastewater Treatment Directive (91/271/EEC) into Irish law and update the Environmental Protection Agency Act, 1992 (Urban Waste Water Treatment) Regulations 1994, as amended) list nutrient sensitive waters in the Third Schedule. There are no nutrient sensitive areas in the sub catchment.

7.4.3.2 Natura 2000 Protected Areas

Natura 2000 is a European network of important ecological sites. The EU Habitats Directive (92/43/EEC) places an obligation on Member States of the EU to establish the Natura 2000 network. The network is made up of Special Protection Areas (SPAs), established under the EU Birds Directive (79/409/EEC), and cSACs, established under the Habitats Directive itself.

As illustrated in Figure 7.5 the Project activities within the development area will not be within any Natura 2000 site (i.e. SPA or cSAC). The development will therefore not have a direct impact on any Natura 2000 sites. However, there is the potential for water dependent protected areas downstream of the Project to be indirectly affected in the event of water pollution, in the absence of mitigation.

One of the main purposes of the water quality assessment is to ascertain whether the development will cause significant effects on the ecological status of the water bodies affected having regard to the environmental objectives for the water bodies, including conservation objectives for qualifying features of the downstream Natura 2000 network. It should also be noted that potential effects on Natura 2000 or “European” sites will be considered extensively in the appropriate assessment process which will be undertaken during the development consenting stage of the development.

7.4.3.3 Bathing Waters

The Bathing Water Directive (2006/7/EC) came into force in March 2006, and was transposed into Irish law by the Bathing Water Quality Regulations, 2008, as amended. The previous 1976 Directive was repealed with effect from 31 December 2014. Since 2014, the annual water quality classification (rating) of a beach or lake has been based on water quality results covering a four-year period rather than a single previous season’s data. Water quality at beaches and lakes is classified as Excellent; Good, Sufficient or Poor. There are no designated bathing waters in the catchment.

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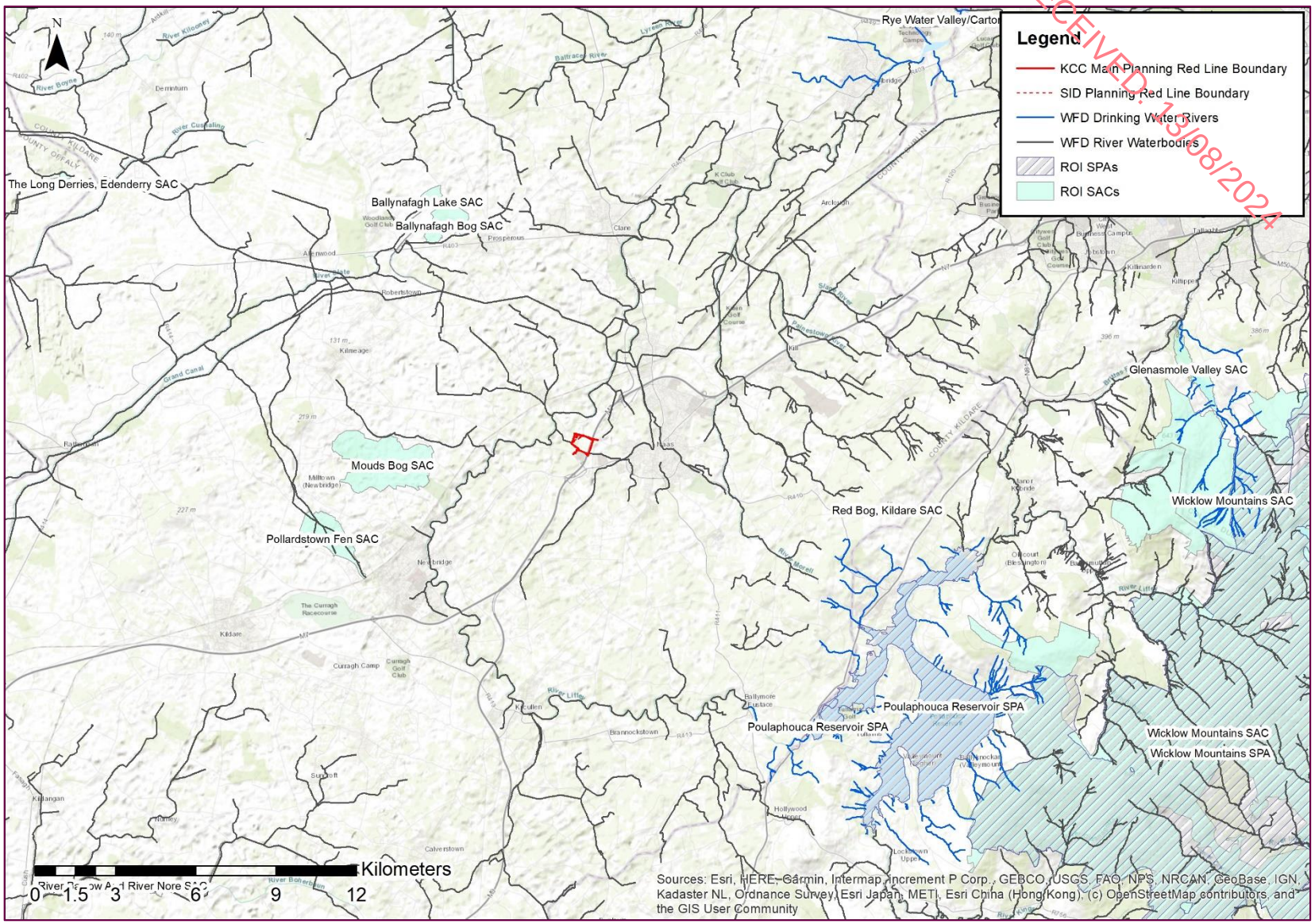

Figure 7.5: Natura 2000 Designated Sites

7.4.4 EPA Water Quality in 2020: An indicators Report

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In 2021 the EPA published the Water Quality in 2020, An Indicators Report. The intention of the report is to keep decision makers and the public informed by providing timely, scientifically sound information on water quality using a series of water quality indicators. Of the ten indicators four relate to the river water bodies located in close proximity to the Project;

- River biological quality
- Nitrate in rivers,
- Phosphate in rivers,
- Oxygen demand in rivers.

In this water quality assessment consideration has been given to potential effects of the development on these environmental indicators.

7.4.4.1 River Quality

The assessment of macroinvertebrates is used to assess the general heath of rivers and general water quality. The health of macroinvertebrate communities is assessed using the Quality Rating System (Q-value). Rivers can then be classed (high/good/moderate/poor/bad ecological status based on these biological elements and supporting physico chemical and hydromorphological conditions) in respect to macroinvertebrate abundance and diversity. The quality is defined by the lowest class recorded. Table 7.6 above details the class recorded for the Liffey River segments.

7.4.4.2 Nitrate in Rivers

Nitrate concentration in rivers is a potential human health concern for drinking water and an indication of nutrient enrichment when present in rivers.

