ENVIRONMENTAL IMPACT ASSESSMENT REPORT – VOLUME I

STRATEGIC HOUSING DEVELOPMENT & VILLAGE CENTRE

AT

PRIORSLAND, CHERRYWOOD, DUBLIN 18.

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TABLE OF CONTENTS

Chapter 1 – INTRODUCTION & METHODOLOGY		Chapter/Page No.
1.1	PROPOSED DEVELOPMENT	1-1
1.2	METHODOLOGY	1-2
1.3	DEFINITION OF EIA	1-3
1.4	EIAR SCREENING	1-3
1.5	EIAR SCOPING	1-5
1.6	EIAR OBJECTIVES	1-6
1.7	EIAR FORMAT & CONTENT	1-6
1.8	EIAR STRUCTURE	1-7
1.9	COMPETENCY	1-9
1.10	DIFFICULTIES IN COMPILING THE SPECIFIED INFORMATION	1-11
1.11	AVAILABILITY OF THE EIAR	1-11
1.12	CONSULTATION	1-11

Chapter 2 – ALTERNATIVES		Chapter/Page No.
2.1	INTRODUCTION	2-1
2.2	ALTERNATIVE LOCATIONS	2-1
2.3	ALTERNATIVE DESIGNS (& USES0	2-2
2.4	ALTERNATIVE PROCESSES	2-3
2.5	DO NOTHING ALTERNATIVE	2.3

Chapter 3 – Description of Development		Chapter/Page No.
3.1	INTRODUCTION	3-1
3.2	CHARACTERISTICS OF THE SITE	3-1
3.3	PROPOSED DEVELOPMENT	3-3
3.4	DEVELOPMENT STATISTICS	3-5
3.5	LANDSCAPING	3-7
3.6	ACCESS	3-8
3.7	WATER SERVICES/FLOODING INFRASTRUCTURE	3-9
3.8	PHASING	3-10
3.9	CONSTRUCTION STAGE	3-11
3.10	OPERATIONAL STAGE	3-17
3.11	CUMULATIVE IMPACTS	3-17

Chapter 4 – Population and Human Health		Chapter/Page No.
4.1	INTRODUCTION	4-1
4.2	METHODOLOGY	4-1
4.3	RECEIVING ENVIRONMENT	4-2
4.4	CHARACTERISTICS OF THE PROPSOED DEVELOPMENT	4-6
4.5	POTENTIAL IMPACTS	4-7
4.6	POTENTIAL CUMULATIVE IMPACTS	4-11
4.7	MITIGATION MEASURES	4-11
4.8	PREDICTED IMPACTS	4-12
4.9	‘DO NOTHING’ SCENARIO	4-12
4.10	WORST CASE SCENARIO	4-12
4.11	MONITORING & REINSTATEMENT	4-12
4.12	DIFFIUCLTIES IN COMPLING INFORMATION	4-12
4.13	REFERENCES	4-13

Chapter 5 – Biodiversity		Chapter/Page No
5.1	INTRODUCTION	5-1
5.2	METHODOLOGY	5-1
5.3	CONSULTATION	5-4
5.4	RECEIVING ENVIRONMENT	5-5
5.5	CHARACTERISTICS OF THE PROPSOED DEVELOPMENT	5-20
5.6	POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT	5-21
5.7	POTENTIAL CUMULATIVE IMPACTS	5-24
5.8	MITIGATION MEASURES	5-25
5.9	RESIDUAL IMPACTS	5-29
5.10	MONITORING	5-29
5.11	DO NOTHING SCENARIO	5-29
5.12	DIFFICULTIES IN COMPILING INFORMATION	5-29
5.13	REFERENCES	5-30

Chapter 6 – Soils & Geology….		Chapter/Page No.
6.1	INTRODUCTION	6-1
6.2	METHODOLOGY	6-1
6.3	RECEIVING ENVIRONMENT	6-2
6.4	CHARACTERISTICS OF THE PROPSOED DEVELOPMENT	6-5
6.5	POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT	6-6
6.6	MITIGATION MEASURES	6-8
6.7	PREDICTED IMPACT OF THE PROPOSED DEVELOPMENT	6-18
6.8	MONITORING	6-11
6.9	REINSTATEMENT	6-11
6.10	INTERACTIONS AND POTENTIAL CUMULATIVE IMPACTS	6-11

Chapter 7 – Water Services		Chapter/Page No.
7.1	INTRODUCTION	7-1
7.2	METHODOLOGY	7-1
7.3	RECEIVING ENVIRONMENT	7-1
7.4	CHARACTERISTICS OF THE PROPOSED DEVELOPMENT	7-3
7.5	POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT	7-4
7.6	MITIGATION MEASURES	7-5
7.7	PREDICTED IMPACT OF THE PROPOSED DEVELOPMENT	7-6
7.8	MONITORING	7-7
7.9	REINSTATEMENT	7-7
7.10	INTERACTIONS AND POTENTIAL CUMULATIVE IMPACTS	7-7

Chapter 8 – Noise & Vibration		Chapter/Page No.
8.1	INTRODUCTION	8-1
8.2	METHODOLOGY	8-1
8.3	RECEIVING ENVIRONMENT	8-4
8.4	CHARACTERISTICS OF THE PROPOSED DEVELOPMENT	8-9
8.5	POTENTIAL IMPACTS	8-9
8.6	POTENTIAL CUMULATIVE IMPACTS	8-17
8.7	MITIGATION MEASURES	8-18
8.8	RESIDUAL IMPACTS	8-19
8.9	M50 MOTORWAY INWARD NOISE IMPACT	8-19

Chapter 9 – Air Quality & Climate		Chapter/Page No.
9.1	INTRODUCTION	9-1
9.2	METHODOLOGY	9-1
9.3	RECEIVING ENVIRONMENT	9-6
9.4	CHARACTERISTICS OF THE PROPOSED DEVELOPMENT	9-11
9.5	POTENTIAL IMPACTS	9-11
9.6	POTENTIAL CUMULATIVE IMPACTS	9-14
9.7	MITIGATION MEASURES	9-14
9.8	PREDICTED IMPACTS	9-15
9.9	'DO NOTHING' SCENARIO	9-16
9.10	WORST CAST SCENARIO	9-16
9.11	MONITORING & REINSTATEMENT	9-16
9.12	DIFFICULTIES IN COMPILING INFORMATION	9-17
9.13	REFERENCES	9-18

Chapter 10 – Landscape & Visual		Chapter/Page No.
10.1	INTRODUCTION	10-1
10.2	METHODOLOGY	10-1
10.3	RECEIVING ENVIRONMENT	10-2
10.4	CHARACTERISTICS OF THE PROPOSED DEVELOPMENT	10-6
10.5	POTENTIAL IMPACTS	10-10
10.6	POTENTIAL CUMULATIVE IMPACTS	10-10
10.7	MITIGATION MEASURES	10-10
10.8	PREDICTED IMPACTS	10-11
10.9	DO NOTHING' SCENARIO	10-29
10.10	WORST CAST SCENARIO	10-29
10.11	MONITORING & REINSTATEMENT	10-29
10.12	DIFFICULTIES IN COMPILING INFORMATION	10-29

Chapter 11 – Traffic & Transportation		Chapter/Page No.
11.1	INTRODUCTION	11-1
11.2	RECEIVING ENVIRONMENT	11-1
11.3	CHARACTERISTICS OF THE PROPSOED DEVELOPMENT	11-1
11.4	SCOPING	11-3
11.5	EXISTING TRAFFIC & TRAFFIC IMPACT OF PROPOSED DEVELOPMENT	11-3
11.6	POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT	11-3
11.7	MITIGATION MEASURES	11-4
11.8	PREDICTED IMPACT OF THE PROPOSED DEVELOPMENT	11-5
11.9	MONITORING	11-5
11.10	REINSTATEMENT	11-6
11.11	INTERACTIONS & POTENTIAL CUMULATIVE IMPACTS	11-6

Chapter 12 – Waste & Management		Chapter/Page No.
12.1	INTRODUCTION	12-1
12.2	METHODOLOGY	12-1
12.3	RECEIVING ENVIRONMENT	12-3
12.4	CHARACTERISTICS OF THE PROPOSED DEVELOPMENT	12-3
12.5	POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT	12-7
12.6	POTENTIAL CUMULATIVE IMPACTS	12-8
12.7	MITIGATION MEASURES	12-10
12.8	PREDICTED IMPACTS	12-10
12.9	'DO NOTHING' SCENARIO	12-10
12.10	WORST CASE SCENARIO	12-10
12.11	MONITORING & REINSTATEMENT	12-10
12.12	DIFFICULTIES IN COMPILING INFORMATION	12-11
12.13	REFERENCES	12.13

Chapter 13 – Cultural Heritage		Chapter/Page No.
13.1	INTRODUCTION	13-1
13.2	METHODOLOGY	13-1
13.3	RECEIVING ENVIRONMENT	13-5
13.4	CHARACTERISTICS OF THE PROPOSED DEVELOPMENT	13-11
13.5	POTENTIAL IMPACTS	13-12
13.6	POTENTIAL CUMULATIVE IMPACTS	13-12
13.7	MITIGATION MEASURES	13-13
13.8	PREDICTED IMPACTS	13-13
13.9	'DO NOTHING' SCENARIO	13-14
13.10	WORST CAST SCENARIO	13-13
13.11	MONITORING & REINSTATEMENT	13-13
13.12	DIFFICULTIES IN COMPILING INFORMATION	13-13
13.13	REFERENCES	13-13

Chapter 14 – Material Assets		Chapter/Page No.
14.1	INTRODUCTION	14-1
14.2	METHODOLOGY	14-1
14.3	RECEIVING ENVIRONMENT	14-1
14.4	CHARACTERISTICS OF THE PROPOSED DEVELOPMENT	14-8
14.5	POTENTIAL IMPACTS	14-8
14.6	POTENTIAL CUMULATIVE IMPACTS	14-12
14.7	MITIGATION MEASURES	14-12

14.8 PREDICTED IMPACTS 14-15
14.9 'DO NOTHING' SCENARIO 14-17
14.11 MONITORING & REINSTATEMENT 14-17
14.12 DIFFICULTIES IN COMPILING INFORMATION 14-18
14.13 REFERENCES 14-18

Chapter 15 – Interactions Chapter/Page No.
15.1 INTRODUCTION 15-1
15.2 ASSESSMENT 15-1

Chapter 16 – Schedule of Mitigation Chapter/Page No.
16.1 INTRODUCTION 16-1
16.2 CONSTRUCTION STAGE 16-1
16.3 OPERATIONAL STAGE 16-11

1.0 INTRODUCTION & METHODOLOGY

1.1 PROPOSED DEVELOPMENT

This Environmental Impact Assessment Report (EIAR) has been prepared on behalf of 1 Carrickmines Land Limited to accompany a Strategic Housing Development (SHD) application to An Bord Pleanála (ABP) for the construction of a new Village Centre and Residential Development located at Priorsland, Cherrywood, Dublin 18

The application site is located within the townlands of Carrickmines Great and Brennanstown. The Carrickmines Stream runs through the subject site in an easterly direction. To the northwest is the Carrickmines Luas Park & Ride and the Luas line to the north. To the southwest is the M50. There are third party lands between the subject site and the M50 and to west. To the east and south-east are third party lands which include Cherrywood SDZ Phase 1 road infrastructure and Beckett Park.

Figure 1.1 Site Location & Adjoining Lands

As per the statutory planning notices, the proposed development will comprise a mixed-use Village Centre and residential development as follows:

- 402 no. apartments (comprising 146 no. 1-beds; 218 no. 2-beds and 38 no. 3-beds) within 6 no. blocks (Blocks A-F) ranging in height up to 5 storeys with basement/undercroft parking areas.
- 41 no. terraced/semi-detached/detached houses (comprising 19 no. 3-beds and 22 no. 4-beds).
- A supermarket (c.1,306 sq.m), 7 no. retail/retail services units (c.715 sq.m total gross floor area); 2 no. non-retail/commercial units (c.213 sq.m total gross floor area); creche (c.513 sq.m), gym (c.155 sq.m), community space (c.252 sq.m), residential facilities (c.551.8 sq.m total gross floor area), Office/High Intensity Employment use (c.708 sq.m).
- Provision of car/ bicycle/ motorcycle parking at basement/ undercroft/ ground level. ESB sub-stations/switchrooms/kiosks, waste storage areas, plant areas.
- Provision of the first phase of Priorsland Public Park, a linear park along the Carrickmines Stream and additional public and communal open spaces.
- Provision of an acoustic barrier along the southern/south-western edge of the site adjacent the M50.
- Construction of Castle Street on the subject lands and two road bridges across the Carrickmines Stream, one to serve a future school site, the second to provide interim pedestrian and cyclist access to the Carrickmines Luas station and future Transport Interchange. Provision of a pedestrian bridge from the Village Centre to Priorsland Park.
- The proposed development includes for all associated site development works, landscaping, boundary treatments and services provision.

1.2 METHODOLOGY

Certain public and private projects that are likely to have significant effects on the environment are subject to EIA requirements derived from EIA Directive 85/337/EC (as amended by Council Directive 97/11/EC, Directive 2003/35/EC, Directive 2009/31/EC, Directive 2011/92/EU and Directive 2014/52/EU.

The EIA Directives have been transposed into the Irish land use planning consent system by way of the Planning & Development Acts 2000 (as amended), and the Planning & Development Regulations 2001-18.

The most recent amendment to the Regulations - the European Union (Planning and Development)(Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018) - transposed Directive 2014/52/EU into Irish law.

Complementary to the legislation is a range of guidelines produced by the EU and government agencies to inform the carrying out of EIA:

- EU Guidance on EIA Screening (DG Environment 2001).
- Guidance on EIA Scoping (DG Environment 2001).
- EIA Review Checklist (DG Environment 2001).
- Guidelines on Information to be Contained in an Environmental Impact Statement (EPA 2002).
- Study on the Assessment of Indirect & Cumulative Impacts as well as Impact Interaction (DG Environment 2002).
- Environmental Impact Assessment (EIA), Guidance for Consent Authorities Regarding Sub-Threshold Development (DoEHLG 2003).
- Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA 2003).
- Development Management Guidelines (DoEHLG, 2007).
- Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA 2017)
- Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems - Key Issues Consultation Paper (Department of Environment, Community and Local Government, 2017).
- Circular letter PL 1/2017 - Advice on Administrative Provisions in Advance of Transposition (Department of Housing, Planning and Local Government, 2017).
- Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission 2017)
- Environmental Impact Assessment of Projects – Guidance on Screening (European Commission 2017)
- Environmental Impact Assessment of Projects – Guidance on Scoping (European Commission 2017)
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, 2018).

1.3 DEFINITION OF EIA

Article 171A of the 2018 Regulations defines *'environmental impact assessment' as:*

"… a process
(a) consisting of:

(i) the preparation of an environmental impact assessment report by the applicant in accordance with this Act and regulations made thereunder,

(ii) the carrying out of consultations in accordance with this Act and regulations made thereunder,

(iii)the examination by the planning authority or the Board, as the case may be, of-

I) the information contained in the environmental impact assessment report,

II) any supplementary information provided, where necessary, by the applicant in accordance with section 172(1D) and (1E), and

III) any relevant information received through the consultations carried out pursuant to subparagraph (ii),

(iv)the reasoned conclusion by the planning authority or the Board, as the case may be, on the significant effects on the environment of the proposed development, taking into account the results of the examination carried out pursuant to subparagraph (iii) and, where appropriate, its own supplementary examination, and

(v) the integration of the reasoned conclusion of the planning authority or the Board, as the case may be, into the decision on the proposed development, and
(b) which includes:

(i) an examination, analysis and evaluation, carried out by the planning authority or the Board, as the case may be, in accordance with this Part and regulations made thereunder, that identifies, describes and assesses, in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of the proposed development on the following:
(I) population and human health;
(II) biodiversity, with particular attention to species and habitats protected under the Habitats Directive and the Birds Directive;
(III) land, soil, water, air and climate;
(IV) material assets, cultural heritage and the landscape;
(V) the interaction between the factors mentioned in clauses (I) to (IV), and
(ii) *as regards the factors mentioned in subparagraph (i)(I) to (V), such examination, analysis and evaluation of the expected direct and indirect significant effects on the environment derived from the vulnerability of the proposed development to risks of major accidents or disasters, or both major accidents and disasters, that are relevant to that development;*

1.4 EIA SCREENING

Section 176(A) of the Act defines *'screening for environmental impact assessment'* as

".. a determination—
(a) as to whether a proposed development would be likely to have significant effects on the environment, and
(b) if the development would be likely to have such effects, that an environmental impact assessment is required."

Section 172 of the Act states that an EIA shall be carried out respect of an application for consent for proposed development where either of the following are relevant:

- the proposed development would be of a class specified in Part 1 of Schedule 5 of the Planning and Development Regulations.
- the proposed development would be of a class specified in Part 2 of Schedule 5 of the Planning and Development Regulations.
- **the proposed development would be of a class specified in Part 2 of Schedule 5 of the Planning and Development Regulations 2001 but does not equal or exceed the relevant quantity, area or other limit specified in that Part, but is concluded, determined or decided that proposed development is likely to have a significant effect on the environment**.

The subject development does not fall within any development classes set out in Part 1 of Schedule 5.

The following development classes set out in Part 2 of Schedule 5 are noted:

- ***10(b)(i) Construction of more than 500 dwellings***
- ***10(b)(iv) 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 area and 20 hectares elsewhere. (In this paragraph, "business district" means a district within a city or town in which the predominant land use is retail or commercial use.)***

The residential proposal in this instance is for 446 units which is just under the 500 unit threshold. The application site is less than 10ha, although a portion of the site is zoned to provide a new Village Centre where the predominant use will be retail/commercial.

Development Class 15 in Part 2 of Schedule 5 is also noted:

- ***15 Any project listed in this Part which does not exceed a quantity, area or other limit specified in this Part in respect of the relevant class of development, but which would be likely to have significant effects on the environment, having regard to the criteria set out in Schedule 7.***

Schedule 7 of the Regulations lists the criteria for determining whether Development listed in Part 2 of Schedule 5 should be subject to an EIA. These are:

1. Characteristics of proposed development
The characteristics of proposed development, in particular—
(a) the size and design of the whole of the proposed development,
(b) cumulation with other existing development and/or development the subject of a consent for proposed development for the purposes of section 172(1A) (b) of the Act and/or development the subject of any development consent for the purposes of the Environmental Impact
Assessment Directive by or under any other enactment,
(c) the nature of any associated demolition works,
(d) the use of natural resources, in particular land, soil, water and biodiversity,
(e) the production of waste,
(f) pollution and nuisances,
(g) the risk of major accidents, and/or disasters which are relevant to the project concerned, including those caused by climate change, in accordance with scientific knowledge, and
(h) the risks to human health (for example, due to water contamination or air pollution).