The assessment uses the three year average of the concentrations from each site and subsequently classes these amongst six different categories in respect to the outcome. Although there are no environmental quality standards set, average concentrations of less than 4mg/l NO3 (0.9mg/l N) and 8mg/l NO3 (1.8mg/l N) are indicative of high and good quality by the EPA respectively. Table 7.7 below displays the levels recorded within the Liffey River sections during 2019-2021.

The indicator evaluated by the Indicator's Report shows that 47% of surveyed river sites, nationally, had unsatisfactory concentrations from 2018-2020. It was stated that the 38% of sites recorded increasing trends and only 3% recorded decreasing trends during 2013-2021.

The development will produce foul water, a potential source of additional N loading to the downstream receiving water bodies, however the foul water will be treated in the Osberstown Waste Water Treatment Station which has adequate capacity to ensure that the existing emission limit values from the WWTP will not be exceeded and therefore should not result in an impact to the nitrate levels in rivers.

Table 7.7: Summary of Total Oxidised Nitrogen (as N) mg/l concentrations at the Liffey River sections during 2019-2021

Total Oxidised Nitrogen (as N) mg/l	Liffey_100	Liffey_110
Min	1.1	1.1
Max	2.4	2.4
Mean	1.79	1.79
5%ile	1.31	1.268
95%ile	2.26	2.33

7.4.4.3 Phosphate in Rivers

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Phosphate is essential for plant growth but excessive levels can be detrimental to river ecological health and lead to eutrophication. The primary sources of phosphate in freshwater systems are sewage/industrial discharges and both diffuse or point sources from agricultural land.

The assessment is undertaken by categorising each site into six different quality classes in respect to concentrations recorded over a three year average. Environmental quality standards for phosphate levels in Ireland in accordance with the objectives of the WFD have been established. Average concentrations less than 0.025mg/l P and 0.035mg/l P are considered of high and good quality respectively. Mean concentrations above a concentration of 0.035mg/l, which is required to meet good ecological status, are likely to result in nutrient enrichment. The Liffey sections are achieving the EQS for phosphate based on the mean annual concentrations (Table 7.8).

Long-term trends nationally from the 2013-2021 average concentrations suggest 24% of sites had increasing concentrations, while only 7% had decreasing concentrations.

The development will produce foul water, a potential source of additional phosphorus loading to the downstream water bodies, however the foul water will be treated in the Osberstown WWTP which has adequate capacity to ensure that the existing emission limit values from the WWTP will not be exceeded.

Table 7.8: Summary of Ortho-Phosphate (as P) mg/l concentrations at the Liffey River sections during 2019-2021

Ortho-Phosphate (as P) mg/l	Liffey_100	Liffey_110
Min	0.005	0.005
Max	0.06	0.06
Mean	0.022	0.023
5%ile	0.01	0.005
95%ile	0.05	0.05

7.4.4.4 Oxygen Demand in Rivers

Excessive biodegradable organic matter will result in excessive microorganism growth, a depletion in dissolved oxygen in the water and thus negative effects on the macroinvertebrate communities or possible fish kills. Wastewater treatment plants and agricultural land are a potential source of organic matter to waterbodies. The amount of oxygen used by the microorganisms during the break down of the organic matter is called the Biochemical Oxygen Demand (BOD). High levels of BOD values give an indication of organic pollution within a waterbody.

Nationally from the 2018-2021 average concentrations suggest 89% of sites monitored have satisfactory (high and good) BOD levels.

The assessment is undertaken by categorising each site into six different quality classes in respect to concentrations recorded over a three year average. Environmental quality standards for BOD levels in Ireland in accordance with the objectives of the WFD have been established. Average concentrations less than 1.3 mg O_2/l and 1.5mg O_2 /l P are considered of high and good quality respectively. Mean concentrations above a concentration of 1.5 mg O2/l, which is required to meet good ecological status, are likely to result in organic enrichment. The Liffey sections are achieving the EQS for BOD based on the mean annual concentrations (Table 7.9).

Table 7.9: Summary of BOD (as O_2) mg/l concentrations at the Liffey River sections during 2019-2021

BOD (as O_2) mg/l	Liffey_100	Liffey_110
Min	0.5	0.5
Max	15	3
Mean	1.40	1.04
5%ile	0.5	0.5
95%ile	3	2

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7.4.5 Site Characterisation

The Pollutant Impact Potential (PIP) mapping produced by the EPA ranks areas within water bodies from 1 (highest) to 7 (lowest) in respect to the potential impact from pollutants. In terms of PIP, the site was rated a PIP category of 5 for nitrate pollution to groundwater and surface waters. However, the PIP for phosphate to surface waters the site is ranked 6 with a small section of rank 4 (fourth highest).

7.4.6 Summary of Existing Water Quality

A review of available national monitoring information for the water bodies in the immediate vicinity of the application boundary has concluded:

- The overall WFD Surface Water Quality status between 2016-2021 is:
  - Liffey_090 – Good Status;
  - Liffey_100 – Good Status;
  - Liffey_110 – Good Status;
  - Naas groundwater body – Good Status;
  - Curragh Gravels East groundwater body – Good Status.
- Downstream of the development area, there are a number of protected areas under Article 6 of the WFD Directive, i.e., Natura 2000 sites and bathing water although the nearest bathing water and Natura 2000 site is over 40 km downstream from the site;
- The receiving water bodies are currently achieving their environmental objective under the WFD and therefore the key focus of the impact assessment must be to demonstrate that the Project will not result in a deterioration in the current water body status, i.e. the status of the water bodies must be protected.

7.5 Impact Assessment

The likelihood of environmental impacts arising due to the development is assessed in relation to the construction and operational phases. The elements of construction and operation and the potential impacts on water quality have been identified for assessment.

The development has the potential to directly impact upon the Liffey_100 water body given the location of the works. The potential to indirectly impact upon the Liffey_110 water body and sensitive areas further downstream has also been considered.

The significance of any environmental effect is rated based on the magnitude of the impact and the importance of the attribute. Based on this criteria the receiving environment is considered to be of very high importance due to the fact that the water bodies are a high quality (Q4). The waterbodies are within the Liffey and Dublin Bay catchment and provide a hydrological link to the important downstream protected areas, particularly the Natura 2000 sites.

In summary and for the purposes of this impact assessment the following components of works have been considered:

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- Surface Water Drainage
- Foul Water Drainage for the entire development
- Demolition of three dwellings and agricultural sheds
- Construction of the Data Centre buildings, associated plant compounds, security hut, 210 car parking spaces and all associated site development and landscaping works.

7.5.1 Do Nothing Scenario

If the Project, its associated works and infrastructure does not proceed, it is assumed that the character of the landscape and its uses will remain much as they are today i.e. agricultural land, until future development under the Naas Local Area Plan by Kildare County Council where is currently zoned for “Data Centre development and their associated infrastructure only”. If the Project does not proceed, the opportunity for the creation of a new facility and employment as established in the Local Area Plan will not occur and the pressures on water quality associated with eh current land use, i.e. diffuse agriculture will continue.