2. Location of proposed development
The environmental sensitivity of geographical areas likely to be affected by the proposed development, with particular regard to—
(a) the existing and approved land use,
(b) the relative abundance, availability, quality and regenerative capacity of natural resources (including soil, land, water and biodiversity) in the area and its underground,
(c) the absorption capacity of the natural environment, paying particular attention to the following areas:
(i) wetlands, riparian areas, river mouths;
(ii) coastal zones and the marine environment;
(iii) mountain and forest areas;
(iv) nature reserves and parks;
(v) areas classified or protected under legislation, including Natura 2000 areas designated pursuant to the Habitats Directive and the Birds Directive and;
(vi) areas in which there has already been a failure to meet the environmental quality standards laid down in legislation of the European Union and relevant to the project, or in which it is considered that there is such a failure
(vii) densely populated areas;
(viii) landscapes and sites of historical, cultural or archaeological
significance.

3. Types and characteristics of potential impacts

The likely significant effects on the environment of proposed development in relation to criteria set out under paragraphs 1 and 2, with regard to the impact of the project on the factors specified in paragraph (b)(i)(I) to (V) of the definition of 'environmental impact assessment report' in section 171A of the Act, taking into account—
(a) the magnitude and spatial extent of the impact (for example,
geographical area and size of the population likely to be affected),
(b) the nature of the impact,
(c) the transboundary nature of the impact,
(d) the intensity and complexity of the impact,
(e) the probability of the impact,
(f) the expected onset, duration, frequency and reversibility of the impact,
(g) the cumulation of the impact with the impact of other existing and/or development the subject of a consent for proposed development for the purposes of section 172(1A) (b) of the Act and/or development the subject of any development consent for the purposes of the
Environmental Impact Assessment Directive by or under any other enactment, and
(h) the possibility of effectively reducing the impact.

Notwithstanding that the size of the site and proposed number of residential units are below the thresholds in Development Class 10 of Part 2 of Schedule 5, having regard to Development Class 15, Schedule 7 and Section 172 of the Act, and with regard to the size and scale of the proposed development, the proposed use of natural resources, the relative environmental sensitivity of the location, and the types of potential impacts, it was deemed prudent to prepare an EIAR for the proposed development to accompany the planning application in this instance.

Furthermore, it is noted that under Article 299A of the Regulations, where a planning application for a sub-threshold development is accompanied by an EIAR and a request for a determination under section 7(1)(*a*)(i)(I) of the Act of 2016 was not made, the application shall be dealt with as if the EIAR had been submitted in accordance with section 172(1) of the Act.

1.5 EIA SCOPING

Section 173(2) (a) of the Planning and Development Act 2000 (as amended) provides that a formal request for scoping may be submitted to the planning authority. However, the *'Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports'* (2017), confirm that this is not mandatory.

The EIAR team carried out a scoping exercise to identify the key issues that may be considered likely to have a significant effect on the environment. Regard was also had to EIAR carried out for other developments in the Cherrywood SDZ.

In accordance with the draft EPA Guidelines (2017), those issues that do not meet the threshold of significance have been 'scoped out'. The following issues have been identified in the context of the proposed development:

- Population & Human Health
- Biodiversity
- Lands, Soils & Geology
- Hydrology & Water Services
- Noise & Vibration
- Air & Climate
- Landscape & Visual
- Traffic & Transportation
- Material Assets
- Waste Management
- Cultural Heritage

1.6 EIAR OBJECTIVES

The EIA process is based on the following four principles:

- *Pursuing Preventative Action*

An assessment of anticipated likely and significant impacts was undertaken during the screening and the considerations of alternatives stages of the EIA process. This involved forming a preliminary opinion with respect to the approximate magnitude and character of the likely environmental impacts. This assessment was based on the knowledge, experience and expertise of the EIA team with reference to EIA guidance material and local information.

- *Maintaining Environmental Focus and Scope*

The EIA process has focussed on those issues where environmental impact is likely to occur and have significant effects.

- *Informing the Decision*

The EIAR has been developed and is presented in such a way as to facilitate the authority decision on the acceptability of the proposed development in the full knowledge of the project's likely significant impacts on the environment, if any.

- *Public & Stakeholder Participation*

Participation is provided through the statutory planning process which allows for public participation and consultation while receiving advice from other key stakeholders and statutory authorities with specific environmental responsibilities.

1.7 EIAR FORMAT & CONTENT

This EIAR is sub divided into 3No. volumes as follows:

• Volume I Non-Technical Summary;
• Volume II Environmental Impact Assessment Report; and,
• Volume III Appendices to Environmental Impact Assessment Report.

The EIAR has been prepared in the Grouped Format as set down in the EPA *"Guidelines on Information to be contained in an EIS"* (2002) and the *'Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports'* (2017). In general, the EIAR follows the framework presented in the EPA *"Advice Notes on Current Practice in the Preparation of Environmental Impact Statements"* (September 2003).

The structure and responsibility of the EIAR chapters is outlined below:

Chapter	Title	Consultant
1.0	Introduction & Methodology	McGill Planning Ltd.
2.0	Alternatives	McGill Planning Ltd.
3.0	Development Description	McGill Planning Ltd.
4.0	Population & Human Health	McGill Planning Ltd.
5.0	Biodiversity	Altemar Ecologists
6.0	Lands, Soils & Geology	PUNCH Consulting Engineers
7.0	Hydrology & Water Services	PUNCH Consulting Engineers

8.0	Noise & Vibration	CLV Consulting
9.0	Air & Climate	Traynor Environmental
10.0	Landscape & Visual	3D Design Bureau & McGill Planning Ltd.
11.0	Traffic & Transportation	PUNCH Consulting Engineers
12.0	Material Assets	McGill Planning Ltd.
13.0	Waste Management	Traynor Environmental
14.0	Cultural Heritage	IAC Archaeologists
15.0	Interactions	McGill Planning Ltd.
16.0	Summary of Mitigations Measures	McGill Planning Ltd.

1.8 EIAR STRUCTURE

The preparation of this EIS requires the co-ordination and synthesis of associated yet diverse elements of the overall assessment. To facilitate this process, a schematic structure is proposed in order to provide a coherent documentation of the varied aspects of the environment considered. The grouped format structure of the Environmental Impact Statement is listed below with a brief outline of each specific stage.

Methodology

The specific approach or techniques used to analyse impacts or describe environments.

Receiving Environment (Baseline Situation)

Dynamic description of the specific environment into which the proposal will fit, taking account of other developments likely to occur. The context, character, significance and sensitivity of the baseline is described. The likely evolution of baseline environmental characteristics without implementation of the proposed project.

Characteristics of the Proposed Development

Description of the physical characteristics of a project having regard to:

- the site location
- the size, design and appearance of the proposed project
- the cumulation with other proposed projects
- the use of natural resources
- the production of waste
- emissions and nuisances
- The potential risk of accidents.

The description of the development should take account of the full ‘life-cycle’ including construction, commissioning (if relevant), operation, changes to the project and potential decommission.

Potential Impacts

The potential impact of the proposal comprises a general description of the possible types of impacts which proposals of this kind would be likely to produce. Impact assessment addresses direct, indirect, secondary, cumulative, transboundary, short, medium and long term, permanent, temporary, positive and negative effects as well as impact interactions. This includes consideration of a 'Do Nothing' impact which describes the environment as it would be in the future if the development is not carried out.

Mitigation Measures

A description of any specific remedial or reductive measures considered necessary and practicable resulting from the assessment of potential impacts described above.

Predicted Impacts

An assessment of the net specific impact of the proposal, noting the direct, indirect, secondary, cumulative, transboundary, short, medium and long term, permanent, temporary, positive and negative effects as well as impact interactions which the proposed development may have. The predicted impact assumes all mitigation measures are fully and successfully applied. A 'Worst Case' impact is also considered. A 'Worst Case' impact is an impact arising where a development or its mitigation measures substantially fail.

Monitoring

A description of any post development monitoring of effects of the environment which might be necessary.

Reinstatement

A description of any post development reinstatement measures which might be necessary.

1.9 COMPETENCY

For the preparation of this EIAR, 1 Carrickmines Land Limited engaged McGill Planning Ltd. to project manage and coordinate the preparation of the EIAR with a team of qualified specialists engaged to prepare individual chapters, as listed in the Table 1.1. Details of the competency, qualifications and experience of the authors is outlined below:

Chapter	Consultant	Lead Consultant	Qualifications	Experience
Introduction & Methodology Alternatives Project Description Populations & Human Health Landscape & Visual (Written) Material Assets Interactions Summary of Mitigations Measure	McGill Planning Ltd.	Trevor Sadler	Master of Regional & Urban Planning (Hons) MA (Geography)(Hons) BA (Geography)(Hons)	Trevor Sadler is the director of McGill Planning Limited, and has worked for 20 years as a Town Planer in Ireland. He has a Masters in Urban and Regional Planning (MRUP) and a Masters in Arts (Human Geography) from University College Dublin. McGill Planning Limited, has carried out numerous EIARs and EIA Screenings. They have also been involved in multiple Strategic Housing Developments including the following successful SHD permissions which were also subject to full EIAR: • Knockboy Waterford City • Parkside Phase 4 North Fringe • Glenheron, Charlesland, Greystones • Airton Road, Tallaght • Taylor's Lane, Ballyboden • Fortunestown, Citywest • Ballycullen, Firhouse • Marmalade Lane Dundrum
Biodiversity	Altemar Ltd.	Bryan Deegan	MCIEEM	Altemar Ltd. is an established environmental consultancy based in Greystones, Co. Wicklow that has been in operating in Ireland since 2001. Bryan Deegan (MCIEEM) is the primary consultant. Bryan Deegan has 26 years' experience working in Irish terrestrial and aquatic environments, providing ecological consultancy. He has a Certificate in Science, Diploma in Applied Aquatic Science, BSc in Applies Marine Biology and a MSc in Environmental Science. Bryan has extensive aquatic and terrestrial fieldwork experience including flora and fauna (bird & mammal) surveys. Hugh Delaney provided specialist support to Bryan Deegan in relation to birds. Hugh Delaney is an ecologist (ornithologist primarily) having completed work on numerous sites with ecological consultancies over 10+ years. Hugh is local to the Dun Laoghaire-Rathdown area in Dublin and is especially familiar with the bird life and its ecology in the environs going back over 30 years.

Lands, Soils & Geology	PUNCH Consulting Engineers	Paul Casey	BEng (Hons) CEng MIEI	Paul Casey is a Civil/Structural Engineer with 15 years' experience in civil/structural engineering with significant experience in project and design management. Paul has extensive experience in leading project delivery from concept through planning and construction both in Ireland and abroad. Paul has experience in the design and delivery of multiple highway and bridge projects throughout Ireland including A2 Maydown to City of Derry Airport, M17 Tuam Bypass, N18 Oranmore to Gort and N7 Nenagh to Limerick. Prior to joining PUNCH Consulting Engineers, Paul worked in Sydney, Australia. Some of Paul's high profile international projects include Sydney Trains Network Maintenance Bases (project value €70 million), the Major Works Regional Bases (project value €20 million) and the Sydney Trains new Engineering & Maintenance Hub in Clyde (project value €40 million). Paul joined PUNCH Consulting Engineers in 2016 and was promoted to Technical Director in 2017, followed by his subsequent appointment as Director in 2019. His extensive residential experience (including EIAR Chapter preparation) includes the following successfully granted developments: • Marmalade Lane, Dundrum (SHD) • RB Central, Rockbrook, Sandyford (SHD) • Beach Road Residential Development (SHD) • Cross Avenue, Blackrock (SHD) • Abingdon, Shankill (SHD) • Duleek Housing Development (SHD) • Ashford Residential Development (SHD) • Waterford North Quay (SDZ)
Hydrology & Water Services				
Traffic & Transportation				
Noise & Vibration	CLV Consulting	Brian Johnson	BSci (Acoustical Engineering), MIOA	Brian Johnson is an internationally experienced acoustic consultant who has worked in the fields of architectural / building acoustics and noise control since 1994. His primary role has been conducting the architectural and mechanical acoustic design for large scale projects of all types over a wide range of geographies. He also has extensive experience in the field of environmental noise assessments and building acoustic commissioning testing. In addition to Ireland, he has previously been based in America, the United Kingdom, Asia, Australia and the Middle East. Academic Certifications • Certificate of Competence in Building Acoustic Measurements, Institute of Acoustics 2016 • Certificate of Competence in Environmental Noise Measurements, Institute of Acoustics 2017 • LEED Certified Green Professional • United States Green Building Council 2015

Air & Climate Waste Management	Traynor Environmental	Nevin Traynor	BSc. Env, H.Dip I.T, Cert SHWW,	Nevin Traynor BSc. Env, H. Dip I.T, Cert SHWW of Traynor Environmental Ltd, is a Senior Environmental consultant and director of the company established in 2004. Traynor Environmental have 17 years' experience as environmental consultants, offering specialist advice in respect of a wide range of environmental disciplines. The company are approved air and climate assessor and have been involved in numerous Strategic housing projects and EIA preparation over the last number of Years.
Cultural Heritage	IAC Archaeology	Faith Bailey Maeve Tobin	MA, BA, MIAI	Faith holds a single honours degree in Archaeology and a Masters in Cultural Landscape Management (University of Wales, Lampeter), has over 18 years' experience working the cultural heritage consultancy, is a licence eligible archaeologist and is a Member of the Institute of Archaeologists of Ireland and a Member of the Chartered Institute for Archaeologists. Maeve graduated from UCC with a B.A in Archaeology & Geography (2003) and an M.A. in Osteoarchaeology (2004), following which she worked as a field archaeologist. Both Faith and Maeve have considerable experience in the preparation, co-ordination and submission of EIA and desk-top assessments for a variety of largescale residential, commercial, windfarm and infrastructural projects across the country.

1.10 DIFFICULTIES IN COMPILING THE SPECIFIED INFORMATION

There were no significant difficulties in completing the Environmental Impact Statement. (Any minor difficulties are presented in each of the respective chapters).

While every effort has been made to ensure that the content of this EIAR is consistent there may be instances where typographical errors and/or minor inconsistencies do occur. These are unlikely to have any material impact on the overall findings and assessment contained in this EIAR.

1.11 AVAILABILITY OF THE EIAR

A copy of this EIAR document and Non-Technical Summary of the EIAR document is available for purchase at the offices of An Bord Pleanála and Dun Laoghaire Rathdown County Council at a fee not exceeding the reasonable cost of reproducing the document.

Additionally, prior to lodging this application, the required information has been issued for the Department of Housing, Planning and Local Government's EIA Portal. The portal provides a URL link.

1.12 CONSULTATION

As part of the preparation of the SDZ planning application with EIAR extensive pre-planning consultations were carried out with the Cherrywood Development Agency within DRLCC and then with the Development Management Team. Formal meetings were held on the following dates:

- 11th October 2018

- 18th December 2018
- 4th February 2019
- 25th February 2019

In addition to these, separate consultations were also held with Inland Fisheries Ireland, Department of Culture, Heritage and the Gaeltacht (various departments), National Museum of Ireland, and the National Inventory of Architectural Heritage. DLRCC Development Agency also consulted in the National Transport Authority (NTA) in relation to the project. Details of consultations are elaborated in individual chapters of the EIAR.

2.0 ALTERNATIVES CONSIDERED

2.1 INTRODUCTION

This section of the EIAR has been prepared by McGill Planning Ltd and provides a description of the proposed development and also explains the evolution of the scheme design through the reasonable alternatives examined.

It is a requirement of the EIA Directive (as amended) to present a description of the reasonable alternatives considered, a justification of the final proposed development, including an indication of the main reasons for the option chosen and taking into account the effects of the project on the environment.

The *Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment* (2018) state the following:

> *"The Directive requires that information provided by the developer in an EIAR shall include a description of the reasonable alternatives studied by the developer. These are reasonable alternatives which are relevant to the project and its specific characteristics. The developer must also indicate the main reasons for the option chosen taking into account the effects of the project on the environment.*
>
> *Reasonable alternatives may relate to matters such as project design, technology, location, size and scale."*

This section of the EIAR document provides an outline of the main alternatives examined throughout the design and consultation process under the following headings:

- Alternative Locations;
- Alternative Designs
- Alternative Processes;

This serves to indicate the main reasons for choosing the specific form and type development proposed, taking into account and providing a comparison of the environmental effects. The type of alternatives depends on the nature of the project proposed and the characteristics of the receiving environment.

The 2018 Guidelines also note that it is generally sufficient for the developer to provide a broad description of each main alternative studied and the key environmental issues. Furthermore, a 'mini- EIA' is not required for each alternative studied.

2.2 ALTERNATIVE LOCATIONS

The 2018 Guidelines note that some projects may be "site specific" so the consideration of alternative sites may not be relevant or warranted.

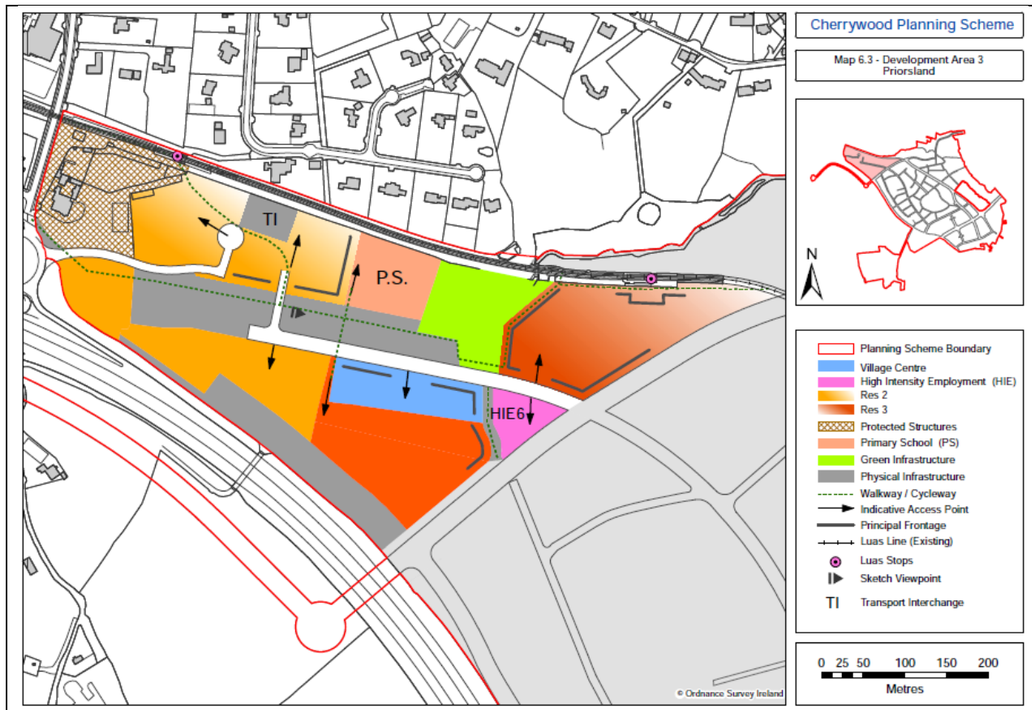
This point is also stated in the Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2017), which states that in some instances alternative locations may not be applicable or available for a specific project which is identified for a specific location. With regard to locations, the considerations of alternatives in many cases will already have been addressed and decided at strategic planning level during the adoption of city/county/local developments plans. Furthermore, these plans will have been subject to Strategic Environmental Assessment which will have taken into account the environmental considerations associated with, for example, the cumulative impact of an area zoned for industry on a sensitive landscape. The Guidelines also state that the statutory development plans can establish project-level objectives or other mitigation that a subsequent site project and its EIAR should be cognisant of.