7.5.2 Likely Significant Environmental Effects

7.5.2.1 Construction Phase

Based on the nature of the components of works proposed for the development, temporary impacts on water quality have the potential to occur during the construction phase of the works. The following have been considered in this assessment:

Increased suspended sediment levels due to the accidental release of sediment to the water column during:

- Construction of buildings & structures (including instream structures);
- Cut and fill operations;
- Suspended sediment, including all soils, sands and rubble is the single main pollutant to the aquatic environment generated at construction sites and largely arises from the erosion of exposed soils and sediments by surface water runoff. Both temporary and permanent impacts on surface waters may occur during construction. Pollution from mobilised suspended solids (silt) is the prime concern. Suspended sediment due to run off from stripped construction areas, stockpiled earth and the dewatering of excavations can have a severe negative impact on water quality. Once suspended sediment load enters a river it can result in long-term changes that cause chronic harm. Sediment can cause river hydromorphological changes, which in turn change the dynamics of the river in the future and can negatively impact on the supporting hydromorphological conditions and ecological status resulting in an increased risk to the environmental objectives of a water body.
- Accidental release of highly alkaline contaminants from concrete and cement during the construction of hardstand areas, etc. The construction works associated with the development will involve the use of cement and concrete for some of the hard standing areas and construction of buildings. During the construction phases, there is the potential for impact on the water quality and a toxic effect on the biological elements resulting in a possible further deterioration in the ecological status or compromise the improvement in ecological status through the implementation of the programme of measures included in the River Basin Management Plan; and
- General water quality impacts associated with works machinery, infrastructure and on-land operations including the temporary storage of construction materials, oils, fuels and chemicals.

7.5.2.2 Operational Phase

The operational phase impacts associated with the Project represent general water quality issues associated with surface and foul water drainage. General water quality impacts associated with runoff from parking areas and other hard standing areas will be collected and discharged via a mixture of traditional and Sustainable

Urban Drainage Systems (SuDS) via attenuation tanks with restricted flow to ensure greenfield run-off rates are achieved. The SuDS features include wetland habitats, soft landscaping and retention ponds.

It is proposed to collect all surface water as far as practically possible at surface level with ponds and swales. Surface water will therefore be utilised at peak times, as well as hydrant and sprinkle back supply. The excess water will be discharged back into Bluebell river a tributary of the Liffey_100 river water body.

All storm water collected on site will be discharged into the current water course following treatment via SuDS measures which include green/blue roofs, permeable surfaces, grass lined bioswales, bioretention areas/ponds, bioretention tree pits and oil interceptors.

It is therefore imperative to ensure that mitigation proposed during the operational phase of the development in relation to drainage and flood relief are adhered to. There will be limited direct impact to the Liffey_100 water body itself that would result in significant changes to the hydromorphological regime of the river and provided the SuDS measures have adequate capacity there will be a beneficial impact associated with the operational phase through the attenuation of contaminants and therefore water quality.

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7.5.2.2.1 Storm water Run-off Contamination:

The operational phase of the development will involve the use of vehicles to the Data Centres and service vehicles to the substation. During the operational phase, there is potential for fuel or oil spillages and contaminants from vehicle engines, transformers and switchgear. Run-off from these areas and roadways may be impacted with residual hydrocarbon contaminants from fuel emission and tyres, sediment and trace contaminants like metals and organics and therefore represent a potential source of contamination that could have a pathway to surface waters through the storm water drainage system. The nature of these contaminants could have a toxic effect on the biology of the receiving waters affecting the ecological status and chemical status of the water body and thereby potentially impacting on the ability of the water body to achieve it environmental objectives and downstream conservation objectives for the Natura 2000 sites.

7.5.2.2.2 Foul Sewerage:

Inadequate or inappropriate urban wastewater infrastructure can result in significant pressures to surface water bodies particularly where misconnections (piping of sewerage directly to a storm water network or surface water body) can result in significant impacts to the biology and chemistry of the aquatic environment. It is also important to ensure the existing sewer network within an agglomeration has capacity to accept the additional hydraulic and pollutant loading from the development and that adequate treatment is provided at the wastewater treatment system so as not to impact the receiving environment and downstream sensitive areas.

7.5.3 Impact Matrix (Absence of Mitigation)

The potential impacts outlined in Sections 7.5.4.1 and 7.5.5 above are rated based on the impact level criteria in Section 7.5.4 to indicate their potential severity (profound, significant, moderate, slight and imperceptible) in the absence of any mitigation. The assessment reflects the activities and pollutants listed above and the different considerations for construction and operational phases of the Project.

Table 7.10: Potential Impact Rating Matrix (in the absence of mitigation)

	Significance of Environmental Impact
Construction Phase	
Suspended sediments / sedimentation	Significant
Concrete and cement pollution	Significant
Impacts associated with general construction works	Significant
Demolition works	Significant

Operational Phase

Storm Water Run-off	Significant
Foul Water	Significant
Hydromorphology	Slight

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7.5.4 Description of likely significant impacts

7.5.4.1 Construction Phase Impacts

7.5.4.1.1 Sediment Loading

The works associated with the development involves extensive earth works throughout with the construction of SuDS, road ways, trench excavations for undergrounding overhead lines and the foul water and surface water drainage system, landscaping and parking areas. Instream works for the surface water drainage outfalls and proposed culverts of the Bluebell Stream (Liffey_100 river water body) at the M7 Business Park access to the southeast of the site will also represent a risk of increased sediment loading.

Suspended sediment, including all soils, sands and rubble is the single main pollutant to the aquatic environment generated at construction sites and largely arises from the erosion of exposed soils and sediments by surface water runoff and direct impacts on water courses and riparia areas causing bank and channel disturbance. Both temporary and permanent impacts on surface waters may occur during construction. Pollution from mobilised suspended solids (silt) is the prime concern. Suspended sediment due to run off from stripped construction areas, stockpiled earth and the dewatering of excavations can have a severe negative impact on water quality. This is particularly true in sloping areas with underlying clay following topsoil stripping. In areas of moderate to high rainfall, the potential problems are clearly exacerbated. If allowed to enter surface watercourses this run off can give rise to high suspended solids and detrimental impacts, in particular to fisheries and aquatic invertebrates which can impact the ecological status of a water body. Suspended solids may have an effect on:

- Sediment movement through rivers and its settlement onto the river bed causing formerly clean gravels to become clogged with fine sediment.
- The survival of fish eggs in gravel beds or spawning grounds as a result of deoxygenation caused by silt deposition;
- The survival of plants and algae by smothering;
- The survival of young fish and aquatic invertebrates such as mayfly larvae (Calopteryz sp.) through gill damage from sediment particles and;
- Amenity value through impaired visual appearance.

Once suspended sediment load enters a river it can result in long-term changes that cause chronic harm. Sediment can cause river hydromorphological changes, which in turn change the dynamics of the river in the future and can negatively impact on the supporting hydromorphological conditions of the water bodies ecological status resulting in an increased risk of deterioration in status.

Both bed and suspended materials, and subsequent changes in channel form associated with changes in sediment supply, may affect benthic invertebrates in many ways at various stages in their life cycle. The direct kill is only the first stage in the damage that silt causes to a benthic invertebrate population. Sediment that infiltrates the river bed decreases oxygen supply in interstitial areas, and destroys habitat for juvenile stages of the many benthic invertebrate life cycles. This can impact on the ecological status of a water body by changing the nature of the invertebrate community to more tolerant species that would not be indicative of the reference conditions expected for an Irish water body typology.

The sediment subsequently provides a medium for macrophyte growth. Macrophytes can smother the river substrate and habitat further, and can trap more sediment which exacerbates the problem in the long term. Silt infiltration of river bed gravels can also have a negative effect on fish species which can further impact on the

biological elements of the WFD ecological status classification and could prevent the achievement of the environmental objectives for the water body.

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As outlined in the Site Specific Flood Risk Assessment the Project is located wholly within Flood Zone C where the probability of flooding from the Bluebell stream is less than 0.1% (1 in 1000 years). This means that there will be no risk of the site being subjected to flooding during the construction of the development and the risk of impacts of suspended solids and other pollutants from site run-off will be from overland flow generated from rainfall falling on the site and not from flood waters from the Bluebell Stream (Liffey_100 river water body).

Given the scale and nature of the works, the magnitude of the impact associated with sediment loading is considered to be **moderate** adverse. The significance of the environmental effect is therefore **significant** in the absence of mitigation based on the very high sensitivity of the receiving environment.

7.5.4.2 Concrete and Cement Pollution

The construction works associated with the development will include concrete crushing and reinforced construction of foundations and the placement of the precast concrete culverts with concrete binding in the Bluebell Stream (Liffey_100 river water body). During the construction phase, there is the potential for accidental spillage of cement materials or during the setting of concrete which could have a significant adverse impact on water quality and a toxic effect on the biological elements resulting in a possible further deterioration in the ecological status or compromise the improvement in ecological status through the implementation of the programme of measures included in the River Basin Management Plan.

Given the scale and nature of the works, the magnitude of the impact associated with concrete and cement pollution is considered to be **moderate** adverse. The significance of the environmental effect is therefore **significant** in the absence of mitigation based on the very high sensitivity of the receiving environment.

7.5.4.3 General Construction Works

The construction works will involve the use of plant and machinery, as well as the associated temporary storage of construction materials, oils, fuels and chemicals. During the construction phase, there is the potential for accidental spillage or release of construction materials (e.g. diesel, oil, chemicals) which could have a significant adverse impact on water quality and a toxic effect on the biological elements resulting in a possible further deterioration in the ecological status or compromise the improvement in ecological status through the implementation of the programme of measures included in the River Basin Management Plan.

Given the scale and nature of the works, the magnitude of the impact associated with general construction is considered to be **moderate** adverse. The significance of the environmental effect is therefore **significant** in the absence of mitigation based on the very high sensitivity of the receiving environment.

7.5.4.4 Demolition Works

During the construction phase, there is potential for various pollutants from buildings and dust to be airborne and scattered throughout the site during demolition works. Three dwellings and agricultural sheds shall be demolished. Therefore, the demolition works have the potential to contaminate water bodies and to stress sensitive species within the water environment.

Given the scale and nature of the works, the magnitude of the impact associated with the demolition works is considered to be **moderate** adverse. The significance of the environmental effect is therefore **significant** in the absence of mitigation based on the very high sensitivity of the receiving environment.

7.5.5 Operational Phase Impacts

Although the Project has been designed to incorporate water retention/detention into its design, potential water quality impacts associated with the operational phase of the Project can be exacerbated due to poor design and implementation of these measures. It is therefore imperative to ensure that mitigation proposed during the operational phase of the developments in relation to drainage are adhered to. There should be limited direct impact to the Liffey_100 water body itself that would result in significant changes to the hydromorphological regime of the river particularly as extensive SuDS measures are incorporated into the design and will ensure that the discharge will achieve greenfield run-off rates. Furthermore, the SuDs measures and oil interceptors will have a beneficial impact associated with the operational phase through the further attenuation of contaminants.

7.5.5.1 Storm water Run-off Contamination

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The operational phase of the development will involve the use of vehicles to the Data Centres and service vehicles to the substation. During the operational phase, there is potential for fuel or oil spillages and contaminants from vehicle engines, transformers and switchgear. Run-off from the these areas and roadways may be impacted with residual hydrocarbon contaminants from fuel emission and tyres, sediment and trace contaminants like metals and organics and therefore represent a potential source of contamination that could have a pathway to surface waters through the storm water drainage system. The nature of these contaminants could have a toxic effect on the biology of the receiving waters affecting the ecological status and chemical status of the water body and thereby potentially impacting on the ability of the water body to achieve it environmental objectives and downstream conservation objectives for the Natura 2000 sites.

Given the scale and nature of the work across the development, the magnitude of the impact associated with surface run-off contamination is considered to be **moderate** adverse. The significance of the environmental effect is therefore **significant** in the absence of mitigation based on the very high sensitivity of the receiving environment.

7.5.5.2 Foul Sewerage

Inadequate or inappropriate urban wastewater infrastructure can result in significant pressures to surface water bodies particularly where misconnections (piping of sewerage directly to a storm water network or surface water body) can result in significant impacts to the biology and chemistry of the aquatic environment. It is also important to ensure the existing sewer network within an agglomeration has capacity to accept the additional hydraulic and pollutant loading from the development and that adequate treatment is provided at the wastewater treatment system so as not to impact the receiving environment and downstream sensitive areas.

Given the scale and nature of the work, the magnitude of the impact associated with inadequate or inappropriate foul water collection and treatment is considered to be **moderate** adverse. The significance of the environmental effect is therefore **significant** in the absence of mitigation based on the very high sensitivity of the receiving environment.

7.5.5.3 Hydromorphological changes

The presence of physical alterations within a waterbody, i.e. the installation of the culverts on the Bluebell Stream (Liffey_100 river water body), has the potential to impact on the hydromorphology of the waterbody. Therefore, should the inclusion of the structures within the water bodies impact negatively the hydromorphology, the water bodies may potential be at risk of deterioration and unable to achieve their WFD objectives. Structures may lead to increases or decreases in sediment deposition, currents and/or water flow patterns within the waterbodies.