In this regard we note that this Priorsland development is located within and subject to the Cherrywood SDZ Planning Scheme. The location, size, and scale of this project and indeed the entirety of the Priorsland Development Area has been pre-determined as part of the Planning Scheme. Furthermore, the Planning Scheme was itself subject to SEA and the consideration of alternatives.

As a result, the consideration of alternative site locations for the proposed development were not considered as part of this EIAR, given that development of this site for the uses proposed was already identified and assessed by DLRCC and An Bord Pleanala.

2.3 ALTERNATIVE DESIGNS (& USES)

The Cherrywood Planning Scheme has established very specific design parameters for the subject site as part of the Priorsland Development Area. These prescriptions include for land use mix, quantum of development and density, building heights and frontages, access points and internal roads, physical and social infrastructure location of main open spaces.



Future Form

Priorsland may be the second of the three Villages to be developed. The Village Centre will be centrally located within this Development Area, fronting onto a landscaped linear space which incorporates a floodplain containment zone and a tree line of existing Turkey Oaks.

The Village Centre is located equidistance from 2 Luas stops, Carrickmines and Brennanstown, and is across from a primary school and a park therefore enhancing its pivotal location within this Development Area.

A Park and Ride facility, most likely in the form of a multi-storey car park, will be located adjacent to the Carrickmines Luas Stop. This Park and Ride facility will be accessed from the Carrickmines Interchange and will ensure that this valuable infrastructure resource is not only accessible to the residents of Cherrywood, but also to residents living in the wider area.

The entrance into Priorsland from Barrington's Road is landmarked by a triangular site accommodating High Intensity Employment development in the form of a building of up to 5 storeys in height.

Specific Objectives:

DA 19 Pedestrian and vehicular connections are to be provided across the flood containment zone by way of bridges.

DA 20 Development adjoining the M50 to provide sound mitigation for the remainder of the Development Area.

DA 21 There shall be a high quality of landscaping and visual amenity at the interface with Cherrywood when viewed from the M50.

DA 22 Lands adjacent to Carrickmines Luas stop to provide a transport interchange, and a park and ride facility with connections to the national road network. A local convenience retail outlet (of up to 200m2 gross floor area) and a tea room/café use are permissible in principle on the lands adjacent to the Carrickmines Luas stop.

DA 23 Access to Brennanstown Luas stop to be achieved through design of the residential plot.

DA 24 To provide appropriate access to Druid's Glen from the open space.

DA 25 To develop Priorsland House and Carrickmines Station in accordance with the details set down in Chapter 3 Cultural and Built Heritage.

DA 26 Access to Carrickmines Interchange will be limited to: Priorsland House, Carrickmines Station including lands adjoining these structures identified in Map 3.3 and the transport facilities adjoining the Carrickmines Luas stop.

DA 27 A community facility in accordance with Section 2.3.4 will be provided in the Village Centre.

Table 6.3.1: Development Type and Quantum for Development Area 3 Priorsland

DEVELOPMENT AREA 3 PRIORSLAND LAND USE AREAS	
LAND USE	AREA IN HECTARES
Mixed Use Village Centre	0.9
High Intensity Employment	0.4
Residential	9.2
Education	0.8
Transport Interchange	0.3
Green Infrastructure	1.2

DEVELOPMENT AREA 3 PRIORSLAND	
Gross Area HA	Net Developable HA
20.3	11.3

PRIORSLAND VILLAGE CENTRE		
Total Village Centre Lands HA	0.9	
RETAIL SQ.M		
	Min	Max
	Net / Gross	Net / Gross
1 no. Supermarket	550 / 834	900 / 1,365
Local Retail	150 / 228	300 / 455
Retail Services	150 / 228	300 / 455
Total Retail Quantum Village Centre	Min Net / Gross 850 / 1,290	Max Net / Gross 1,500 / 2,275
RESIDENTIAL		
Residential Dwelling Units	Min 75	Max 100
Gross Residential Floor Area Sq.m	Min 9,000	Max 12,000
NON RESIDENTIAL USES SQ.M		
Non Retail Uses	Min 700	Max 1,000
High Intensity Employment	Min 700	Max 1,000
Community Facilities	Min 250	Max 500
Total Non Residential Floor Area	Min 1,650	Max 2,500
TOTAL FLOORSPACE QUANTUM PRIORSLAND VILLAGE CENTRE SQ.M	Min 11,940	Max 16,775
Plot Ratio	Min 1: 1.3	Max 1: 2
Site Coverage	Min 40%	Max 60%
Building Height in Storeys	Min 3	Max 4

HIGH INTENSITY EMPLOYMENT		
Site HIE 6		
High Intensity Employment Lands HA	0.4	
Proposed Quantum Sq.m	Min 6,000	Max 8,000
Plot Ratio	Min 1: 1.5	Max 1: 2
Site Coverage	Min 40%	Max 60%
Building Height in Storeys	Min 3	Max 5

RESIDENTIAL DEVELOPMENT		
Total Residential Lands HA	9.2	
	Land Area HA	Density Range
Res 1	0	35 - 50
Res 2	4.5	45 - 70
Res 3	4.7	65 - 100
Res 4	0	85 - 125
No. of Dwellings on Residential Lands	Min 508	Max 785
Overall Residential Density	Min 55 per ha	Max 85 per ha
Building Height in Storeys	2	5
No. of Dwellings in Village Centre	Min 75	Max 100
TOTAL NO. OF RESIDENTIAL DWELLINGS	Min 583	Max 885

EDUCATION		
Educational Use Lands HA	0.8	
Quantum and Type of Schools	1 Primary	0 Post Primary
Site 1 Area HA	0.8	-

TRANSPORT INTERCHANGE (T.I)	
Site Area HA	0.27

Table 6.3.2: Infrastructure Requirements Development Area 3 Priorsland. See Maps 4.1-4.5.

Road Requirements
• Construct M – D.
• Roads D-C-P-Q, A-B and B-C as specified for Development Area 1.
Construction Access
• Through single controlled access at Junction D on Barrington's Road.
Stormwater Requirements
• Flood containment zone.
• Diversion of Ticknick Stream.
• Flood flow bypass culvert parallel to Carrickmines River.
• Detention basins and swales as shown on Map 4.2.
Foul Sewer Requirements
• 450mm approx. diameter sewer from E and D connecting into the Carrickmines Sewer.
Water Supply Requirements
• Upsizing (600mm) and re-route of existing 20" AC main.
• 300mm branch main from the upsized 600mm diameter main to existing 300mm diameter at I.
• Connection to DCC Stillorgan 24" main at Q.
• 400mm diameter from 24" main to A, A', B, L, P2, C, D and at 300mm. via M and S to connect to existing 200mm watermain in Glenamuck Road.
• 400mm diameter Luas crossing at C.
• Abandon section of existing 33" Main and reroute through E to tie back into existing main near attenuation pond 1.

Figure 2.1 – Extract from the Cherrywood SDZ Planning Scheme Regarding Priorsland

The detailed design of the scheme has had to adhere to the principles of the Planning Scheme which in turn significantly limits the alternatives that can reasonably be considered.

Nevertheless, a number of minor alternatives to the design were considered during the pre-planning process and were discussed in detail between the various design team disciplines and the DLRCC Development Agency:

Potential Minor Design Alternatives	Commentary
The location of the prescribed commercial uses within the Village Centre having regard to adjacent uses, residential amenity and the landscape design rationale. The specific layout, streetscape and elevations of the residential and commercial areas within the Village Centre and the RES2 and RES3 zones.	The location of the prescribed retail, non-retail, employment, community uses are all to be located within the zoned Village Centre area as per Map 6.3 of the Planning Scheme. During pre-planning consultations some minor alternative designs for each use within the Village Centre zoning were considered having regard to urban design principles (e.g. active street fronts), adjoining residential amenities and traffic/access. However, given the extent of VC zoning available to facilitate these uses; the need to locate these uses (in the majority) at street level; the need to provide public realm and acceptable amenity standards (e.g. daylight, wind microclimate); in tandem with the Planning Scheme requirements in terms of providing principal frontages and access points, meant that design alterations were slight in difference and did not result in any one option creating a significantly different environmental impact from the other.
The location and design of the attenuation areas originally identified along the M50 boundary but relocated due to unfavourable site topography. The removal of the existing hedgerow to the east of the site having regard to Planning Scheme requirements in relation to services provision, building frontages, access and provision of walkway/cycleway	Early design layouts proposed removal of the entirety of the hedgerow along the eastern boundary to facilitate services provision and a significant north-south public walkway. However, the removal of the hedgerow was considered would have a negative ecological impact. The retention of hedgerows is also identified in the Planning Scheme (e.g. Map 5.2). At the same time elsewhere in the Planning Scheme the provision of a surface water pond is also identified along the south-eastern boundary (i.e. Map 4.2) whilst the future provision of the Barrington's Road with bridge crossing over the M50 would also likely eliminate the potential to retain the hedgerow at the south-eastern boundary, despite Map 4.2. As a result the current proposal includes for the removal of the section of hedge along the south-eastern boundary to facilitate the necessary surface water infrastructure, whilst the existing hedge along the eastern boundary is retained along with a modest public footpath north-south to the west of the same, both in accordance with the Planning Scheme intentions.
The precise number, location and design of the bridges crossing the Carrickmines Stream were subject to a range of considerations including: • The extent of the flood containment zone • Seeking to complete Castle Street D-M-TI (To the Transport Interchange at Priorsland) and to facilitate access to the future school and the public park. • Providing a bridge design/span that will facilitate an ecological corridor along the Carrickmines Stream. • Avoiding removal of mature trees along the stream particularly the Turkey Oaks.	The location of the bridges across the stream to facilitate access to the Luas Park & Ride and future school site align with the associated Maps 2.5 and 6.3 of the Planning Scheme but have also been carefully positioned to limit the impact on and loss of trees along the stream. This was finalised in consultation with the scheme ecologist and arborist. At the same time the design/span of the bridges was also carefully decided upon by the design team to ensure ecological pathways underneath could be maintained.

2.4 ALTERNATIVE PROCESSES

This is a residential and commercial development located on lands specifically designated for this range and quantum of development as per the SDZ Planning Scheme. Alternative processes are not considered.

2.5 DO NOTHING ALTERNATIVE

As highlighted above the site is zoned for the uses proposed under the Cherrywood SDZ Planning Scheme, and as such, consideration of alternative sites is not necessary. The consideration of an alternative location would equate to a 'do-nothing' alternative for the subject site the site would become overgrown and unkept. This would mean that these lands would not be developed in accordance with the zoning objectives of the Planning Scheme. This in turn would have the knock on impact on the delivery of the overall Planning Scheme, and also the Core Strategy of the County Development Plan, potentially creating pressures to develop unzoned, unserviced or remote sites that would not support sustainable development. This is not in line with National, Regional or Local plan policies which require the efficient use of zoned land within established built up areas.

3.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT

3.1 INTRODUCTION

This section of the EIAR has been prepared by McGill Planning Ltd. with input from the project team. The section describes the nature of the proposed development in accordance with the requirements of the relevant EIA legislation and guidance on preparation and content of EIAR.

3.2 CHARACTERISTICS OF THE SITE

The subject site lies wholly within Development Area 3 Priorsland at the western extremity of the Cherrywood SDZ Planning Scheme lands. The site amounts to approximately 8.59 ha and comprises in the majority land in the ownership of the applicant but includes a small portion of the existing TII Park & Ride facility which is on land controlled by the Smith family. These additional lands are included in order to facilitate the bridge proposal to the Carrickmines Luas station and future Transport Interchange.

Figure 3.1 – Views Across Site

The site is distinguished by a number dominant physical feature. Apart from the stand of mature Turkey Oaks, which stretch along the Carrickmines stream and some sections of hedgerow on the perimeter worthy of retention, the site is characterised by its open aspect and outward views. To the south and southwest is the Dublin Mountains with rolling countryside in the foreground, and to the north and northeast are areas of mature woodland. The site is accessed primarily by an extension of the substantially developed Castle Street which crosses Barrington's Road and passes south-east through much of the Cherrywood lands to Bishops Street and Cherrywood Town Centre, now under construction. The principal access route from the Wyattville Link Road (and the M50 and N11 Beyond) will be via Grand Parade when the western section to Barrington's Road is completed. The Luas line skirts the site's northern boundary and two stops, Carrickmines and Brennanstown. Both are equidistant from the proposed Village Centre of Priorsland. The network of cycle, bus, pedestrian and green routes, a cornerstone of the Planning Scheme, permeate the Cherrywood SDZ and create a multiplicity of connections to the Priorsland site.

A notable feature of the Priorsland Development Area within the Cherrywood Planning Scheme is the extent of the total land area devoted to uses other than development. Some 9 hectares are designated variously to woodland, parks and other forms of amenity space. A major flood containment zone tracks the Carrickmines Stream and consequently also contributes to the array of open amenity space. Surface water attenuation is designated along the southern perimeter which will provide a buffer landscaped strip to the M50 incorporating swales and appropriate water-loving plant species.

The subject lands are generally characterised by an open expanse of unobstructed pasture lands devoid of fence or other form of subdivision. They are encompassed by a meagre, occasionally interrupted, perimeter of tree, scrub and hedgerow planting. Most notably, however, a stand of mature Turkey Oaks traces the west to east route of the Carrickmines Stream through the site. The gradients are gentle, almost imperceptible and fairly constant on these open lands which constitute the bulk of the site. A slight local increase in slope occurs where the lands fall towards the stream which the oaks separates. The slope from west to east amounts to a fall of approximately 2.5 to 3.0 metres over the 450 metre long axis of the site, while a fall of 1.5 to 2.0 metres occurs from the M50 to the stream and from the stream to the northern boundary along the LUAS line.

Within the site, there are a number of physical constraints which provide both challenges and opportunities for the development. Namely;
- The Carrickmines Stream and attendant flooding risks.
- Retention of the linear stand of Turkey Oaks and surrounding hedge rows.
- The physical infrastructure requirements of the SDZ's Planning Scheme, namely the provision of a surface water detention basin, attenuation zones, and a flood containment zone along the Carrickmines Stream
- The primary North facing elevation along Castle Street.

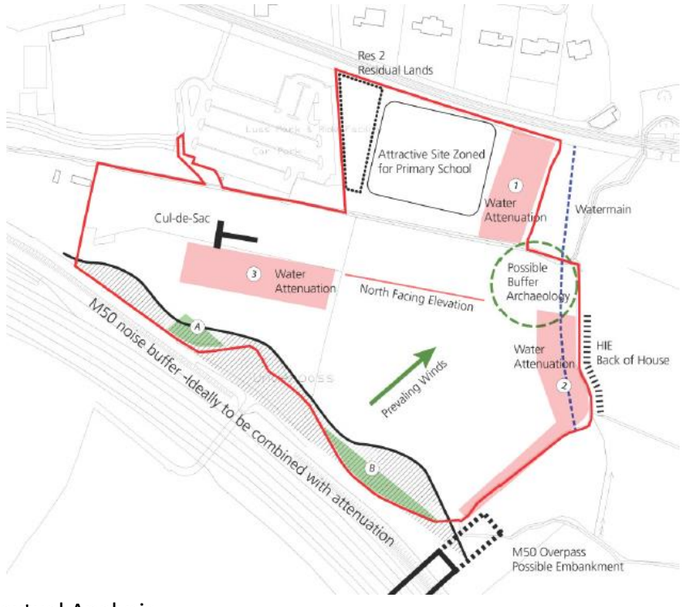


Figure 3.2 – Contextual Analysis

3.3 PROPOSED DEVELOPMENT

The development will comprise a mixed-use Village Centre and residential development as follows:

- 402 no. apartments (comprising 146 no. 1-beds; 218 no. 2-beds and 38 no. 3-beds) within 6 no. blocks (Blocks A-F) ranging in height up to 5 storeys with basement/undercroft parking areas.
- 41 no. terraced/semi-detached/detached houses (comprising 19 no. 3-beds and 22 no. 4-beds).
- A supermarket (c.1,306 sq.m), 7 no. retail/retail services units (c.715 sq.m total gross floor area); 2 no. non-retail/commercial units (c.213 sq.m total gross floor area); creche (c.513 sq.m), gym (c.155 sq.m), community space (c.252 sq.m), residential facilities (c.551.8 sq.m total gross floor area), Office/High Intensity Employment use (c.708 sq.m).
- Provision of car/ bicycle/ motorcycle parking at basement/ undercroft/ ground level. ESB sub-stations/switchrooms/kiosks, waste storage areas, plant areas.
- Provision of the first phase of Priorsland Public Park, a linear park along the Carrickmines Stream and additional public and communal open spaces.
- Provision of an acoustic barrier along the southern/south-western edge of the site adjacent the M50.
- Construction of Castle Street on the subject lands and two road bridges across the Carrickmines Stream, one to serve a future school site, the second to provide interim pedestrian and cyclist access to the Carrickmines Luas station and future Transport Interchange. Provision of a pedestrian bridge from the Village Centre to Priorsland Park.
- The proposed development includes for all associated site development works, landscaping, boundary treatments and services provision.