The works are extremely limited and small-scale in nature and will be undertaken over an extremely limited time period and in line with best practice measures. Given the extent of the works and the magnitude of the impact is considered to be minor

This watercourse is fairly narrow (less than 2m wide) and supports slow flowing conditions with a fairly uniform U-shaped channel and is well vegetated at the margins. For much of its length, within the survey area, the watercourse was assessed as having characteristics of a well-fed field drain. The watercourse is culverted under the M7 to the east of the site boundary. Significant lengths of the watercourse are entirely covered by vegetation including common reed *Phragmites australis*, reed canary-grass *Phalaris arundinacea*, lesser water parsnip *Berula erecta* and floating sweet-grass. The sensitivity of the water course is therefore medium at best and therefore the significance of effect is considered to be slight.

7.5.6 Mitigation

In the absence of mitigation, the construction of some elements of the Project has the potential to have significant effects on the water quality and aquatic environment.

Similarly, with no mitigation the Project has the potential to have significant adverse effects on water quality and the aquatic environment during the operation stage.

With these considerations in mind, detailed mitigation has been incorporated into the engineering design of the Project to minimise its potential impact on the water environment. The risk to water quality posed by this Project during construction and operation will be dependent on the quality of drainage and treatment of site run-off before discharge to the river. Therefore, it is pertinent to ensure that procedures are put in place for the

control and minimisation of surface water and suspended solids movement, it is also important that measures are taken to ensure existing drainage pathways are kept free from construction sediment and pollutants through the use of effective barriers to pollutant export and best practice techniques to control these pressures at source. Section 7.5.8 and Section 7.5.9 details the mitigation measure that will be employed on site during the Project construction and operational phases.

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7.5.7 Mitigation Incorporated into the Drainage Design

7.5.7.1 Wastewater

Wastewater generated on-site particularly during the operational phase of the development will be piped and discharged to the existing Irish Water foul sewer which flows along the L2030 Newhall Road to the Newhall Wastewater Pumping Station located (west of the site) and is ultimately pumped to Osberstown WWTP (north of the site). Irish Water has provided agreement in principle for the connection of the development associated with the development to their assets and have confirmed that the connection is feasible without the need to upgrade Irish Water infrastructure. The Project will include a private rising mains from the site to the existing 300mm wastewater gravity network along Newbridge Road. Provided the sewer network is installed using industry standard best practice, including the installation of the sewer under the Bluebell Stream by trenchless techniques, and routinely checked there is likely to be no impact from wastewater from the development and therefore no further mitigation required. Drainage pipelines will be inspected by CCTV at completion of the construction project and any damage will be repaired.

7.5.7.2 Surface Water

There is no existing surface water infrastructure on the site, drainage runoff is collected via overland flows to agricultural ditches connected to Bluebell Stream. Consultation has taken place with Inland Fisheries Ireland (IFI) and the IFI document “Planning for Watercourses in the Urban Environment” has been incorporated into the design. The development has incorporated a variety of Sustainable Drainage Systems (SuDS) techniques to counteract the potential increased runoff as a result of increased hardstanding. It is proposed to collect all surface water as far as practically possible at surface level with ponds and swales. Surface water will therefore be utilised at peak times, as well as hydrant and sprinkle back supply. The excess water will be discharged back into Bluebell Stream. While all storm water collected on site will be discharged into the current water course following treatment via SuDS measures which include permeable surfaces, grass lined swales, bioretention ponds and oil interceptors at critical locations within the drainage network, e.g. on the surface water drainage form the GIS substation. The SuDS processes decrease the impact of the development on the receiving environment by providing amenity and biodiversity in many cases.

Adequately specified oil interceptors will be incorporated into the proposed drainage network for the substation, parking areas and access roads.

7.5.8 Construction Phase Mitigation Measures

7.5.8.1 Construction Phase Best Practice Measures

Mitigation measures will be implemented by the contractors who will construct the development in accordance with the requirements listed within the Construction Environmental Management Plan which will be submitted as part of the planning applications for the development. Furthermore, once appointed, the contractors will submit a detailed Construction Management Plan based on the requirements of these submitted planning documents for approval by the Planning Authority. The mitigation measures implemented by the contractor will refer to the construction management procedures for best practice regarding the following recognised international guidelines:

- Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA, 2001);
- Control of Water Pollution from construction sites, Guidance for consultants and contractors (C532);
- Environmental Good Practice on Site (3rd edition) (C692); and
- Guidelines on Protection of Fisheries During Construction Works and Adjacent to Waters (2016).

7.5.8.2 Suspended Sediment and Sedimentation

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Preventing run-off is an effective method of preventing sediment pollution in the water environment. Therefore, adoption of appropriate erosion and sediment controls to manage run-off during construction is essential to prevent sediment pollution.

Mitigation measures to address the potential impact from suspended solids will be carried out in accordance with a site specific CEMP. The measures will be employed prior to the commencement and during construction and will include such measures as:

- Drainage and measures to control run-off will be employed to manage sediments prior to any works to be undertaken at the site, i.e., arrangements for the treatment of dirty groundwater ingress from any excavations will be in place in advance of the dewatering to ensure it can be adequately managed on site;
- If possible, earthworks operations should be limited to the summer months.
- The site shall be surveyed to identify all existing drainage features and waterbodies.
- It is proposed that this work on the culverts to facilitate the secondary access through the M7 Business Park will be undertaken in dry conditions and will utilising an open-cut methodology with temporary damming and fluming of the relevant lengths of watercourse.
- Works within the channel of a watercourse with sensitive fish present (i.e. salmon, lamprey, trout and eels) requires appropriate timing of the works. Therefore, IFI's document entitled 'Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016) will be consulted for additional information on timing of works. In salmonid rivers such as the Liffey_100, downstream of the Project, the guidelines require that all in-stream works should be carried out during the period July to September; any requirement for works to be conducted earlier will seek approval from IFI.
- In order to ensure that the biological elements of the ecological status are not impacted the risk of the potential loss or crushing of sensitive fish in the vicinity of the culvert crossings should be mitigated before in-channel works commence by their capture and translocation distantly away from the works area. Authorisation via Section 14 of the Fisheries Act will be required from IFI and should be conducted using a competent fisheries expert, with the application made at least 12 weeks prior to works commencement.
- A minimum Buffer of 10 metres is proposed from the proposed works to the Bluebell Stream to protect the aquatic environment.
- Silt fencing will be installed at strategic locations around the perimeter of the site. The indicative location of the silt fencing has been determined in the Construction Phase Surface Water Management Plan within the in the construction stage CEMP (EIAR Volume II, Appendices, Appendix 4.5) and will be subject to confirmation for phase to be developed. The purpose of the silt fencing is to prevent silt laden water leaving the site and entering neighbouring land with the potential to impact nearby watercourses.
- Filter drains be cut to intercept surface water where there is a risk of significant water flow into excavations or on to adjoining lands. There will also be a requirement to periodically pump water from excavations. All collected and pumped water will have to be treated prior to discharge. The run-off will be directed through appropriately sized propriety settlement tanks, with a proprietary silt bag to intercept bulk silt volumes, to remove suspended solids. Details are provided in the Surface Water Management Plan included in the construction phase CEMP (EIAR Volume II, Appendices, Appendix 4.5);
- The use of filter drains and temporary settlement ponds shall further treat any potential contaminated/ polluted runoff prior to discharge to a Silt Bag arrangement which will provide maximum treatment of surface water runoff entering the Bluebell stream.
- During the construction phase of the development, all silt/ pollution removal strategy structures shall be constructed/ installed outside the extent of the riparian buffer which has been determined as 10m from the Bluebell Stream bank
- Retention and utilisation of subsoil and topsoil for the creation of landscape mounding, up to 6.5m high, to the site boundary with the M7 and for reinstatement of disturbed landscape areas

- Emergency contact numbers for the Local Authority Environmental Section, Inland Fisheries Ireland, the Environmental Protection Agency and the National Parks and Wildlife Service will be displayed in a prominent position within the site compound. These agencies will be notified immediately in the event of a pollution incident;
- Site personnel will be trained in the importance of preventing pollution and the mitigation measures described here to ensure same;
- The site manager will be responsible for the implementation of these measures. They will be inspected on at least a daily basis for the duration of the works, and a record of these inspections will be maintained;
- Any temporary storage of soil, hardcore, crushed concrete or similar material will be stored as far as possible from any surface water drains. There can be no direct pumping of silty water from the works directly to any watercourse. All water from excavations must be treated by infiltration over lands or via settlement areas, silt busters etc;
- Spillage and blow-off of debris, aggregates and fine material onto public roads will be reduced to a minimum by employing the following measures:
    - Vehicles delivering material with potential for dust emissions to an off-site location shall be enclosed or covered at all times to restrict the escape of dust;
    - Any hard surface site roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only;
    - A power washing facility or wheel cleaning facility will be installed near to the site compound for use by vehicles exiting the site when appropriate;
    - Road sweepers will be employed to clean the site access route as required.

The incorporation of these mitigation measures during the construction phase means the potential impact to receiving water environment will be reduced to negligible thus reducing the significance of the environmental effect to **imperceptible**, based on the very high sensitivity of the receiving environment.

7.5.8.3 Concrete and Cement Pollution

The impacts in relation to cement and concrete for the development are, for the most part (but not limited to) the installation of the concrete areas (to be poured in-situ) and construction works of buildings. The principal risks are:

The use of concrete in close proximity to water bodies requires a great deal of care. Fresh concrete and cement are very alkaline and corrosive and can cause serious pollution in water bodies. It is essential to ensure that the use of wet concrete and cement in or close to any water course is carefully controlled so as to minimise the risk of any material entering the water, particularly from shuttered structures or the washing of equipment. The following measures will be undertaken to mitigate against possible pollution:

- A concrete washdown area will be provided on site for trucks to use after delivery of concrete or on return to the batching plant. This area will be adequately bunded to mitigate the risk of contaminated runoff discharge to the Liffey_100 water body. Concrete trucks are to be washed down within the concrete truck washdown area after delivery of concrete, prior to exiting the site. Washdown runoff will be appropriately treated prior to discharge;
- Wash-out areas on site will be properly designed with an impermeable line to contain all cement laden water. No wash-out of ready-mix concrete vehicles shall be located within 10 metres of any temporary or permanent drainage features. Signage shall be erected to clearly identify the wash-out areas. Sufficient wash-out areas shall be provided to cater for all vehicles at peak delivery times;
- The installation of the box and pipe culverts, including the concrete required for the binding will be undertaken in dry conditions through the damming and fluming of the minor water course, to prevent wet concrete from entering the aquatic environment.

In circumstances where the mitigation measures are employed during construction operations, the potential impact to receiving water environment will be reduced to negligible thus reducing the significance of environmental effect to **imperceptible**.

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7.5.8.4 General Construction Works

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The risk of water quality impacts associated with works machinery, infrastructure and on-land operations (for example leakages/spillages of fuels, oils, other chemicals and waste water) will be controlled through good site management and the adherence to codes and practices which limit the risk to within acceptable levels. The following measures will be implemented during construction:

- A works specific Construction Environmental Management Plan has been prepared as part of the planning submission and will be developed and implemented by the contractor and will include detail in respect of every aspect of the works in order to minimise potential impacts and maximise potential benefits associated with the works;
- Management and auditing procedures, including tool box talks to personnel, will be put in place to ensure that any works which have the potential to impact on the aquatic environment are being carried out in accordance with the contactors environmental controls, which will be consistent with an approved CEMP and any planning conditions;
- Existing and proposed surface water drainage and discharge points will be mapped on the Drainage layout. These will be noted on construction site plans and protected accordingly to ensure water bodies are not impacted from sediment and other pollutants using measures to intercept the pathway for such pollutants;
- Welfare facilities (canteens, toilets etc.) will be available within the construction compound and this will remain in place for the construction of the Project. The offices and site amenities will initially need to have their own foul water collection until connections are made to the mains networks.

The use of oils and chemicals on-site requires significant care and attention. The following procedures will be followed to reduce the potential risk from oils and chemicals:

- New metal gerry cans with proper pouring nozzles will be used to move fuel around the site for the purposes of refuelling items of small plant on site. Metal gerry cans and any other items of fuel containers will be stored in certified metal bunded cabinets.
- Drip trays will be used under items of small plant at all times. Any waste oils etc. contained in the drip trays or the bunded area will be emptied into a waste oil drum, which will be stored within the bund.
- Any gas bottles will be stored in a caged area at a secure location on the site. All will be properly secured at point of work.
- No bulk chemicals will be stored within the active construction areas. Temporary oil and fuel storage tanks may be kept in the material storage area in suitable containers and will be stored on appropriately bunded spill pallets as required. Any fuel and oil stored onsite shall be stored on bunded spill pallets approved under BS EN 1992-3:2006). All bunds will be impermeable and capable of retaining a volume of equal to or greater than 1.1 times (>10%) capacity of the containers stored on them. In the event of a filling spillage excess oil or fuel will be collected in the bund;
- Refuelling of vehicles and the addition of hydraulic oils or lubricants to vehicles will be undertaken offsite where possible. Where this is not possible, filling and maintenance will take place in a designated material storage compound, which is located at least 10 metres from any temporary or permanent drainage features. Spill protection equipment such as absorbent mats, socks and sand will be available to be used in the event of an accidental release. Training will be given to appropriate site workers in how to manage a spill event. A certified double skinned metal fuel tank will be situated in this secure bunded area on the construction site if applicable. This tank will be certified for lifting when full.
- Spill protection equipment such as absorbent mats, socks and sand will be available to be used in the event of an accidental release during refuelling. Training will be given to appropriate site workers in how to manage a spill event. A hazardous bin will also be available to contain any spent sand or soak pads.
- Contingency Planning: A project specific Pollution Incident Response Plan will be prepared by the contractor and will refer to PPG 21 Pollution Incident Response Planning. The contractor's Environmental Manager will be notified in a timely manner of all incidents where there has been a breach in agreed environmental management procedures. Suitable training will be provided by the

contractor to relevant personnel detailed within the Pollution Incident Response Plan to ensure that appropriate and timely actions is taken.