Figure 3.3 Site Plans

Figure 3.4 Development Images

3.4 DEVELOPMENT STATISTICS

18029 - PRIORSLAND - AREA SCHEDULE

SITE TOTALS

	ZONE 1 VILLAGE CENTRE	ZONE 2 RES 3	ZONE 3 RES 2	TOTAL (m2)
	PLOT A + B	PLOT C, D + E	PLOT F + G	
SDZ ZONE AREA	9,050.00	20,050.00	14,351.00	**43,451.00**
SITE AREA (RED LINE BOUNDARY)				**87,517.00**
SITE AREA (BLUE LINE BOUNDARY)				**85,910.00**
FOOTPRINT	5,427.00	9,253.00	4,763.20	**19,443.20**
SITE COVERAGE	0.60	0.46	0.33	**0.22**
TOTAL AREA ABOVE GROUND	17,093.10	20,428.30	10,642.70	**48,164.10**
PLOT RATIO	1.89	1.02	0.74	**0.55**
NUMBER OF UNITS	143	201	99	**443**
OVERALL RESIDENTIAL DENSITY (UNITS/HECTARE)	158.01	100	69	**50.62**
COMMUNAL AMENITY SPACE REQUIREMENT	869.00	1,328.00	367.00	**2,564.00**
COMMUNAL AMENITY SPACE PROVIDED	1,203.00	3,671.77	370.00	**5,244.77**
GROSS RESIDENTIAL FLOOR AREA	9,593.80	14,648.10	9,553.80	**33,795.70**
BUILDING HEIGHT IN STOREYS	1-4	3-5	2-4	

18029 - PRIORSLAND - AREA SCHEDULE

OTHER USES TOTALS

USE	TYPE	PROVIDED IN SCHEME	SDZ REQUIREMENTS	
		AREA SQM	MIN	MAX
		GROSS	GROSS	NET/GROSS
RETAIL	SUPERMARKET	1306	834	1365
	RETAIL (LOCAL RETAIL AND RETAIL SERVICES)	715	456	910
Total Retail Quantum Village Centre		**2021**	**1290**	**2275**
NON RETAIL	NON RETAIL (INC. 513 M2 CRECHE)	726	700	1000
HIGH INTENSITY EMPLOYMENT		708	700	1000
COMMUNITY FACILITIES (PLOT A)		252	250	500
Total Non Residential Floor Area		**1686**	**1650**	**2500**
RESIDENTIAL FACILITIES (PLOT C)		213	–	–
RESIDENTIAL FACILITIES (PLOT E)		338.8	–	–
GYM (PLOT E)		155	–	–
Total Residential Facilities Floor Area		**706.8**		

CRECHE REQUIREMENTS

Childcare Facilities: Guidelines for Planning Authorities, June 2001

	NUMBER OF DWELLINGS	NUMBER OF CHILD SPACES REQUIRED (20 CHILD SPACE PER 75 DWELLINGS)	AGE	NUMBER OF CHILDREN	AREA REQUIRED PER CHILD (M2)	TOTAL AREA REQUIRED PER AGE GROUP (M2)	TOTAL AREA PER CLASSROOM (2 CLASSROOMS PER AGE GROUP)	TOTAL NUMBER OF CHILDREN PER CLASSROOM (2 CLASSROOMS PER AGE GROUP)	NUMBER OF ADULTS REQUIRED PER AGE GROUP	NUMBER OF ADULTS REQUIRED	NUMBER OF WC / NAPPY CHANGING REQUIRED PER AGE GROUP	NUMBER OF WC REQUIRED	NUMBER OF NAPPY CHANGING REQUIRED	NUMBER OF STAFF WC REQUIRED (1 PER 8)
			0-1 YRS	12	3.70	44.40			1 PER 3	4	1 PER 10 NAPPY		1.2	
			1-2 YRS	35	2.80	98.00	49.00	17.50	1 PER 5	7	1 PER 10 NAPPY		3.5	
			3-5 YRS	36	2.32	83.52	41.76	18	1 PER 6	6	1 PER 10 WC	3.6		
TOTALS	297	79.2		83		225.92				17		3.6	4.7	2.125

+ 1 PAC TOILET

18029 - PRIORSLAND - AREA SCHEDULE

APARTMENT TOTALS

PLOT	NO. OF UNITS	1 BED APT.	2 BED 3p APT.	2 BED 4p APT.	3 BED APT.	UNITS AREA (GFA)	OVERSIZED UNIT	VIEW ASPECT DUAL	VIEW ASPECT SINGLE	BALCONY / PRIVATE AMENITY AREA (m2)	COMMUNAL AMENITY SPACE REQUIRED BASED ON MINIMUM AREAS	COMMUNAL AMENITY SPACE PROVIDED	TOTAL INCLUDING BALCONY
A	72	30	0	42	0	4952.10	39	27	45	461.60	444.00	463.00	5413.70
B	71	34	4	33	0	4641.70	34	18	53	471.20	425.00	740.00	5112.90
C	71	29	3	32	7	4871.80	27	20	51	580.90	450.00	1438.80	5452.70
D	45	11	10	11	13	3472.50	20	20	25	416.60	309.00	517.37	3889.10
E	85	19	12	42	12	6303.80	37	39	46	748.60	569.00	1715.60	7052.40
F	58	23	5	24	6	4190.80	44	22	36	452.70	367.00	370.00	4643.50
TOTAL	402	146	34	184	38	28432.70	201	146	256	3131.60	2564.00	5244.77	31564.30
		36.3%	8.5%	45.8%	9.5%		50.0%	36.3%	63.7%				

18029 - PRIORSLAND - AREA SCHEDULE

HOUSE TOTALS

			HOUSE TYPE 1	HOUSE TYPE 2	HOUSE TYPE 3	HOUSE TYPE 4	HOUSE TYPE 5				
PLOT	NUMBER OF UNITS		4 BED END TERRACE (146M2)	4 BED SEMI-DETATCHED (144M2)	4 BED MID TERRACE (144M2)	3 BED SEMI-DETATCHED (115M2)	3 BED MID TERRACE (115M2)	4 BED TOTALS	3 BED TOTALS	TOTAL HOUSES (GFA)	CAR PARKING REQUIRED (2 PER UNIT)
G	41		5	15	2	10	9	22	19	41	82
GFA			730.00	2160.00	288.00	1150.00	1035.00	3178.00	2185.00	5363.00	
			12.2%	36.6%	4.9%	24.4%	22.0%	**53.7%**	**46.3%**		

3.5 LANDSCAPING

The proposal for the Landscape at Priorsland strives to retain and enhance the existing character and quality of the site. In relation to the proposed use, the site must be re-examined through the lens of a small and sustainable microcosm landscape – a village centre with retail, schooling, recreation, housing, and amenity space. The existing Priorsland site has a number of particularly special existing features that must be maintained in this change of usage – including the protection of the particularly important row of Turkish Oak trees. The main objectives of the landscape strategy are:

1. Proposed realistic retention of existing trees and replacement planting
2. Integration of the scheme within the wider context.
3. Maintain the distinct spatial character of the existing site, while enhancing the identity.
4. Provide a safe and accessible environment.
5. Provide new opportunities for the protection and establishment of habitat.
6. Creation of Priorsland Park.

The local facilities of Priorsland will include connection with green infrastructure, access to park space, linear park stream, green corridor. These connections were all made prominent components in the landscape design. To the north east of the site is the proposed Priorsland Park. This park sits within a network of green parkland in the Cherrywood SDZ. In the park there is informal kick-about, proposed work-out zones, additional tree planting and native planting areas. The existing bramble thickets along the northern edge of the park are proposed to be retained and will provide a buffer from the Luas line to the north. Additional tree planting is proposed to strengthen this space and further emphasise its use as an amenity. Priorsland Park sits directly beside the site for the future primary school (directly west). This proximity to the future school is instrumental to the park's usability. It will provide additional recreational space for students in addition to the local children of Priorsland.

Figure 3.5 Landscape Masterplan

The vegetation will also be exploited to further its use as amenity space within the scheme. The dense vegetation is currently acting as a buffer between the M50 and the Priorsland development. Not only will it continue to be used as a buffer, but the proposal also incorporates swales and SUDs into this vegetative zone. There are a number of swales proposed along the southern boundary of the site. The swales are proposed to be planted with appropriate plant species. The treeline of Turkish Oaks along the existing Carrickmines stream is probably one of the most striking and significant features existing on the site. This feature is central to the configuration and layout of the site proposal – with sight from each road leading towards the treeline or running beside the treeline. The linear park is also designed in a way that interacts with the treeline –

while maintaining a safe distance as not to disturb the trees. Through the consideration of amenity space in the Priorsland development, we see that the amenity space is not only multifunctional, but it supports ecological life, play, and multiple recreational uses – while protecting and enhancing the features already existing within the landscape.

3.6 ACCESS

It is proposed that the construction traffic temporarily access/exit the proposed development via a western route utilising the available legal Right of Way (itself accessed via the M50 Southbound Roundabout). This is a temporary arrangement only and has a precedent approval associated with it under the previously granted permission DZ16A/0585. This access track will be utilised for construction activities associated with construction of the western Carrickmines Stream bridge crossing to establish the proposed interim pedestrian and cyclist access to the Transport Interchange.

This interim access represents an 'alternative use of infrastructure' pursuant to the adopted amendment to the SDZ states the following in Section 7.2.2:

> *"However, it is acknowledged that there may be exceptional or unforeseen circumstances beyond the reasonable control of an individual developer or the local authority, whereby a piece of infrastructure necessary to progress the development of a Growth Area cannot be provided in the short to medium term (circa 0-3 years). In such instances, there may be an appropriate alternative utilising other infrastructure as provided for under the Planning Scheme, as an interim measure to facilitate the early delivery of housing, and early engagement with the Development Agency will be an essential prerequisite."*

Once the Castle Street extension becomes viable, and is completed in its entirety, that Level 2 route would become the standard, on-going access route for the operation of Priorsland development. Access to the Priorsland development will therefore eventually utilise the Level 2 Road access route as required under the permanent SDZ requirement. Regarding the certainty of delivery of Castle Street, we note a recent planning application DZ20A/0399 has been approved/granted by DLRCC which includes for the extension of Castle Street up to the proposed development site. As per the associated planning grant conditions, it is a requirement for the adjacent developer to complete the full extension of Castle Street to the client's Priorsland site boundary which will alleviate any issues with access through the main Cherrywood SDZ route.

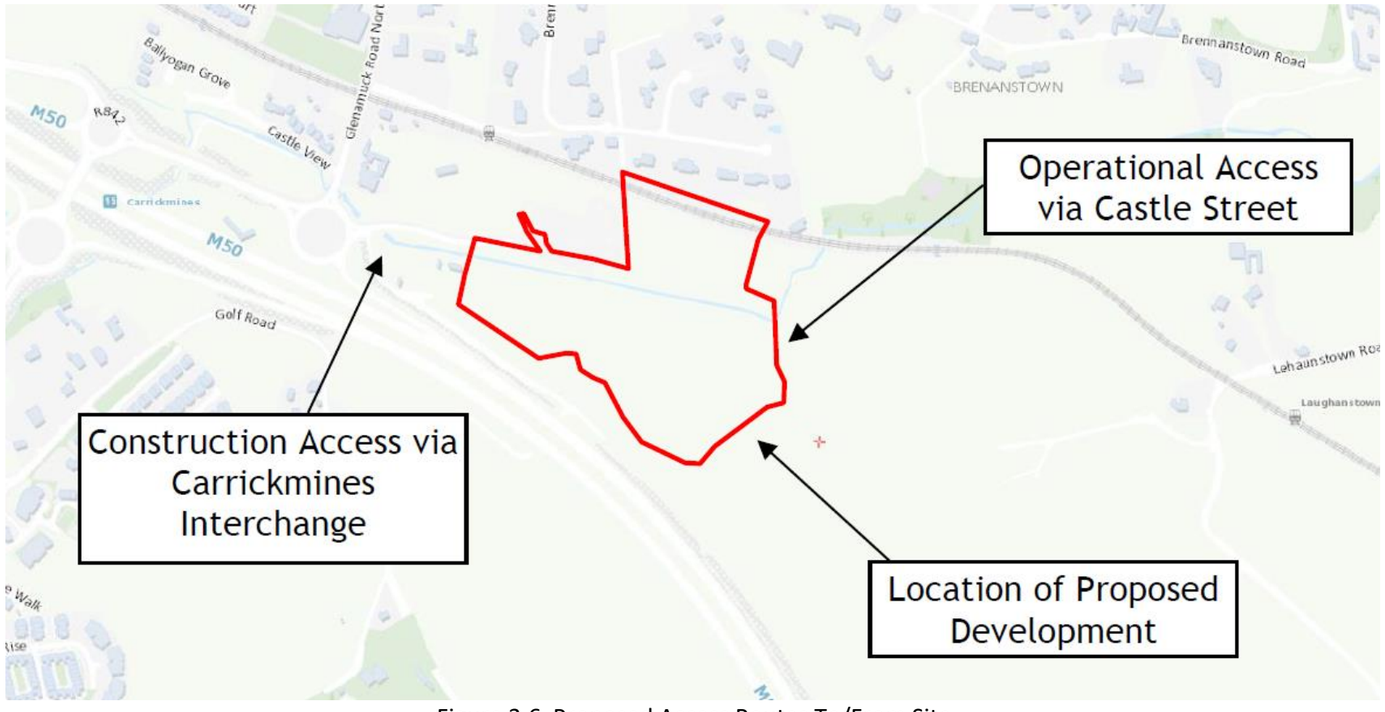


Figure 3.6 Proposed Access Routes To/From Site

3.7 WATER SERVICES / FLOODING INFRASTRCCTURE

The following connections to existing public drainage and water supply services works are proposed:

1) A new 300mm diameter foul water connection is proposed to connect to the existing 750mm diameter foul water sewer that runs from east to west through the site parallel to the Carrickmines River
2) A new 225mm diameter surface water outfall is proposed to discharge surface water to the Ticknick Stream to the east of the site.
3) A new 225mm diameter potable water service connection is proposed to connect to the existing 300mm diameter water main on Castle Street to the east of the proposed development site. It is noted that recent planning application DZ20A/0399 has been approved/granted by DLRCC which includes for the extension of Castle Street up to the proposed development site. This also includes a planning condition that stipulates the completion of all service routes associated with this road extension.

The following in-ground, on site drainage and water supply services works are proposed:

1) Foul water:
   a) An in-ground gravity foul drainage network along the exterior of the buildings underneath the proposed road network on site is proposed.
   b) Foul drainage from the shared basement under Plot A and Plot B will be pumped to the proposed external in-ground gravity foul drainage system.
   c) All other foul drainage from each of the buildings on site will discharge by gravity to the proposed external in-ground gravity foul drainage system.

2) Surface Water:
   a) Proposed road gullies and other surface channel drains will connect to tree root structured cell systems or to a stone storage layer within the pavement build-up in hard standing areas.
   b) Drainage networks will be attenuated via attenuation tanks. The attenuation tanks will ultimately outfall to engineered swales or a detention basin/regional pond. The surface water from the ponds will then outfall to the Ticknick Stream at an attenuated rate of 1l/s/ha, as per the requirements of the Cherrywood Planning Scheme Chapter 4.
   c) Surface water within carparks will pass through a petrol interceptor prior to discharge.
   d) SuDS measures have been adopted including incorporation of green roofs to the local authority standard requirements.
   e) An in-ground gravity surface water network along the exterior of the buildings underneath the proposed road network on site is proposed.
   f) Surface water drainage from the shared basement under Plot A and Plot B will be pumped to the proposed external in-ground gravity foul water drainage system as per the requirements of the *Greater Dublin Regional Code of Practice for Drainage Works*.
   g) All other surface water drainage from each of the buildings on site will discharge by gravity to the proposed external in-ground gravity surface water drainage system.

3) Potable Water:
   a) An in-ground pressurised watermain network along the exterior of the buildings underneath the proposed road network on site is proposed.
   b) Metered connections will be provided from this network to each building.
   c) Sluice valves, air valves, scour valves and hydrants will be provided to meet the requirements of Irish Water and the Building Regulations.

The following flood mitigation works are proposed:

a) Finished Floor Levels (FFLs) of the ground floor of the proposed buildings on the site have been set at above the flood levels from the adjacent Carrickmines Stream, and flood modelling has shown that no buildings are at risk of flooding. Basements are included in the development and entrance levels to these basements will be above the Q1000 flood level;
b) Surface water flows will be attenuated on site and the runoff rate from the site will not be greater than the runoff rate agreed with DLRCC, in order to reduce the risk of flooding elsewhere. Runoff from the site will be limited to 1 l/s/ha as per the Cherrywood SDZ;
c) The surface water drainage systems within the blocks include attention tanks to limit flows to the external network. Block A and B will be a pumped, while other units will discharge by gravity;
d) It is proposed that the proposed development will incorporate a mixture of extensive and intensive green roof systems. This will provide a degree of attenuation for rainfall and additionally will reduce surface water being discharged to the carrier drainage system through evapotranspiration;
e) The 1650mm diameter Flood Relief Culvert to the north of the Carrickmines Stream will be extended will be constructed in the Interim period as far as the boundary with the third-party lands to the east. An alternative, additional floodwater culvert south of the river will be constructed and will operate in the interim. This will improve conveyance of floodwaters away from the site.

3.8 PHASING

Outline Phasing Strategy
It is currently envisaged that the proposed development will be completed in three total phases, as detailed below (and elaborated further in the Outline Construction Management Plan prepared by PUNCH Consulting Engineers and submitted with the planning application).

Phase 1:
1. Construction of the western bridge crossing over Carrickmines Stream, i.e. the established flood containment zone, including establishment of the temporary pedestrian and cyclist access route to the Carrickmines Luas Stop in the north-west of the site.
2. Construction of Castle Street within the private site extents, i.e. no crossing of the Ticknick Stream, and completion of associated service routes and ancillary works. This will also include a bus turning head at the western end of Castle Street to facilitate bus operations subject to development of adjacent lands to the northwest and the permanent vehicular connection to the Transport Interchange.
3. Establishment of easement associated with the Irish Water trunk watermain.
4. Topsoil removal through development lands – refer to Item 17 below for constraints regarding phased translocation of the eastern hedgerow.
5. Site regrading throughout development extents to establish flood containment zone.
6. The hedgerow along the eastern site boundary will be protected and retained throughout the Works.
7. Consideration can be given to the delivery of the Phase 2 basement car park and associated bulk excavations as a means of reducing the nett fill associated with the development. Construction of the basement structure to transfer slab level is an option that will ultimately be influenced by consideration of costs and the financing programme.
8. Construction of flood relief culverts to the north and south of Carrickmines Stream.
9. Construction of the eastern bridge crossing over the established flood containment zone, including establishment of access routes to the park lands in the north east of the site.
10. Installation of drainage/SuDS elements along southern boundary with ultimate discharge to the Ticknick Stream.
11. Completion of internal road network to service Phase 1a development, i.e. Plots F and G, including associated private realm SuDS measures.
12. Construction of residential units for Plots F and G.
13. Installation of perimeter fencing and noise attenuation measures along southern site boundary as required.
14. Delivery of landscaping and parks/recreation elements throughout the Phase 1 extents.

Figure 3.7 Phasing

Phase 2:
15. Completion of internal road network to service Phase 2 development, i.e. Plots A, B and C, including associated private realm SuDS measures. This includes the delivery of the service access yard at the basement car park entrance.
16. Construction of residential and non-residential units for Plots A, B and C.
17. Delivery of landscaping and parks/recreation elements throughout the Phase 2 extents.

Phase 3:
18. Completion of internal road network to service Phase 2 development, i.e. Plots D and E, including associated private realm SuDS measures.
19. Construction of residential units for Plots D and E.
20. Delivery of landscaping and parks/recreation elements throughout the Phase 3 extents.
21. Subject to completion by third party landowner, construction of Castle Street from the as-built extents at junction with Barrington's Road up to the Ticknick Stream crossing point as per the extant permission DZ20A/0399.
22. As per the extant permission DZ20A/0399, construction of bridge over Ticknick Stream – providing the operational/permanent access arrangement to the subject lands at Priorsland.
23. Subject to completion by third party landowner, construction of associated services along Castle Street from relevant tie-in locations within adjacent landowners' lands (to be progressed in tandem with Items 21 and 22 above). This is in accordance with the planning conditions associated with the extant permission DZ20A/0399.
24. Subject to completion by third party landowner, establishment of the vehicular connection at western bridge crossing over Carrickmines Stream.

3.9 CONSTRUCTION STAGE

This section of the EIAR summarises the construction of the proposed development. The Outline Construction Management Plan & Outline Construction and Demolition Waste Management Plan, submitted separately in the planning application, should be consulted for a more detailed assessment of the construction and waste proposals for this development.

Indicative Construction Programme
It is estimated that the construction programme for the works associated with the proposed works will last 36 months from the date of commencement. This estimation is based on the typical construction programmes for other similar developments that are currently underway. It is envisaged that construction of the proposed building and external works will be carried out over two large phases, the first of which will have two subphases within itself. The Main Contractor will be required to prepare a detailed
construction programme as part of their tender proposal.

Site Set-Up and Security
The Main Contractor will be required to submit a site layout plan that will detail the proposed location of the site compound. The Contractor will ensure that the site compound will be serviced as required and will be secured with appropriate fencing/hoarding. The site compound will be used as the primary location for the storage of materials, plant and equipment, site offices and worker welfare facilities. As Project Supervisor Construction Stage (PSCS), the Contractor will be responsible for site security and they are to ensure that the site and site compound are adequately secured at all times. As with the other construction activities that are being carried out within the Dun Laoghaire-Rathdown County Council local authority area, activities associated with the construction compounds will be subject to restrictions to the nature and timing of operations so that they do not cause undue disturbance to neighbouring areas and communities.

The site layout plan will also include the site perimeter and the proposed detail with regards the hoarding and gate system.

Site Access
It is proposed that the construction traffic temporarily access/exit the proposed development via a western route utilising the available legal right of way (itself accessed via the M50 Southbound Roundabout). This is a temporary arrangement only and has a precedent approval associated with it under the previously granted permission DZ16A/0585. This access track may be utilised for construction activities associated with construction of the western Carrickmines Stream bridge crossing to establish the proposed interim pedestrian and cyclist access to the Transport Interchange. Refer to the 'Outline Construction & Demolition Waste Management Plan'.

This interim access represents an 'alternative use of infrastructure' pursuant to the adopted amendment to the SDZ Section 7.2.2. Once the Castle Street extension becomes viable, and is completed in its entirety, that Level 2 route would become the standard, on-going access route for the Priorsland development. Access to the Priorsland development will therefore eventually utilise the Level 2 Road access route as required under the permanent SDZ requirement. This also applies to the residential/operational traffic associated with the proposed development.

Material Storage and Delivery
The Contractor will ensure that the delivery of materials is coordinated to minimise impacts to adjacent properties. The Contractor will ensure that all materials are adequately stored and secured in their site compound. For more details please refer to the Outline Construction and Demolition Waste Management Plan prepared and included in the planning submission. The Contractor will ensure the roads adjacent to the site are kept clean and free of debris.

Traffic Management Plan
The Contractor will be required to prepare and submit a detailed traffic management plan as part of their tender submission. Once appointed, the preferred Contractor will further develop the traffic management plan as required for the developer to submit to the local authority for approval in advance of works commencing onsite. The Contractor will ensure that advanced warning signs are erected on approaches to the site as required by the PSCS. The Contractor will use a competent sign provider and all signage that meets the requirements of the Safety, Health & Welfare at Work (General Applications) Regulations 2007 and Chapter 8 Traffic Signs Manual. Any proposed temporary road markings must also confirm to the requirements of Chapter 8 of the Traffic Signs Manual.

The Main Contractor will be responsible for all site access and works activity and must ensure the continued operation of the Cherrywood SDZ road network and the surrounding local road network as a result of its construction traffic.

The management of construction traffic on the public and private road networks in and around the Cherrywood SDZ is a critical part of the overall project and must be actively managed by the Contractor.

The Contractor must submit a Construction Traffic Management Plan to the Local Authority for approval. Haulage vehicle movements should be fully coordinated to comply with the requirements of the agreed plan:

- Construction vehicles must not stop or park along the routes at any time;
- Haulage vehicles must not travel in convoys greater than two vehicles at any time;
- Site entrance to remain free of parked or stationary vehicles at all times;
- All loading of demolition material will occur within the site boundary;
- All off-loading of deliveries will take place within the site, remote from the public road and will access via the agreed construction access point.

The site is located in an established (in the case of the interim scenario) and emerging suburban area (in the case of the permanent scenario) – as the Cherrywood Area becomes more and more developed - where the road and junction space is shared with public road users and construction traffic associated with other nearby developments. Therefore, the flow of construction traffic will need to be marshalled and controlled to ensure that potential conflicts are avoided as much as possible.

There are no proposals to introduce temporary road closures or temporary traffic light signals to facilitate construction of the proposed development. There are also no proposals to amend the existing local access arrangements to the surrounding areas.

Potential Interface with Other Projects
Given the development activity associated with the Cherrywood SDZ, the proposed works will likely have an interface with other projects within the locality. The appointed Contractor will need to coordinate with other Contractors as required to ensure a smooth interface between projects.

There may be a number of PSCS's operating in the urban locality at any one time on individual sites. It will be responsibility of the appointed Contractor as PSCS to ensure that delivery and haul routes, site access and egress points and potential crossing points associated with the site are fully coordinated and agreed with other Contractors in advance of the works commencing.

General Construction Approach - Construction Working Space

Construction working space will be set out in the detailed construction management plan at compliance stage. Construction access routes, haul routes and delivery routes to the site are to be agreed with the Engineer/Employer's Representative in advance of works commencing onsite. Any road closures required will be submitted and approved in advance with the local authority. It is the responsibility of the Main Contractor to prepare and submit the road closure application to the local authority in advance of works commencing onsite.

Hoarding, Site Set-up and Formation of Site Access/Egress
The site area will be enclosed with hoarding details of which are to be agreed with DLRCC. Hoarding panels will be maintained and kept clean for the duration of the works. This will involve erecting hoarding around the proposed site perimeter in line with the finished development extents. The available site footprint will enable the Contractor to set up the site compound within the site boundary.

The Contractor will be responsible for the security of the site. The Contractor will be required to:
• Operate a Site Induction Process for all site staff;
• Ensure all site staff shall have current 'Safe Pass' cards and appropriate PPE;
• Install adequate site hoarding to the site boundary;
• Maintain site security at all times;
• Install access security in the form of turn-styles and gates for staff;
• Separate public pedestrian access from construction vehicular traffic;

Site Clearance and Demolition
The location is a greenfield site and will require minimal site clearance past topsoil removal and some light tree removal. It is noted that the proposed development consists of the excavation and construction of a single level of basement, the subsequent construction of multiple storeys of residential apartments and the associated site landscaping and ancillary development. It also includes the construction of single-family homes and overall site in-fill to raise the site as a whole south of the Carrickmines Stream flood zone.

Construction Sequence of Development
The construction of the proposed Plots A and B mixed-use development will consist of excavation and installation of the basement car park and construction of RC framed structures on ground floor transfer slabs. The construction of the proposed Plots C, E, and F will consist of construction of RC framed structures on an associated transfer slab over undercroft parking. Plot D will consist of an RC framed structure over a typical pad foundation. Plot G will consist of typical blockwork houses on a pad foundation.
The construction methodology and programme of these activities will be dictated by the Contractor.

Site Grading
The basement area will involve the excavation of approximately 15,000m3 of material. However, in order to raise the site out of flood zones A and B, the site as a whole will need to be raised a little more than a meter, on average. This will involve the infill of approximately 47,000m3 of material. A geotechnical report undertaken by IGSL on 22/01/2019 (See Appendix 6.1)shows that the predominant soils in the area are brown silt/clay. The basement formation level is at c-1.50mOD, so it is not envisaged that rock will be encountered during excavation. The Contractor must prepare a Construction and Demolition Waste Management Plan in accordance with the "Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects" (Department of Environment, Heritage and Local Government, 2006) and ensure that all material is disposed of at an appropriately licensed land fill site. The Contractor must also outline detailed proposals within the Construction Management Plan to accommodate construction traffic.

Basement Construction
In the case of Plots A and B, the construction of the basement will involve the excavation of the basement footprint and immediate surrounds to enable construction of an RC foundation slab with thickenings coinciding with column locations. The basement perimeter wall will consist of RC construction (likely a pre-cast component). The spoil generated from the basement construction must be disposed at an appropriate licensed land fill site. The concrete operations associated with the basement structure will
require concrete deliveries to site.

The geotechnical report by IGSL indicates a relatively high groundwater table. This may be problematic for the basement car park below Plots A and B. To prevent any potential risk of groundwater intrusion into the lower structure the basement car park will be constructed as a water tight box, the proposed grade for the basement is Grade 1, as per BS 8102:1990. The proposed structural integrity of the basement and its ability to prevent groundwater intrusion into the site is deemed sufficient to mitigate the potential risk to acceptable limits. The concrete works will involve concrete deliveries to site and adequate wash-down and wheel wash facilities must be provided for the concrete wagons.

Construction Sequence of Superstructure
The construction of the various superstructures will involve complex sequencing of activities and various construction methodologies could be adopted to deliver the Contract. The nature of the buildings in Plots A-F, the column grids and economic factors, among other issues, would suggest that the buildings will be constructed utilising reinforced concrete frames. The houses in Plot G will be constructed of traditional concrete blocks, with a façade as shown in the architect's details. As noted the construction methodology and therefore the programme of the construction activities will be dictated by the Contractor.

Building Structure Plots A and B:
• Construction of the foundation basement slab and permanent basement perimeter wall structures;
• Construction of rising elements to Level 0 and construction of Level 0 floor slab and transfer structures;
• Similar sequence of construction of rising elements and floor slabs.

Building Structure Plot C – Plot F:
• Construction of the ground floor foundation slab
• Construction of rising elements to Level 1 and construction of Level 1 floor slab;
• Similar sequence of construction of rising elements and floor slabs.

Building Structure Plot G:
• Construction of the ground floor foundation slab
• Construction of concrete block masonry to Level 1 and construction of level 1 floor slab.

Envelope / Cladding Plot A – Plot F:
• Commencement of envelope works to Level 1 when structure has progressed to approximately Level 2/3;
• Advancing of Cladding two levels behind the structure.

Envelope / Cladding Plot G:
• The structural blockwork will also act as the envelope for the structure, and cladding will follow completion of the blockwork.

Mechanical & Electrical Fit-Out:
o First fix will commence from ground floor level upwards;
o This will be followed by the second fix and final connections.

Fit-Out:
o Initial installation of stud work when cladding completed and floor is weather tight;
o Installation of equipment and associated connection to services;
o Completion of finishes.

Commissioning:
o The final commissioning period will commence during fit-out.

The above represents a high level indicative construction sequence only. The actual sequence will be dictated by the Contractor. The Contractor will issue a detailed construction programme outlining the various stages prior to commencement of works.
It is envisaged that multiple tower cranes will be temporarily erected to accommodate the apartment block construction works for the distribution of building materials and plant. The Contractor is required to obtain all necessary licences from DLRCC.

Construction Waste Management Plan
The Main Contractor will be required to prepare a detailed waste management plan for the project. This will be included in the overall construction management plan that will be submitted to the local authority. For more details please refer to the Outline Construction and Demolition Waste Management Plan prepared and included in the planning submission.

Communications and Local Stakeholder Management
The Contractor will, as required, liaise with owners of the local properties in advance of works commencing onsite. The Contractor will use a competent sign provider and all signage used will meet the requirements of the Safety, Health & Welfare at Work (General Applications) Regulations 2007 and Chapter 8 Traffic Signs Manual.

Construction Working Hours
The proposed hours of work on site will be 08:00 hrs to 19:00 hrs Monday to Friday and 08:00 hrs to 14:00 hrs Saturday unless otherwise specified by planning conditions. It is anticipated that construction working hours will be stipulated in the planning conditions attached to the planning grant. Any working hours outside the normal construction working hours will be agreed with Dun Laoghaire-Rathdown County Council. The planning of such works will take consideration of sensitive receptors, in particular any nearby businesses. For more details please refer to the Outline Construction and Demolition Waste Management Plan prepared and included in the planning submission.

Construction Lighting
There are no proposals to alter the existing lighting arrangements in the area. It is not envisaged that any existing public lighting will need to be disconnected as a result of the proposed works. Appropriate lighting will be provided as necessary at construction compounds. All lighting will be installed so as to minimise light spillage from the site.

Construction Employment
Construction employment numbers will vary depending on the construction stage of the project and the actual approach adopted by the Contractor. However, it is anticipated that at the peak of construction there may be a workforce of approximately 300 people employed (maximum).

Disposal of water, wastewater and sewage
Run-off into excavations/earthworks cannot be prevented entirely and is largely a function of prevailing weather conditions. Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts. All run-off will be prevented from directly entering into any water courses as no construction will be undertaken directly adjacent to open water.

No significant dewatering will be required during the construction phase which would result in the localised lowering of the water table. There may be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the excavation is kept relatively dry.

Air Quality & Dust Minimisation
This section describes the site policy with regard to dust management and the specific mitigation measures which will be put in place during construction works. The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the measures set out below have been formulated by drawing on best practice guidance from Ireland, the UK and the US, such as:

- Department of Environment, Heritage and Local Government (DOEHLG), *Quarries and Ancillary Activities, Guidelines for Planning Authorities* (2004) [4];
- US Environment Protection Agency (USEPA), *Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition* (periodically updated) (1986) [5];
- The Scottish Office – Development Department, *Planning Advice Note PAN50 Controlling the Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings* (1996) [6]; and
- Institute of Air Quality Management (IAQM), *Guidance on the Assessment of Dust from Demolition and Construction* (2014) [7].

The site activities will be undertaken with due consideration of the surrounding environment and the close proximity of sensitive receptors such as residents and pedestrians. Dust management during the construction phase will be the most important aspect in terms of minimising the impacts of the project on the surrounding air quality. The following measures will also be implemented to ensure impacts are minimised:

- Complaint registers will be kept detailing all telephone calls and letters of complaint received in connection with construction activities, together with details of any remedial actions carried out;

- Equipment and vehicles used on site will be in good condition such that emissions from diesel engines etc. are not excessive; and
- Pre-start checks will be carried out on equipment to ensure they are operating efficiently and that emission controls installed as part of the equipment are functional.
- Dust deposition levels will be monitored to assess the impact that site construction site activities may have on the local ambient air quality and to demonstrate that the environmental control measures in place at the site are effective in minimising the impact of construction site activities on the local receiving environment including the M50 Motorway and the Carrickmines Luas Park & Ride. The following procedure shall be implemented at the site on commencement of site activities:
- The dust deposition rate will be measured by positioning Berger off Dust Deposit Gauges at strategic locations near the boundaries of the site for a period of 30 +-2 days. Monitoring shall be conducted on a monthly basis during periods when the highest levels of dust are expected to be generated i.e., during site preparation works and soil stripping activities and on a quarterly basis thereafter. The proposed monitoring locations (D1 – D15) are presented below in Figure 9.3. The selection of sampling point locations will be completed after consideration of the requirements of *Method VDI 2119* with respect to the location of the samplers relative to obstructions, height above ground and sample collection and analysis procedures. The optimum locations will be determined by a suitably qualified air quality expert to ensure that the dust gauge locations are positioned in order to best determine potential dust deposition in the vicinity of the site boundaries and existing on-site buildings.
- After each (30 +-2 days) exposure period, the gauges will be removed from the sampling location, sealed and the dust deposits in each gauge will be determined gravimetrically by an accredited laboratory and expressed as a dust deposition rate in mg/m2-day in accordance with the relevant standards. Technical monitoring reports detailing all measurement results, methodologies and assessment of results shall be subsequently prepared and maintained by the Site Manager. Monitoring reports shall be made available to the Local Authority as requested.
- A dust deposition limit value of 350 mg/m2-day (measured as per German Standard Method VDI 2119 – Measurement of Particulate Precipitations – Determination of Dust Precipitation with Collecting Pots Made of Glass (Bergerhoff Method) or Plastic. is commonly specified by Local Authorities and by the EPA to ensure that no nuisance effects will result from specified activities and it is to this Best Practice standard method that this programme of dust monitoring and control has been prepared. The *German Federal Government Technical Instructions on Air Quality Control - TA Luft* specifies an emission value for the protection against significant nuisances or significant disadvantages due to dustfall. This limit value is 350 mg/m2-day and it is to this limit value that all measured dust deposition levels shall be assessed. This limit value is commonly specified by Local Authorities at construction sites.

Dust Control Measures

In order to ensure that adverse air quality impacts are minimised during the construction phase and that the potential for soiling of property and amenity, local public roads and the LUAS tram system is minimised, the following mitigation measures shall be implemented during the course of all construction activities:

- Avoid unnecessary vehicle movements and manoeuvring, and limit speeds on site so as to minimise the generation of airborne dust.
- Use of rubble chutes and receptor skips during construction activities.
- During dry periods, dust emissions from heavily trafficked locations (on and off site) will be controlled by spraying surfaces with water and wetting agents.
- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads will be restricted to essential site traffic only.
- Re-suspension in the air of spillages material from trucks entering or leaving the site will be prevented by limiting the speed of vehicles within the site to 10kmh and by use of a mechanical road sweeper.
- The overloading of tipper trucks exiting the site shall not be permitted.
- Aggregates will be transported to and from the site in covered trucks.
- Where the likelihood of windblown fugitive dust emissions is high and during dry weather conditions, dusty site surfaces will be sprayed by a mobile tanker bowser.
- Wetting agents shall be utilised to provide a more effective surface wetting procedure.
- Exhaust emissions from vehicles operating within the construction site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions from vehicles are minimised by routine servicing of vehicles and plant, rather than just following breakdowns; the positioning of exhausts at a height to ensure adequate local dispersal of emissions, the avoidance of engines running unnecessarily and the use of low emission fuels.
- All plant not in operation shall be turned off and idling engines shall not be permitted for excessive periods.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.

- Material stockpiles containing fine or dusty elements including top soils shall be covered with tarpaulins.
- Where drilling or pavement cutting, grinding or similar types of stone finishing operations are taking place, measures to control dust emissions will be used to prevent unnecessary dust emissions by the erection of wind breaks or barriers. All concrete cutting equipment shall be fitted with a water dampening system.
- A programme of air quality monitoring shall be implemented at the site boundaries for the duration of construction phase activities to ensure that the air quality standards relating to dust deposition and PM_{10} are not exceeded. Where levels exceed specified air quality limit values, dust generating activities shall immediately cease and alternative working methods shall be implemented
- A complaints log shall be maintained by the construction site manager and in the event of a complaint relating to dust nuisance, an investigation shall be initiated
- Dust netting and site hoarding shall be installed along the northeastern site boundary to minimise fugitive windblown dust emissions falling on the LUAS tram line.