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The following mitigation measures will be taken at the construction site in order to prevent any spillages to ground of fuels during machinery activities and prevent any resulting soil and/or groundwater quality impacts:

- Refuelling will be undertaken off site where possible;
- Where mobile fuel bowsers are used the following measures will be taken:
  - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;
  - The pump or valve will be fitted with a lock and will be secured when not in use;
  - All bowsers to carry a spill kit and operatives must have spill response training; and
  - Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

Provided these mitigation measures are employed during construction operations, the potential impact to receiving water environment will be reduced to **negligible** thus reducing the significance of environmental effect will be reduced to **imperceptible**.

7.5.8.5 Demolition Works

The risk to water quality impacts associated with demolition works during the construction phase will be controlled through good site management conforming to health and safety, while adhering to codes and practices which limit the risk of demolition related contamination. PPG 6: Working at construction and demolition sites, shall be adhered to particularly in relation to safe and secure on site storage and minimising storage time, wheel washing, placing of concrete and dealing with silty water for the construction and demolition industry (Environmental Agency, 2012).

A Method Statement for the demolition of the building shall be prepared showing the sequence of demolition and the method of demolition to be employed. A health and safety plan showing all the measures for the protection of the public including hoardings shall also be prepared.

In circumstances where the above mitigation measures are employed during the construction phase operations, the potential magnitude of the impact on the receiving waters will be reduced to **negligible** thus reducing the significance of the environmental effect to **imperceptible** during demolition works.

7.5.9 Operational Phase Mitigation Measures

7.5.9.1 Foul Water

Foul wastewater generated on-site particularly during the operational phase of the development will be piped and discharged to the existing Irish Water foul sewer. Agreement in principal to discharge to the existing foul network and Osberstown WWTP will be secured with Irish Water and will ensure the wastewater discharge authorisation for the existing agglomeration will not be adversely affected (see EIAR Volume II, Appendices, Appendix 4.12, Planning Engineering Report, Appendix E).

Furthermore, each Data Centre building is serviced by its own local foul drainage network which conveys flows to one of two onsite pumping stations, located west and east of the site. Each pumping station will have sufficient capacity to accommodate wastewater generated by a sprinkler discharge event by a Data Centre (max 440m^3). This is sufficient to accommodate 24 hour storage for domestic and process wastewater generation.

Both the surface water and foul system are to be entirely separate developments.

Where the mitigation measures listed above are employed, the potential impact to receiving water environment will be reduced to negligible thus reducing the significance of environmental effect will be reduced to Imperceptible.

7.5.9.2 Storm Water Run-off

The development has incorporated a variety of Sustainable Drainage Systems (SuDS) techniques to counteract the potential increased need for supply. SuDS, supplemented by bypass separators on the piped storm water network, will include green roofs, permeable paving, rain gardens, attenuation tanks, bioretention pods, as well as, grassed and open space landscape portions of the site.

To reduce the water demand on the Local Authority water supplies and to reduce the requirement of the facility to use mains connection, water conservation measures will be incorporated throughout the development. Surface waters will be collected as far as practically possible at surface level via ponds and swales, to be used for peak hours and hydrant and sprinkler back up supply. Rainwater will be collected for use in the cooling operations of the plant to decrease reliance on public supply.

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During the operational phase, there is potential for storm water run-off to be impacted by pollutants arising within the car parking areas and roadways. This runoff has the potential to provide pathways for a wide range of contaminants arising from general operations to the aquatic environment. The main potential pollutants from surface water drainage or direct run-off are sediment, hydrocarbons, and trace contaminants including metals and organics.

The attenuation tanks and pervious pavements have proposed dual purpose and whilst they are flow attenuation features they also mitigate against potential water quality issues associated with storm water run-off.

All surface water run-off from roof areas and hardstanding areas are designed to be collected by a gravity pipe network. The collected stormwater will be diverted through a petrol interceptor prior to an underground attenuation storage tank.

Provided the best-practice techniques illustrated in CIRIA's guidance document (C768 – Guidance on the Construction of SuDS) are followed, no further mitigation is required. Where the measures listed above are employed, the potential impact to receiving water environment will be reduced to **negligible** thus reducing the significance of environmental effect will be reduced to **imperceptible**.

7.5.9.3 Hydromorphology

In terms of the culvert installation the condition of the Bluebell Stream the existing stream bed shall be excavated to the design formation levels as set by the engineer. If suitable, all existing bed material will be stockpiled on site for re-use along the culverted stream channel. Where the measures listed above are employed, the potential impact to receiving water environment will be reduced to negligible thus reducing the significance of environmental effect will be reduced to imperceptible.

7.5.10 Monitoring

7.5.1 Construction Phase

The CEMP includes emergency response procedures to mitigate against contamination to water systems, in particular in relation to oil spillage, uncontrolled silt discharge and sewage spill. The CEMP will also have procedures for monitoring the performance and effectiveness of mitigation measures employed during construction to ensure they are operating as intended and are providing the necessary protection to the receiving environment.

Weekly checks will be carried out to ensure surface water drains are not blocked by silt, or other items, and that all storage is located at least 10m from surface water receptors. A regular log of inspections will be maintained, and any significant blockage or spill incidents will be recorded for root cause investigation purposes and updating procedures to ensure incidents do not reoccur.

7.5.2 Operational Phase

A number of elements of the development require frequent inspection and cleaning as a maintenance requirement. Visual inspections and cleaning of drainage elements are required at different times for each element, these will be monitored and maintained as necessary.

7.5.3 Residual Impacts

Where the appropriate mitigation measures are fully implemented during the construction and operational phases of the development as outlined in the previous section, the impact of the Project on the water quality in the area will be imperceptible as indicated in Table 7.11.

Accordingly, the development will not have a significant effect on the water quality of the receiving waters.

It can therefore be concluded that the proposed works are compliant with the requirements and environmental objectives of the EU Water Framework Directive and the other relevant water quality objectives for these water bodies.

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Table 7.11: Residual Impacts (with mitigation)

Significance of Environmental Impact	
Construction Phase	
Suspended sediments / Sedimentation	Imperceptible
Concrete and cement pollution	Imperceptible
Impacts associated with general construction works	Imperceptible
Demolition works	Imperceptible
Operational Phase	
Storm Water Run-off	Imperceptible
Foul Water	Imperceptible
Hydromorphology	Imperceptible

7.6 Interactions

The water environment and impact on water quality has the potential to impact on water dependent habitats and species in the water bodies affected and therefore there is a strong interaction with biodiversity. The protection of the water environment will help to ensure that biodiversity is not significantly impacted by the implementation of the Project.

Geology and soils also have a strong interaction with water quality. The interaction of surface and sub surface water means it is important in the generation of run-off and the mitigation of same. Chapter 6 Lands and Soils notes that no significant pollutant linkages are considered to be present within the study area and that impact to groundwater is considered to be Neutral.