3.10 OPERATIONAL STAGE

It is anticipated that the primary direct significant environmental effects will arise during the construction stage. Once the development is completed, and mitigation measures employed, it is expected to operate without creating any significant additional environmental impacts. The range of anticipated activities, materials/natural resources used, effects/emissions are not expected to result in a significant impact on the constituent environmental factors. The primary likely and significant environmental impacts of the operation of the proposed development are fully addressed in the EIAR document; and relate to Population and Human Health, Landscape and Visual Impact and Noise and Air impacts associated with the traffic generated. There is also the potential for cumulative, secondary and indirect impacts (for instance traffic) but are unlikely to be significant and have been addressed in the EIAR.

3.11 CUMULATIVE IMPACTS

There are no planned expansions or increases to the proposed development within the application site south of the Carrickmines Stream and given the prescriptions of the Cherrywood Planning Scheme the potential for future expansion within the application site south of the stream is considered limited but may include minor extensions to own door houses which would be contained within the rear gardens of each property.

On lands to the north of the stream, within the application site is an area designated for a future primary school. This will be delivered by the Department of Education at a future date and will be subject to a separate planning application. The size, scale and extent of the school will be determined by the Department at the appropriate time and having regard the likely demand that will be generated by new residential development in the area, including the current proposal.

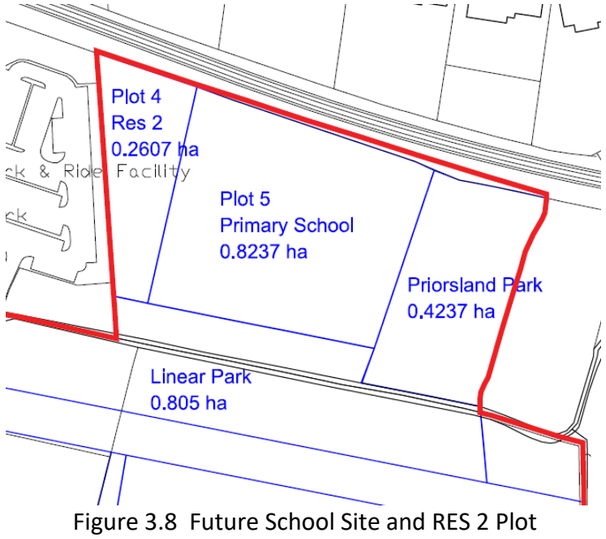


Figure 3.8 Future School Site and RES 2 Plot

To the west of the school site is a small plot of land of c.0.26ha within the applicant's ownership and which is zoned RES2 in the Cherrywood Planning Scheme and is prescribed for residential development at a density range of 45-70 units per ha. The plot will therefore be developed at a future date to provide c.12-18 additional residential units, subject to a separate future planning application.

Potential and Committed Developments within the Wider Area

In addition the remaining Priorsland Development Area 3 lands in separate third party ownership to the north-west (Smiths) are expected to be developed at a future date, again subject to separate planning application and environmental assessment.

Lands to the east and south within the remainder of the Cherrywood SDZ Planning Scheme have been subject to a number of planning permissions and many of the lands in the immediate vicinity are currently under construction including those controlled by Quintain Developments and Cairn Homes.

To assess the cumulative impact of development within the wider area, a cut-off point of grants of permission within a radius of a c.500m has been included. The assessment also only includes new built development and does not include extensions to existing buildings. These have been identified from a desk-top review of the Dun Laoghaire Rathdown planning history portal. The below review includes approved developments.

Ref. No.	Address	Proposal
DZ20A/0399	Site in townlands of Laughanstown and Brennanstown	Residential development - 136 no. dwellings (total gross floor area of c.15,910 sqm) in a mixture of houses, duplexes, and apartments.
DZ20A/0552	Site in townlands of Laughanstown and Brennanstown	Residential development - 163 no. dwellings in a mixture of houses, duplexes, and apartments.
DZ21A/0334	Site in townlands of Laughanstown and Brennanstown	Residential development - 482 no. dwellings in a mixture of houses, duplexes, and apartments.
DA21/0664	Site in townlands of Laughanstown and Brennanstown	Residential development - 47 apartments with communal space
DZ21A/1042	Townlands of Laughanstown, Brennanstown and Cherrywood	Residential development – 122 dwellings
DZ21A/0699	Townlands of Laughanstown, Brennanstown and Cherrywood	Minor Amendments to DZ20A/0552
DZ21A/1069	Site in townlands of Laughanstown and Brennanstown	Minor Amendments to DZ20A/0399
DZ19A/0597	Development Area 8 -Tully, Cherrywood SDZ, Includes the Res 2 plots ''T9'' and ''T10''	Residential development comprising of 184 dwellings
DZ18A/0208	Site approx. 6.57ha in area and generally bounded by, Lehaunstown Lane to the west, Carrickmines Stream (partly) to the south, and Cabinteely Stream, (partly) to the east that is, located within the townland of, Brennanstown, Dublin 18	Residential Development comprising of: • 360 no units • childcare facility
DZ19A/0863	Site measuring approximately 8.24 ha in area generally bounded by Lehaunstown Lane to the west, Carrickmines Stream (partly) to the south and, Cabinteely Stream (partly) to the east and is located within the townland of, Brennanstown, Dublin 18	Residential development comprising of: • 342 new residential dwellings, • Childcare Facility 249sq.m. (GFA), • Delivery of the Cherrywood SDZ Planning Scheme's Druid's Glen Distributor Road (also known as Q to P3), measuring approximately 390 m in length to include the construction / completion of the part approved 3-span bridge (Option 1) over the Cabinteely Stream under Planning Ref. DZ16A/0587 (ABP Ref. PL06D.247915).
DZ18A/1129	Site (c.0.95ha) at Laughanstown & Brennanstown, Dublin 18 (Development Areas 1 & 8)	• Construction of an attenuation pond (detention basin) with associated outfall to Ticknick stream • Infilling of the existing temporary attenuation pond (north of Mercer Link Road, constructed as part of the Phase 1 Roads and Infrastructure works permitted under Reg. Ref. DZ15A/0758)

Ref. No.	Address	Proposal
		Construction of a new stormwater outfall pipe from Beckett Park attenuation system to Ticknick stream
DZ15A/0758	Lands in the townlands of Cherrywood, Laughanstown, Brennanstown, Loughlinstown and Glebe	Roads and infrastructure (phase 1) to form part of public road network providing access and services for the future development of the adjoining SDZ lands. The total road length proposed is c.5.4kms, of which c.4.1kms is new road and c.1.3kms relates to works to existing roads.
D10A/0164	Carrickmines(Priorsland), East of Glenamuck Road, North of M50, & South of Luas Line B1 (Currently under construction)	Park and Ride (temporary) 6 year permission for 350 space park and ride facility with access off existing Carrickmines roundabout. Development will also include pedestrian access to Carrickmines Luas stop (currently under construction).
DZ16A/0585	Off Glenamuck Road, adjacent the Carrickmines roundabout and M50 interchange Carrickmines Dublin	Permission for retention (temporary for 3 years) for park and ride facility previously granted permission under Reg. Ref. D10A/0164.
DZ17A/0114	Lands at Priorsland, Glenamuck Road North, Carrickmines, Dublin 18	Permanent park and ride facility
DZ19A/0683	Lands at Priorsland, Glenamuck Road North, Carrickmines, Dublin 18	Permission for retention (temporary for 3 years) for park and ride facility previously granted permission under Reg. Ref. D10A/0164.
DZ15A/0813	Laughanstown, Dublin 18, (Tully Park)	Permission granted for a public park known as Tully Park
DZ15A/0814	Laughanstown, Dublin 18, (Beckett Park)	Planning permission granted for a public park known as Beckett Park
DZ16A/0570	Lands in the townlands of Ticknick, Co Dublin and Laughanstown, Dublin 18	Planning permission granted for a public park known as Ticknick Park
DZ17A/0862	Lands in the townlands of Cherrywood, Dublin 18	Permission for Mixed Use Town Centre development, including amendments to Tully Park entrance
DZ18A/0458	Lands in the townland of Laughanstown, Dublin 18	Permission granted for Tully Primary School
DZ19A/0874	Ticknick, Co. Dublin, and Laughanstown, Dublin 18	Split decision - Permission granted for revised proposals for previously approved pavilion building at Ticknick Park, and permission refused for a temporary car park off Lehaunstown Lane.
DZ20A/0478	Laughanstown and Cherrywood, Dublin 18	Permission granted for the provision of a temporary car park for approximately 75 cars, 3 coaches and 4 motorcycles on lands at Laughanstown (on a site of c.0.6 ha) west of Lehaunstown Park (a Protected Structure RPS No. 026-093). The proposed carpark is a temporary facility (0-3 years) and is to serve the Ticknick Park development.
DZ20A/0946	Lands known as Tully Park Laughanstown, Dublin 18	Permission granted for amendments to Tully Park.

4.0 POPULATION & HUMAN HEALTH

4.1 INTRODUCTION

This chapter addresses potential impacts of the proposed development of a mixed-use scheme at Priorsland, Cherrywood on population and human health. Potential impacts of this proposal on population and human health arise from air quality and climate, noise and vibration, landscape and visual impact, traffic and transportation, etc. These aspects are dealt with in the specific chapters in this EIAR dedicated to those topics. This chapter has been prepared by Trevor Sadler, who is the director of McGill Planning Limited, has worked for 20 years as a Town Planner in Ireland. He has a Masters in Urban and Regional Planning (MRUP) and a Master in Arts (MA – Human Geography) from University College Dublin.

4.2 METHODOLOGY

At the outset it is important to note that the quantum and extent of development proposed is as prescribed in the Cherrywood SDZ Planning Scheme, which in turn was assessed at strategic level prior to being adopted. The Planning Scheme was subject to Strategic Environment Assessment (SEA) which considered Population & Human Health. Indictor HH1 considered the "*Occurrence (any) of a spatially concentrated deterioration in human health arising from environmental factors resulting from development provided for in the Planning Scheme*". This assessment was carried out in consultation with the EPA and HSE. It was determined that no health problems arose in this regard.

To establish the existing receiving environment / baseline for the subject site, the methodology included site visits to evaluate the location and likely significant potential impact upon human sources in the area. Desk based study of Central Statistics Office Census data, the ESRI Quarterly Economic Commentary, and national, regional and local planning documents was also carried out. The following guidance was also examined in the preparation of this chapter:

- Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment (European Union, 2017).
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, Draft August 2017).
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2002)
- United States (US) EPA Health Impact Assessment Resource and Tool Compilation (US EPA 2016);
- Institute of Public Health in Ireland (IPHI) Health Impact Assessment Guidance (IPHI 2009).
- IEMA's Health in Environmental Impact Assessment: a primer for a proportionate approach

<u>Population</u>

To establish the existing receiving environment/baseline for the subject site, the methodology included site visits to evaluate the location and likely significant potential impact upon the human population in the area. Desk based study included an analysis of the Central Statistics Office Census (CSO) data, the ESRI Quarterly Economic Commentary, and national, regional and local planning policy, school and creche enrolment figures.

Different local catchment areas were established for analysing population data, creche demand and capacity, and school demand and capacity. These areas were chosen to gather the most relevant data for each factor. A general local catchment area of 1km from the subject site forms the basis of most areas of analysis.

<u>Human Health</u>

To establish an existing baseline of the human health of the area, desk-based study including an analysis of the Central Statistics Office Census (CSO) data was undertaken. As referenced in the Department of Housing, Planning and Local Government (2018) Guidelines for Planning Authorities and An Bord Pleanála, (taken from the European Commission's Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report (2017)), human health is; "*a very broad factor that would be highly Project dependent. The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation, and decommissioning of a Project in relation to workers on the Project and surrounding population.*"

The WHO (World Health Organization) also define health as *"a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."*

4.3 RECEIVING ENVIRONMENT

Land Use and Settlement Patterns

The subject site is located c. 12km south east of Dublin City Centre in the suburb of Carrickmines, Dublin 18, on a gross site area of approximately 9ha. The subject site is located in the north-western section of the Cherrywood SDZ area. The lands are currently undeveloped, greenfield and rural in nature. There are no inhabitants, structures or buildings on the application site at present.

The site is bounded to the north by the Luas Green Line, to the south by agricultural lands, a wayleave access road and further south by the M50 Motorway, to the east by Cherrywood SDZ development lands and to the west by Carrickmines Luas Park and Ride Car Park and undeveloped lands located between the agricultural wayleave access road leading to the Park and Ride car park.

On the north side of the Green Luas line is the existing low density residential neighbourhood known as Brennanstown. These properties are typically larger residential properties with established gardens, often large hedges and established landscaping along property boundaries and large dwellings.

Given the lack of population on the site and adjoining lands south of the Luas there are no existing ancillary social infrastructure including education, employment, healthcare, community services or public amenities.

These are designated to be delivered in tandem with the new population as outlined in the SDZ Planning Scheme for Priorsland Development Area 3. The development of Cherrywood from greenfield lands into a new residential community will incorporate these mixed uses to ensure there is no strain or dependence on the existing infrastructure that currently serve the nearby settlements of Carrickmines, Brennanstown, Cabinteely and Loughlinstown.

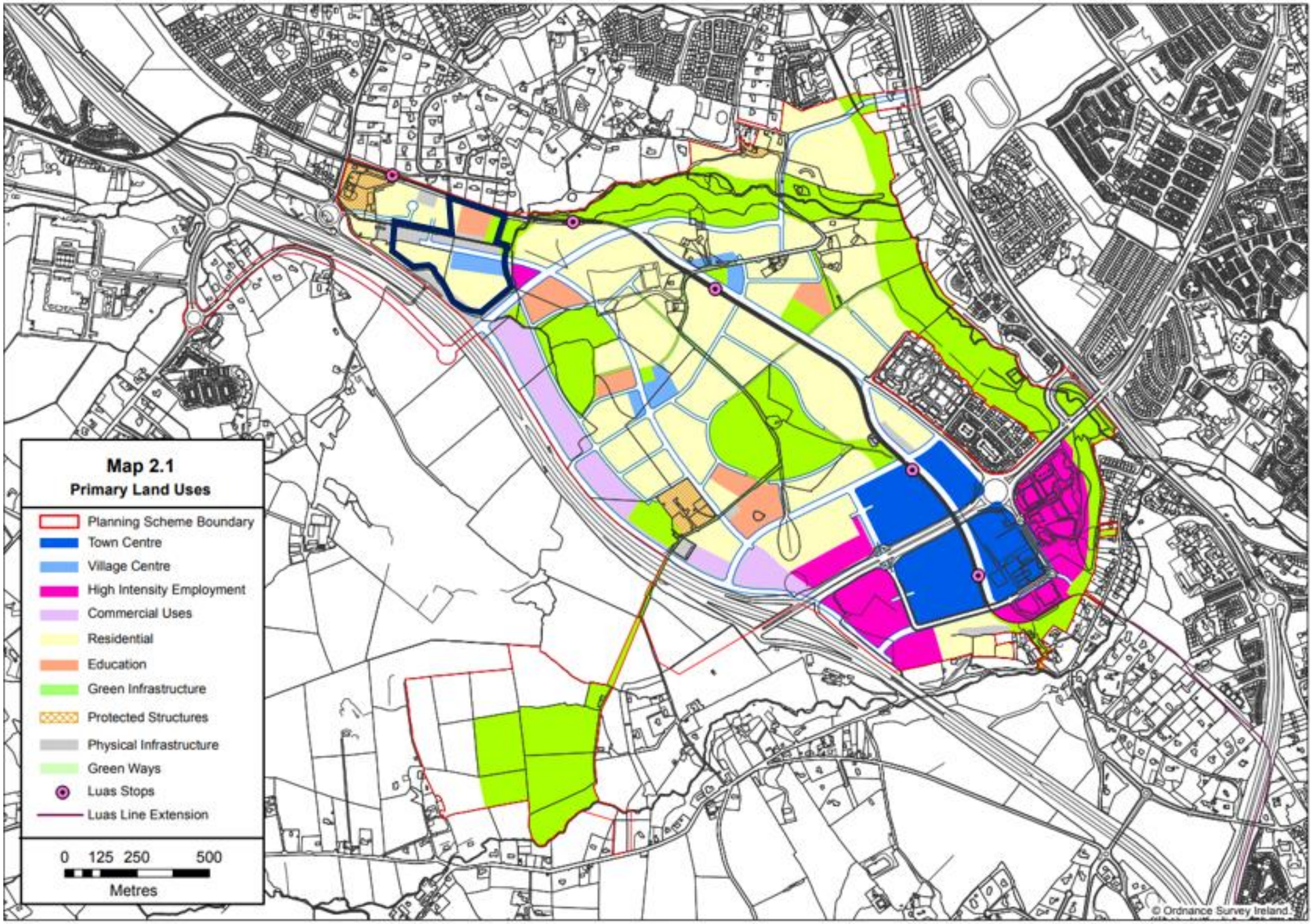


Figure 4.1 – Extract from the Cherrywood SDZ Planning Scheme showing the Land Use Zoning for the Cherrywood development, with the subject site outlined in blue.

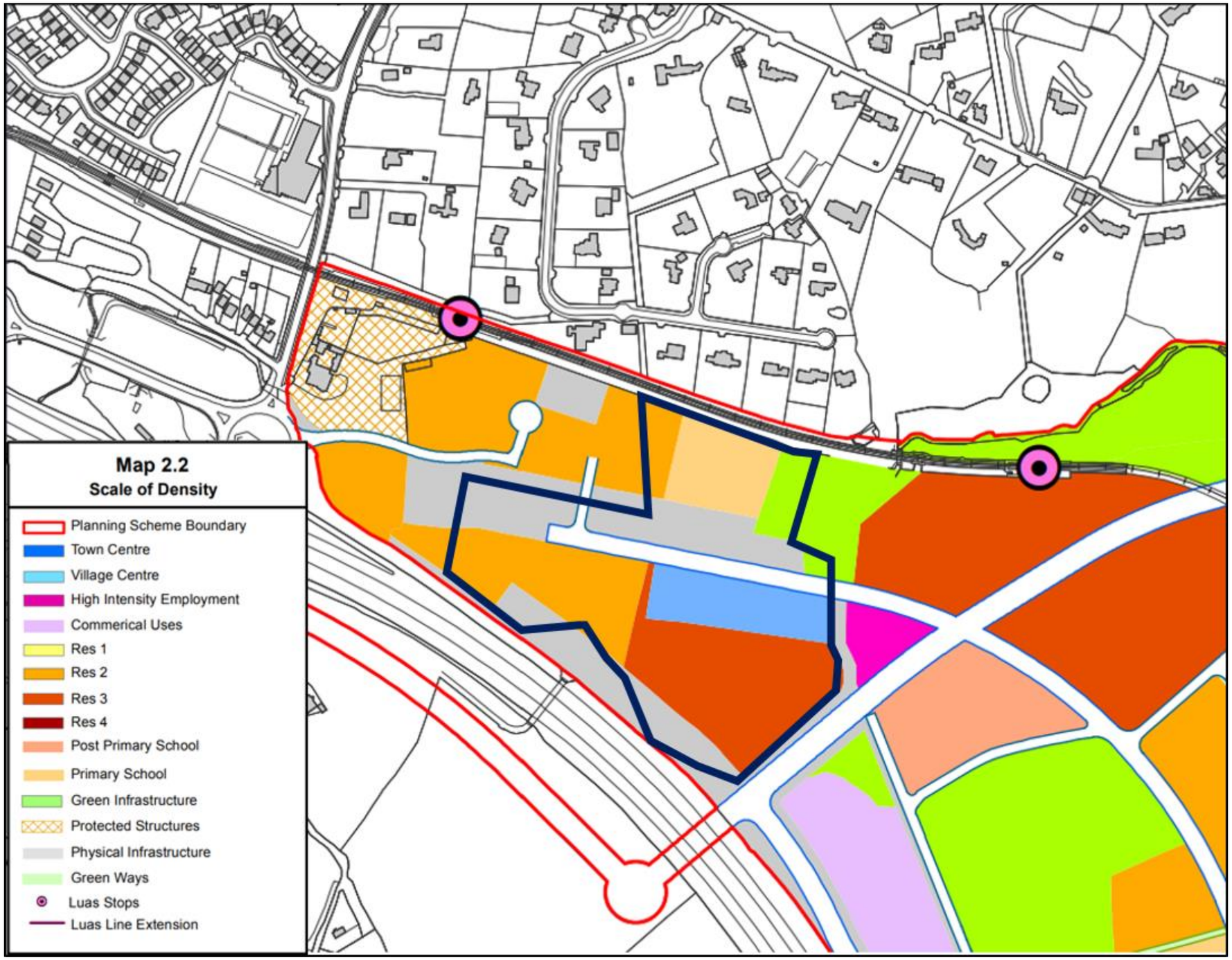


Figure 4.2 – Extract from the Cherrywood SDZ Planning Scheme showing the Land Use Zoning for Priorsland, with the subject site outlined in blue.

Population & Social Patterns

CSO data identifies a 3.8% growth in population for the Irish State between the 2011 – 2016 period, bringing the total population to 4,761,865. Metropolitan Dublin and Dun Laoghaire Rathdown County experienced slightly higher growth with a 5.3% (+62,552 people) and 5.4% (+11,757 people) increase respectively.

The significant growth experienced in Cherrywood and surrounding lands can be related to the lands being former greenfield lands, and the current growth in development in and around the subject site. The Electoral Division of Cabinteely-Loughlinstown experienced growth of 11.1% or 474 persons, whilst the combined 9 Small Areas experienced growth of 10.8% or 282 persons in this time. It is expected for this trend to continue and significantly increase with various permitted developments currently under construction or at/nearing planning stage. The extension of the Luas and creation of stops such as Carrickmines, Laughanstown, Cherrywood and Brides Glen have also contributed to the increase in population, providing direct public transport links to Dublin City Centre.

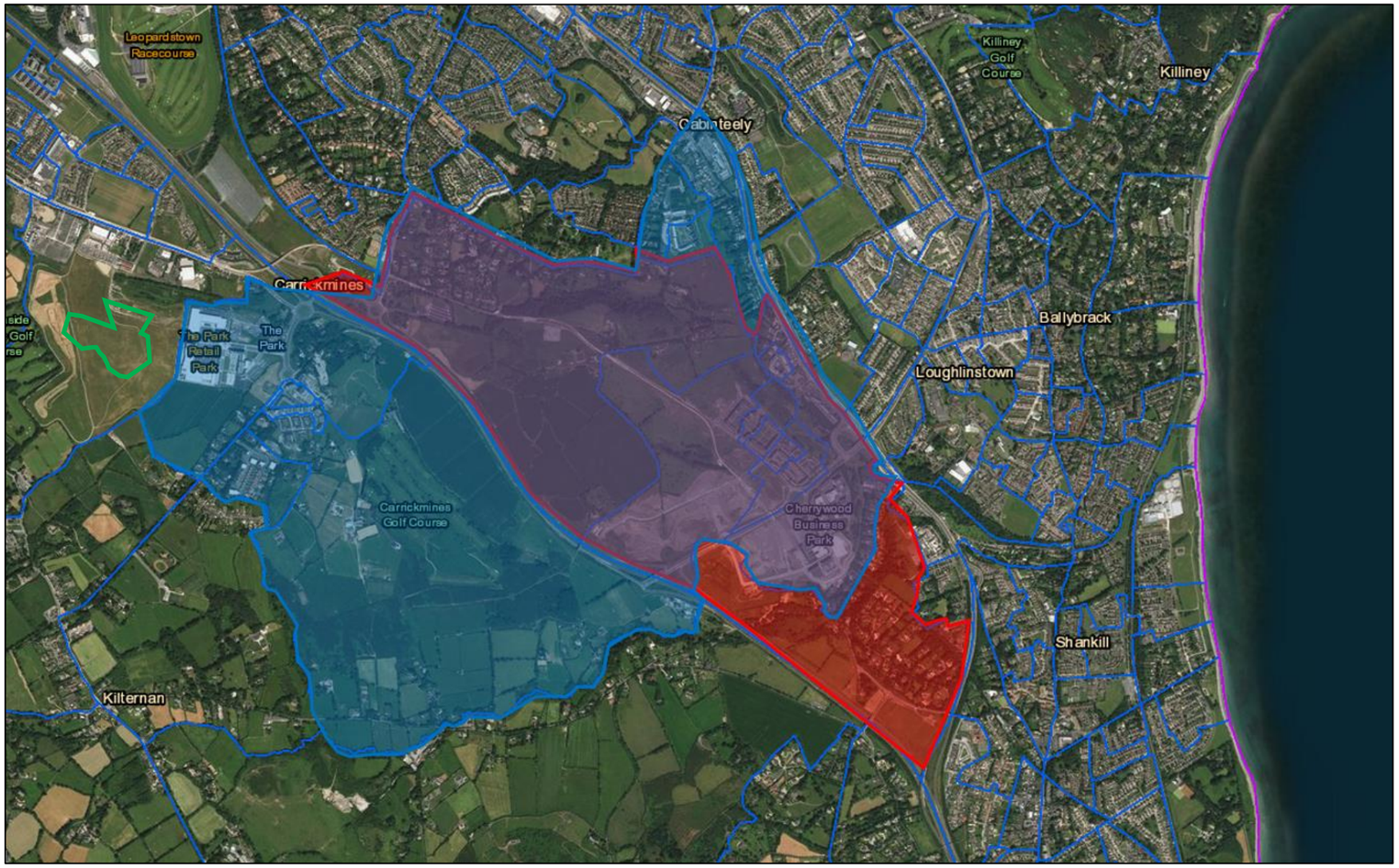


Figure 4.3 – Map of Cherrywood and surrounds, illustrating the 9 no. 'Small Areas' shaded in red, and the Cabinteely-Loughlinstown Electoral Division shaded blue. The subject site is outlined in green.

Area	Number of Persons		
	2011	2016	% Change 11 – 16
Ireland - State	4,558,252	4,761,865	3.8
Metropolitan Dublin	1,110,627	1,173,179	5.3
Dun Laoghaire Rathdown	206,261	218,018	5.4
Electoral Division of Cabinteely-Loughlinstown	3,806	4,280	11.1
Small Areas (9 in total)	2,337	2,619	10.8

Table 4.1 – Population change in the State, Metropolitan Dublin, DLR County Cabinteely-Loughlinstown ED and Small Areas encompassing Cherrywood.

Economic Activity and Employment

The CSO's Quarterly Force Survey for Q3 of 2018 provide the following data in relation to national employment levels, unemployment levels and current labour force participation rates.

Indicator	Q3 2018	Annual Change	Annual Change as %
Employed	2,273,200	+ 66,700	2.93
Unemployed	143,800	-19,700	-13.7
In Labour Force	2,417,000	+46,900	1.9
Not in Labour Force	1,443,200	+14,500	1

Table 4.2 – Quarterly Force Survey for Q3 2018

The increase in employment by 2.93% was across 10 of the 14 economic sectors, with construction seeing the largest growth of 13.9% (or +17,900), followed by administration and support service activities with 13.5% growth (or +12,500). Wholesale and retail trade (including repair of motor vehicles and motorcycles) still remains the largest industry of employment with around 301,000, followed closely by Industry (285,000) and Human Health and Social Work Activities (282,000).

The number of employees in Q3 2018 was 1,942,700, up 74,400 (+4%) over the course of the year. However, the number of self-employed persons decreased by 6,600 people (-2%) over the year to 318,500.

Health and Safety

The lands surrounding the site comprise of a mixture of a Motorway (M50), transport infrastructure (Green Luas line), greenfield land and existing residential development. There is no man made industrial processes (including SEVESO II Directive sites – 96/82/EC & 2003/105/EC) which would impact on the human health and safety of the nearby residents and future residents of the site.

Risk of Major Accidents and Disasters

The main risk in relation to major accidents or disasters that may affect the site relate to the Carrickmines Stream that runs through the subject site. The stream is at risk to potential 1 in 100 and 1 in 1000 year flood events and would result in extensive flooding of the adjoining lands based on the current profile. However, a flood containment zoned is proposed as part of the current application.

4.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The development will comprise a mixed-use village centre and residential development of 443 no. units comprising 6 no. blocks of apartments (up to 5 storeys with basement/undercroft parking) providing 402 no. apartments units (146 no. 1-beds; 218 no. 2-beds and 38 no. 3-beds), and 41 no. houses (19 no. 3-beds and 22 no. 4-beds). All apartments provided with private balconies/terraces. Provision of indoor residential facilities to serve apartment residents.

The Village Centre and non-residential elements will comprise a supermarket, local retail/retail service units, non-retail commercial units, creche, gym, community space, and offices (High Intensity Employment) use.

Provision of car/bicycle/motorcycle parking; ESB sub-stations; bin storages areas, and all associated plant areas.

Provision of the first phase of Priorsland Park (on lands within the applicant's ownership) and other public and communal open spaces.

Construction of Castle Street through the subject lands and two road bridges across the Carrickmines Stream, one to serve the future school site/ park, the second to provide pedestrian and cyclist access to the Carrickmines Luas station and future Transport Interchange to the north. Provision of additional pedestrian bridge to the park. Provision of an acoustic barrier along the southern/western edge of the site.

All associated site development works, landscaping, boundary treatments and services provision.

A more detailed description is outlined in Chapter 3.

4.5 POTENTIAL IMPACTS

This section of the EIAR establishes the implications of the proposed development on 10 key criteria with specific relevance to the population and human health of both the surrounding environment and receiving environment. This is broken down into two phases which include the construction and operational phase.

The assessment of impacts on population and human health will focus on health issues and environmental hazards arising from the other environmental factors generated by the proposed development. The assessment will not require a wider consideration of human health effects which do not relate to the factors identified in the EIA Directive.

Noise

Construction Phase

The construction phase will see an increase in noise generated from the site due to extensive site works comprising of construction machinery, excavation works and an increase in construction traffic and employees. The noise is anticipated to continue for the duration of the construction phase which has been estimated at c.36 months.

The short term increase in noise on the site will introduce noise that is considered to be standard amongst residential developments. The works will occur during normal daytime hours which will minimise the impacts to the majority of the surrounding population who leave their residence for school/work.

The receiving environment is somewhat accustomed (to an extent) to construction works occurring with previous grants of permission having being carried out or underway on the adjoining Cherrywood SDZ lands to the east and south (Full list of relevant permissions noted in Chapter 3 of the EIAR). Those works closest to the site have comprised the early phases of road and infrastructural works for Cherrywood and more recently a number of residential developments underway by Quintain Developments and Cairn Homes. However, it is noted that the proposed works on lands at Priorsland are situated closer to existing residential developments at Brennanstown. It is envisaged that some degree of noise disturbance will occur to the nearby population. This will be of minimal impact and will be appropriately managed during the construction phase. This is discussed in further detail in the Chapter 8 - Noise and Vibration.

The subject site also adjoins the M50 and the Green Luas line. There is considerable noise that is generated from both vehicle traffic and the Luas tram on a daily basis. So, whilst the construction phase will see an increase in noise generated on the site, the competing traffic and Luas noise will continue to be the dominating noise generated.

Operational Phase

The operation of the development will see a growth in population and vehicle traffic on the site. The increase in noise will be noticeable given the previous use of the lands as agriculture, however the noise generated will not be to the detriment of the surrounding population and human health. The general day to day noise generated by traffic, building plant, etc, are not considered to be noise that is of detriment to the surrounding population and human health, but rather noise associated with 'everyday living'.

Traffic speed within the development will be c.30km/h, which is not considered to generate a significant amount of noise as to negatively impact the surrounding population and human health.

The site abuts the M50 Motorway and at present there is no sound barrier that protects the subject site at Priorsland from noise generated by vehicles which travel of speeds up to 120 km/h past the site. As part of the proposed development, a 3m sound proof barrier shall be erected along the southern boundary of the development which will significantly reduce the noise currently projected across the subject site. This will be a significant gain for the site and surrounding properties north at Brennanstown, with the M50 Motorway noise substantially reduced from the present levels.

Air Quality and Climate

Construction Phase
Due to the site being former greenfield land, the construction work required for the mixed use development will to some degree disturb the site. The likely implications of this will be the potential for dust emissions due to the movement of heavy machinery and construction traffic through the site during the construction phase. If not properly mitigated this has the potential to impact on the surrounding population and human health. This includes surrounding established neighbourhoods such as Brennanstown to the north, as well as road users of the adjoining M50 Motorway located to the south.

The increase in population and associated construction vehicles on site may also lead to an increase in the localised emissions on the site. Due to the extent of works and the nature of the construction works, the increase in exhaust emissions will be short term and will not have a detrimental impact to air quality. The air quality will not be significantly altered for the long term and thus will not impact on the surrounding population and human health.

Both the potential of an increase in dust and exhaust emissions will be managed through the developments Construction Management Plan, along with any associated waste on the site through the Waste Management Plan. Both documents will adequately address the requirements to ensure that the construction phase does not significantly impact or impede on the existing population and human health.

The mitigation measures outlined in further detail in Chapter 11 identify the need to reduce any unnecessary movement of vehicles, as well as restricting speed to ensure that dust and exhaust levels are maintained to an appropriate standard. This is of particular importance given the location of the M50 Motorway immediately to the south.

Operational Phase
The operation of the development may see a slight reduction in air quality with the growth in population on the site and the associated increase in vehicular traffic through the site. Emissions associated with standard living conditions such as heating may also contribute to the small increase in localised emissions.

The completion and operation of the development will see a growth in the landscaped areas within the site. Provision for planting within designated open space along with landscaping within streets and within properties will see the absorption of Carbon Dioxide from the atmosphere, releasing Oxygen back into the atmosphere. This is discussed in further detail in Chapter 9 – Air Quality and Climate. The air quality and climate may be slightly affected by the operation of the mixed use development comprising of residential, education, commercial/retail and open space, however this is not anticipated to be of significant consequence to the population and human health of the surrounding environment.

Water Services

Construction – Interim
During the construction phase of the proposed development with the proposed interim arrangement, there are several potential processes that could impact the existing surface water, foul water and watermain networks including the Carrickmines stream and Ticknick stream watercourses:

1) Topsoil stripping and cut/fill earthworks activities may cause an elevated silt load to the adjacent watercourses,
2) Hydrocarbons may be released into networks from accidental spills,
3) The construction of the proposed in-ground services will require the excavation, removal and reinstatement of existing natural and man-made ground,
4) There is potential for existing infrastructure to conflict with proposed excavation works, by existing infrastructure being close to the proposed works,
5) Construction of 2 no. vehicular bridge structures over the Carrickmines River/Flood Containment Zone.
6) The permanent floodwater culvert north of the stream will be constructed in the Interim period as far as the boundary with the third-party lands to the east. The alternative floodwater culvert south of the river will be constructed and will operate in the interim.

Construction – Permanent
During the construction phase of the proposed permanent arrangement, there are a number of potential processes that could impact the existing watermain networks and the Ticknick stream watercourses:

1) The permanent floodwater culvert north of the stream will be completed when the remainder of the culvert is completed on the adjoining lands by others.
2) The diversion of the existing 33" DCC trunk watermain that will be carried out by others in adjacent lands will require the public water network to be suspended for a period to allow connection into the existing network with the diverted line. It will also involve installation of the diverted watermain under the Carrickmines River and Ticknick Stream at isolated locations.
3) Construction of 1 no. vehicular bridge structure over the Ticknick Stream forming the extension of Castle Street into the Priorsland Area.

Operational – Interim
If the material assets are not constructed appropriately, then there is a risk of pipe leakage.

Operational – Permanent
As per the interim arrangement, if the material assets are not constructed appropriately, then there is a risk of pipe leakage.

Landscape and Visual impact

Construction Phase
During the construction phase of the development the proposed works may be visible at times from the M50 Motorway, The Green Luas line, the associated Carrickmines Luas Park and Ride, from properties located north of the Luas line in Brennanstown Vale and south of the M50 in Carrickmines. The construction phase will have short term landscape and visual impacts. The impacts are not considered significant on population and human health, particularly given the level of screening to site boundaries and the setting back of the main residential elements of the scheme from adjacent sensitive land uses.

Operational Phase
The operation of the proposed development will see a positive impact on population and human health with the provision of open space located along the Carrickmines Stream corridor and in the first phase of Priorsland Park. This will provide a valuable open space contribution to the wider community and help to maintain scenic green views of the lands, particularly when viewed from properties to the south of the M50 Motorway in Carrickmines.

The proposed mixed use development incorporates appropriate design promoting walking and cycling links from the village centre and residential streets through to the Carrickmines Luas stop. Landscaping throughout the development and within the designated open space will also significantly enhance the visual impacts of the development from within the development and from surrounding area. The operation of the development and associated changes to the landscape and visual aspect of the site will not be to the detriment of the population and human health.

Economic & Employment Activity

Construction Phase
The construction phase will provide considerable opportunity for growth in construction related employment for the entirety of the phased development. Various trades will be required throughout the completion of the development, providing economic growth for the building and construction industry. There are also unintended secondary/indirect impacts stemming from the growth in employment for such a large mixed use development. Localised spending is likely to increase with the growth in the 'working' population during the construction phase. The influx of employment opportunities within the site will see the opportunity for spending at local centres such as The Park Carrickmines, Cabinteely, Loughlinstown, and Cherrywood Town Centre once complete. This is seen as a positive contribution to the local population and will not have an adverse effect on the population and human health.

Operational Phase
The operation of the mixed use development will provide 443 no. of residential units which will enhance local spending power and will assist with the delivery of a critical mass of population which will support a wide range of additional local businesses, services, transport infrastructure and employment opportunities. The main support of this new population will be the Priorsland Village Centre which will also be available to adjoining residential populations to come in the Priorsland Development Area. The village centre will increase the employment opportunities within the immediate area, and subsequent spending further boosting economic activity within the local area. The mixed use development will positively contribute to the surrounding population and will not be of detriment to the population and human health.