7.7 Cumulative Effects

7.7.1 Other Projects

As identified in Chapter 1 of the EIAR (Section 1.4), there are a number of other projects which have been identified for consideration in terms of their potential for cumulative effects.

Table 7.12 provides an assessment of the potential cumulative effects of these developments with the Project by establishing their location, hydrologically connective to the Project site and the assessments undertaken for each individual application. Based on the assessment in Table 7.12 it can be concluded that there is no potential for cumulative effects with the Project and these developments.

Table 7.12 Assessment of Cumulative Effects

Planning Reference	Address	Description	Status	Cumulative Assessment
201418	Kerdiffstown and Monread North, Naas, Co. Kildare	A proposed solar farm on an area of approximately 10.8 hectares	Granted	The location of this proposed development is downstream of the Project in the Liffey_120 river water body. The supporting documents had identified that the development would not have a significant impact on the feeder stream feeding the Grand Canal and the surface water management measures would ensure that there would be no impact on water quality. The Project is upstream of this development but with the implementation of the mitigation measures proposed as part of the Project there is no potential for any cumulative effects and the water quality in the Liffey_120 will not be affected by the Project.
PL09.305953	Townlands of Drehid, Mulgeeth, Ballynamullagh, Mucklon, Kilmurray (Carbury By), Killyon and Timahoe East, Co. Kildare	Renewable energy development for 2 areas of solar photovoltaic arrays	Granted	This development is in the Boyne catchment and therefore is not hydrologically connected to the Project site and there is no potential for cumulative effects.
181328 & PL09.303577	Townlands of Guidenstown South and Rahilla Glebe, Co. Kildare	The development consist / consists of a ground mounted solar photovoltaic (PV) farm	Refused	This project was refused planning permission and is located int eh River Barrow Catchment and is therefore not hydrologically connected to the Project.
18969	Brownstown and Carnalaway, Kilcullen, Co. Kildare	A solar farm to be installed over restored landfill	Granted	This development is upstream of the Project site location in the Liffey_060 river water body which is current at moderate ecological status with the significant pressure noted as Agriculture by the EPA. The solar farm is proposed on a restored landfill but all works are undertaken above ground so as not to compromise the integrity of the capping system that has been installed on the site of the old landfill. It was concluded that this proposed development would not impact on surface water and groundwater quality or result in preferential pathways for leachate export. A Construction Environmental Management Plan will ensure best practice. Given the nature of the works and the application of best practice in the CEMP there is no significant effects predicted. The Project site is downstream of this development but hydrologically connected, however water quality will not be affected by this development therefore there is no potential for cumulative effects in the River Liffey, particularly given the significant pressure on the Liffey_060 water body is due to nutrient pressures from agriculture.
18250	Killeenlea, Ardrass Lower & Killadoon, Celbridge, Co. Kildare	A solar farm comprising: the installation of photovoltaic panels on ground mounted frames	Granted	This development is downstream of the Project site location, located in the Liffey_140 river water body which is currently at good ecological status. An AA screening undertaken by Kildare County Council determined that there would be no impact on freshwater habitats or species from the development. Given the distance downstream from the

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				Project site, the conclusion of the impact assessment for the Project and the fact that there is no potential from significant effects from this development there is no risk to the existing good ecological status from cumulative effects.
12577	Bord na Mona, Main Street, Newbridge, Co. Kildare.	Construction of a new I.T. data centre building, concrete slab to facilitate a 550 Kva back-up generator and a concrete fuel storage bund to hold a 3000L fuel tank	Granted	This development is located in the main street in Newbridge within the Liffey_050 river water body which is currently at good ecological status. The development is upstream of the Project site and has already been constructed. The current baseline in the Liffey_050 is achieving its objective so there is no potential for cumulative effects.
18247	Porterstown and Kilteel Lower, Kill, Co. Kildare	Transmission System Operator (TSO) compound including substations and containerised battery storage modules (Battery Storage Facility)	Granted	This development is located in the Painestown_010 river water body which is currently at poor ecological status due to agricultural and hydromorphological (channelisation) pressures. This development is downstream of the Project site. An EIA Screening was undertaken for this development and concluded that there would not be any significant impacts and only clean uncontaminated surface water would be discharged from the site.
20745	Porterstown, Kill, Co. Kildare.	The development of a new electrical substation and additional equipment in the existing ESB Kilteel 110kV Substation to facilitate the connection of the Porterstown Battery Storage Facility infrastructure.	Granted	This application is associated with the TSO compound above and the AA screening concluded that there was no potential for impacts on freshwater habitats or species. Therefore there is no potential for cumulative effects with the Project.
PL09.310841	Dunnstown, Co. Kildare	An enclosed battery energy storage system compound on c. 4.089 ha with 76 no. battery storage units.	Granted with Conditions after Appeal	This development is located in the Liffey_050 river water body which is currently at good ecological status. The development is upstream of the Project site. A review of the An Bord Pleanala inspectors report established that the site is remote from any surface water or groundwater connectivity to the Liffey_050 and the inspector concluded that there was no potential to impact on the Water Framework Directive Objectives of the Liffey_050 river water body. There is therefore no potential for cumulative effects with the Project.

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7.7.2 Gas Connection

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

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

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

7.7.2.1 Potential Route in Context of the Water Environment

The likely route for the gas pipeline commences at the existing Above Ground Installation (AGI) at Glebe West which is within the Liffey_050 river water body, which is currently at good ecological status. On leaving the AGI the gas pipeline will likely travel in a north westerly direction into the Liffey_110 river water body, which is also at good ecological status. Within this water body there is a minor water course crossing just north of the L6409 at Bawnoge after which the likely route will continue on a north-westerly direction crossing another water course within the Liffey_110 water body to the west of Punchestown race course, the Naas River. From here the likely route for the gas pipeline will continue in a west north-westerly direction along the R411, Ballymore Eustace Road, crossing another water course in the Liffey_110 water body at Oak Park, Naas. The likely route then continues west along the Naas Southern Link Road and crosses into the Liffey_100 river water body where it crosses the Bluebell Stream. The likely route continues northwards in the Liffey_100 water body where it then crosses a tributary of the Bluebell Stream and the Grand Canal, it is likely that a single crossing will be used to traverse these water courses. After crossing the Grand Canal the likely route of the gas pipeline will continue to traverse the Liffey_100 catchment in a north-westerly direction along agricultural lands on the approximate alignment of the existing wayleave for the foul drainage network after which it will likely deviate west to cross the Naas Road and the M7 motorway onto the R409 to the Project site.

7.7.2.2 Potential Cumulative Effects

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

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

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

On the basis of the likely route of the pipeline and the minor nature of the water courses traversed, including the selection of the most appropriate crossing technique in consultation with the relevant statutory authorities

and the application on best practice it is reasonable to assume that the cumulative effects of the main Project with the GNI gas transmission line connection will not be significant and will not compromise the environmental objectives of the water bodies affected.

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