Social Patterns

Construction Phase
No significant impact on social patterns during the construction phase is envisaged. There may be small impacts to social patterns due to some of working population on site seeking accommodation locally. The short-term negative impacts on local residents associated with construction traffic and possible nuisances associated with construction access requirements is not expected to be significant given the location of existing population and separation for the application site and proposed accesses.

Operational Phase
The provision of 443 no. of residential units and a new Village Centre will dramatically transform the area providing a new urban community on currently agricultural lands. The proposed new population and social infrastructure will integrate with existing infrastructure providing an urban development that is highly accessible and self-sufficient. The proposed development will provide much needed homes, including a range of family dwelling types and sizes, in this area of the County, which will help cater for the considerable demand in the Dublin Region which is not being met at present.

The Village Centre will also serve the wider community as it will be accessible through the Cherrywood road infrastructure.

The initial demand of the new community for school places will be initially met by other school developments being progressed in Cherrywood by the Department of Education which has confirmed that there is sufficient capacity within to serve the proposed development. In time the Department will deliver a further school on the subject lands north of the Carrickmines Stream.

Land-Use and Settlement Patterns

Construction Phase
The construction phase will include site clearing, excavation, vegetation removal which will have a shorter term negative impact on local visual amenities where the site is visible. The land-use will see significant change during this process with an increase in population working on the site, however this will not significantly impact on the population in the local area as most will travel to/from the site from their existing places of residences. The construction phase and population of trade workers will be temporary and only last for the duration of the construction period.

Off-site land use impacts related to quarrying activities for aggregates used in the construction of the development are noted, as well as disposal for removed spoil, although much will be re-used on site where feasible. A detailed Construction Environmental Management Plan will address these issues in more detail.

Operational Phase
The operation phase will see the change of land-use occur from greenfield lands (agriculture) to mixed use which will include residential, commercial/retail, landscaped open space and physical infrastructure. The growth in population and provision of the village centre will be of benefit to the surrounding population.

The provision of open space into the development with linkages along the Carrickmines Stream corridor will promote an active community and provides a green link that reaches Druid Valley, which is considered to be a positive contribution to human health.

Health and Safety

Construction Phase
During the construction phase of the development there are a number of short term impacts that may arise from the proposed works impacting on the surrounding population and human health. As previously mentioned, the increase in population on the site through construction workers will see an increase in vehicle traffic on the site which may increase the likelihood of traffic congestion near the site, increase in dust, run-off of surface contaminants and an increase in noise.

The construction impacts will be short term and minimal given the context of the site and distance nearby residential dwellings. The Construction Management Plan, Traffic Management Plan and Waste Demolition Management Plan to be agreed with the planning authority prior to commencement of development will ensure that the works conducted during the construction phase will not significantly impact on the surrounding population and human health. The hours in which construction works are conducted will also be restricted to ensure that impacts to nearby residents and business are mitigated. Health and Safety Regulations will

also ensure that the construction phase identifies any potential risks, and appropriate mitigation measures put in place to ensure that impacts to the construction workers, surrounding population and human health are mitigated/removed.

Operational Phase
The operation of the development is unlikely to contribute to any significant negative impacts to the surrounding population and human health. The design of the development in terms of street layout, access into the site, pedestrian links and street lights will be in accordance with the applicable guidelines and ensures the safety and wellbeing of residents during the operation of the mixed use development.

The operation of the development will also see the installation of a sound proof safety barrier along the southern boundary of the development, located between the subject site and the M50 Motorway. This will be of significant benefit to the local residents, not only reducing the significant noise generated from the M50 Motorway, but also providing an element of safety to the residents.

The operational phase of the development will provide a significant gain to the health and safety of the surrounding population, with no negative impacts expected to the population and human health.

Risk of Major Accidents or Disasters

Construction Phase
Having regard to the topography and natural features of the site, there a number of small risks of major accidents or disasters impacting the site. The Carrickmines Stream runs through the property, and the flood risk assessment that was conducted previously for Cherrywood and Priorsland identified the sites likelihood of flooding in a 1:1000 year event. Whilst this is a considerably rare event, appropriate measures will be taken to ensure that in the event of a flood, contaminated run-off and other construction related materials do not find their way into the waterways or that the safety of workers on site isn't compromised.

Operational Phase
By operation stage a full containment zone will be in place to deal with any future extreme flooding events. This, in tandem with various Suds measures throughout the development will ensure that the future residences and village centre are not at risk of flooding. Otherwise it is considered that there is no significant risk related to major accidents or disasters, external or internal, man-made or natural in respect of the proposed development.

4.6 POTENTIAL CUMULATIVE IMPACTS

The overall cumulative impact of the proposed development on population and human health will be positive. Notwithstanding providing 443 residential units and a significant new population the development will include a new Village Centre with a range of local services and facilities, and new open spaces to serve the new and future populations in the area. The forthcoming schools elsewhere in Cherrywood will serve the development initially until the Department development another school at Priorsland.

4.7 MITIGATION MEASURES

There will be a number of mitigation measures that will be employed where practicable that will have regard to the potential environmental impacts that may arise during the construction and operational phases of the proposed development.

Construction Phase
A Construction and Environmental Management Plan will be prepared by the contractor and implemented during the construction phase. The CEMP will be agreed with the planning authority prior to commencement of development.

A range of other construction related mitigation measures are proposed in this EIAR under the various environmental topics examined. These measures are likely to avoid any significant negative environmental impacts on population and human health during the construction phase.

Operational Phase

The proposed development has been designed to avoid negative impacts on population and human health through the provision of various physical and social infrastructure as part of the development as are outlined in Chapter 3 of this EIAR. No addition mitigations measures are considered necessary.

4.8 PREDICTED IMPACTS

The predicted impacts of the proposed development are assessed from a qualitative perspective, with the presumption that all mitigation measures are appropriately and successfully applied.

Construction Phase
Subject to the implementation of the remedial and mitigation measures proposed throughout this EIAR, then any adverse likely and significant environmental impacts will be avoided. Positive impacts are likely to arise due to an increase in employment and economic activity associated with the construction of the proposed development. The overall predicted likely and significant impact of the construction phase will be short-term, temporary and neutral.

Operational Phase
Upon completion of the mixed use development at Priorsland, the predicted impacts will be a positive contribution to new residential community and the surrounding environment. The new residential population will be served by a new Village Centre with a range of services and facilities, new open spaces, and connections to public transport and schools in the area.

The predicted impacts of the operation phase of the proposed development is considered to be long-term, permanent and positive to population and human health.

4.9 'DO NOTHING' SCENARIO

A *'do nothing'* impact would result in the subject lands remaining green-field state and undeveloped. From a planning and development perspective, this situation would be contrary to the provisions of the SDZ Planning Scheme which identified these lands for providing significant residential population and a new Village Centre to serve the area. Were the lands to remain undeveloped in the long term it would restrict the development of adjoining Planning Scheme lands also which require the delivery of key infrastructure on these subject lands, to allow them in turn be permitted and develop – these include the links to the Cherrywood Luas stop/Transport Interchange and the new Village Centre.

Failure to deliver the proposed residential units would result in existing housing need and demand remaining unmet. The new pedestrian and cycle links, childcare facility, and public open spaces to be provided in the development and serving the wider area would also not be provided.

4.10 WORST CAST SCENARIO

A worst-case scenario would be where the development was partially built but not completed, for instance a portion of the residential element provided without the public open spaces and the Village Centre. The landscape, visual and social impacts of same would be significant. However, such a scenario is considered would only occur for a temporary period and would not be protracted.

4.11 MONITORING & REINSTATEMENT

The monitoring measures required for the aspects of water, air quality and climate, noise, landscape and visual impact, etc provides an appropriate response in this instance.
There are no reinstatement works proposed for the proposed site.

4.12 DIFFICULTIES IN COMPILING INFORMATION

There were no identified difficulties experienced whilst compiling the Population and Human Health Chapter of the EIAR.

4.13 REFERENCES

- Cherrywood SDZ Planning Scheme
- Dun Laoghaire Rathdown County Development Plan 2016-2022.
- CSO Labour Force Surveys- www.cso.ie.
- Census 2016 Results - www.cso.ie.

5.0 BIODIVERSITY

5.1 INTRODUCTION

The Biodiversity assessment has been undertaken by Altemar Limited. It assesses the biodiversity value of the proposed development area and the potential impacts of the development on the ecology of the surrounding area and within the potential zone of influence (ZOI). The programme of work in relation to biodiversity assessment was designed to identify and describe the existing ecology of the area and detail designated sites, habitats or species of conservation interest that could potentially be impacted by the proposed development. It also assesses the significance of the likely impacts of the scheme on the biodiversity elements, and designs mitigation measures to alleviate identified impacts.

A separate AA Screening/Natura Impact Statement, in accordance with the requirements of Article 6(3) of the EU Habitats Directive, has been produced to identify potential impacts of the development on European (Natura 2000) sites, Annex species or Annex habitats. It concludes that:

> '*In a strict application of the precautionary principle, it has been concluded that effects are likely on Rockabill to Dalkey Island SAC from the proposed works in the absence of mitigation measures, primarily as a result of direct hydrological connection to the site via the Ticknick Stream and Carrickmines Stream. For this reason, an NIS was carried out to assess whether the proposed project, either alone or in combination with other plans or projects, in view of best scientific knowledge and in view of the sites' conservation objectives, will adversely affect the integrity of the European Site. All other European sites were screened out at initial screening.*
>
> *Mitigation measures will be in place to ensure that there are no significant impacts on the watercourse network that leads to Killiney Bay. Surface water discharge from site will include petrochemical interception.*
>
> *The mitigation measures proposed for the construction and operational phases of the development satisfactorily address the potential for significant effects on Rockabill to Dalkey Island SAC, through the application of the standard construction phase controls as outlined above. In particular, the mitigation measures to prevent silt and pollution entering the Ticknick Stream and Carrickmines Stream will satisfactorily address the potential for significant effects on downstream biodiversity and Rockabill to Dalkey Island SAC. No significant adverse effects on the conservation objectives of Rockabill to Dalkey SAC are likely following the implementation of the mitigation measures proposed*.'

Background to Altemar Limited

Altemar Ltd. is an established environmental consultancy based in Greystones, Co. Wicklow that has been in operating in Ireland since 2001. Bryan Deegan (MCIEEM) is the primary consultant. Bryan Deegan has 26 years' experience working in Irish terrestrial and aquatic environments, providing ecological consultancy. He has a Certificate in Science, Diploma in Applied Aquatic Science, BSc in Applies Marine Biology and a MSc in Environmental Science. Bryan has extensive aquatic and terrestrial fieldwork experience including flora and fauna (bird & mammal) surveys. Hugh Delaney provided specialist support to Bryan Deegan in relation to birds. Hugh Delaney is an ecologist (ornithologist primarily) having completed work on numerous sites with ecological consultancies over 10+ years. Hugh is local to the Dun Laoghaire-Rathdown area in Dublin and is especially familiar with the bird life and its ecology in the environs going back over 30 years.

5.2 METHODOLOGY

A pre-survey biodiversity data search was carried out in August 2020 and updated in April 2022. This included examining records and data from the National Parks and Wildlife Service (NPWS), National Biological Data Centre (NBDC) and the Environmental Protection Agency (EPA), in addition to aerial, 6 inch maps and satellite imagery. A habitat survey of the site was undertaken within the appropriate seasonal timeframe for terrestrial fieldwork. Field surveys were carried out as outlined in Table 5.1. All surveys by Altemar were carried out in the appropriate seasons. It should be noted however that a habitat survey was also conducted on 15th January 2019 by Maeve Maher-McWilliams ACIEEM, and Lauren Shinkwin of Scott Cawley Ltd. In addition, a Bushnell HD trail camera was installed to monitor activity at an adjacent badger sett on 21st February 2019, and collected on 1st March 2019. A fauna survey was conducted concurrent with the habitats and flora survey on 15th January 2019 by Scott Cawley.

Survey	Surveyors	Survey Dates
Terrestrial Ecology/ Aquatic Ecology/Avian Ecology	Bryan Deegan (MCIEEM) of Altemar	20th September 2020, 9th July 2021, 2nd April 2022
Bat Survey	Bryan Deegan (MCIEEM) of Altemar	20th September 2020, 9th July 2021
Mammal *Mammal / Amphibian Survey*	Scott Cawley Bryan Deegan (MCIEEM) of Altemar	15th January 2019 10th February 2021, 2nd April 2022
Wintering Bird Assessment	Hugh Delaney Ornithologist	22nd October 2020, 31st October 2020, 13th November 2020, 25th November 2020, 2nd December 2020, 18th December 2020, 6th January 2021, 19th January 2021, 4th February 2021, 22nd February 2021, 1st March 2021, 15th March 2021, 18th November 2021, 29th November 2021, 11th December 2021, 23rd December 2021, 6th January 2022, 22nd January 2022, 6th February 2022, 27th February 2022, 6th March 2022, 26th March 2022

Table 5.1 Field Survey

5.2.1 Proximity to Designated Conservation Sites and Habitats / Species of Conservation Interest

The designated conservation sites within 15km of the site were examined for potential impact. Sites beyond 15km had no direct or indirect pathways and no potential impact is foreseen on these sites. This assessment included sites of international importance; Natura 2000 sites (Special Areas of Conservation (SAC), candidate Special Areas of Conservation (including candidate sites of Community importance and sites of Community importance) (cSAC), Special Protection Areas (SPA) and candidate Special Protection Areas (cSPA)) and Ramsar sites and sites of National importance ((Natural Heritage Areas (NHA), proposed Natural Heritage Areas (pNHA). Up to date GIS data (NPWS data shapefiles) were acquired and plotted against the proposed development site. A data search of rare and threatened species within 5 km of the proposed site (GIS shapefile), which in our professional opinion is deemed appropriate, was provided by NPWS. Additional information on rare and threatened species was researched through the National Biodiversity Data Centre maps.

The Carrickmines Stream traverses through the subject site. The Ticknick Stream flows along the eastern boundary of the subject site. In-stream works to the Carrickmines Stream and construction works proximate to the Carrickmines Stream and Ticknick Stream are proposed and as a result out of an abundance of caution, it is considered that there is a direct hydrological pathway to the Natura 2000 site (Rockabilll to Dalkey Islands SAC), as the both watercourses outfall to the Shanganagh River, which outfalls to the marine environment that extends to the Rockabill to Dalkey Islands SAC. As a result, an AA Screening/Natura Impact statement was carried out for the project and is included with the supporting documentation for this application.

5.2.2 Terrestrial and Avian Ecology

A pre-survey data search was carried out in August 2020 and updated in December 2021. This included a literature review to identify and collate relevant published information and ecological studies previously conducted and comprised of information from the following sources; the National Parks and Wildlife Service, NPWS Rare and Protected Species Database, National Biodiversity Data Centre, EPA WMS watercourses data, in addition to aerial, 6 inch, satellite imagery. Following the desktop study, walk-over assessments of the site were carried out as outlined in Table 5.1. Habitat mapping was carried out according to Fossitt (2000) using AcrGIS 10.5 and displayed on Bing satellite imagery based on the 2nd April 2022 site visit. Any rare or protected species or habitats were noted. As part of the fieldwork an invasive species assessment was carried out. A Wintering Bird Assessment was also carried out on 22nd October 2020, 31st October 2020, 13th November 2020, 25th November 2020, 2nd December 2020, 18th December 2020, 6th January 2021, 19th January 2021, 4th February 2021, 22nd February 2021, 1st March 2021, 15th March 2021, 18th November 2021, 29th November 2021, 11th December 2021, 23rd December 2021, 6th January 2022, 22nd January 2022, 6th February 2022, 27th February 2022, 6th March 2022, and 26th March 2022 (Appendix 5.2).

5.2.3 Bat Fauna

As outlined in Appendix 5.1 a desktop assessment and two bat detector surveys were carried out. There are no buildings on site.

5.2.4 Rating of Effects

The terminology for rating impacts is derived from the EPA Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (2017) (Table 5.2)

Magnitude of impact and typical descriptions.

Magnitude of impact (change)		Typical description
High	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Medium	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Low	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	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
Negligible	Adverse	Very minor loss or alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.

Criteria for Establishing Receptor Sensitivity/Importance

Importance	Ecological Valuation
International	Sites, habitats or species protected under international legislation e.g. Habitats and Species Directive. These include, amongst others: SACs, SPAs, Ramsar sites, Biosphere Reserves, including sites proposed for designation, plus undesignated sites that support populations of internationally important species.
National	Sites, habitats or species protected under national legislation e.g. Wildlife Act 1976 and amendments. Sites include designated and proposed NHAs, Statutory Nature Reserves, National Parks, plus areas supporting resident or regularly occurring populations of species of national importance (e.g. 1% national population) protected under the Wildlife Acts, and rare (Red Data List) species.
Regional	Sites, habitats or species which may have regional importance, but which are not protected under legislation (although Local Plans may specifically identify them) e.g. viable areas or populations of Regional Biodiversity Action Plan habitats or species.
Local/County	Areas supporting resident or regularly occurring populations of protected and red data listed-species of county importance (e.g. 1% of county population), Areas containing Annex I habitats not of international/national importance, County important populations of species or habitats identified in county plans, Areas of special amenity or subject to tree protection constraints.
Local	Areas supporting resident or regularly occurring populations of protected and red data listed-species of local importance (e.g. 1% of local population), Undesignated sites or features which enhance or enrich the local area, sites containing viable area or populations of local Biodiversity Plan habitats or species, local Red Data List species etc.
Site	Very low importance and rarity. Ecological feature of no significant value beyond the site boundary

Quality of Potential Impacts on Biodiversity

	Impact Description
Negative /Adverse Impact	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Neutral Impact	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Positive Impact	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).

Significance of Impacts

Significance of Impact	Description of Potential Impact
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable2 changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound	An impact which obliterates sensitive characteristics.

Duration of Impact

Duration of Impact	Description
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting less than a year
Short-term	Effects lasting one to seven years.
Medium-term	Effects lasting seven to fifteen years.
Long-term	Effects lasting fifteen to sixty years.
Permanent	Effects lasting over sixty years
Reversible	Effects that can be undone, for example through remediation or restoration

Possibility of Impacts

Possibility of Impact	Description
Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.

Table 5.2 Impact description terminology

5.2.5 Difficulties Encountered

No difficulties were encountered in relation to the preparation of the biodiversity report. All surveys were carried out in the optimal survey season and access to all areas of the site was possible.

5.3 CONSULTATION

Altemar did not carry out consultation externally beyond the project team in relation to the biodiversity elements of the proposed project. Consultation was carried out with the project team in relation to the preparation of the project design and in particular the landscape and lighting strategy and Construction Environmental Management Plan (CEMP). Scott Cawley Ecologists met with the Dún Laoghaire-Rathdown Biodiversity Officer on 5th March 2019 to discuss the proposed development of the site.

5.4 RECEIVING ENVIRONMENT

The proposed development site is a greenfield site located adjacent to the M50 motorway and Carrickmines LUAS stop. The site primarily consists of grassland and hedgerows with a treeline within the site. Of particular note is the Carrickmines River that traverses through the subject site (flowing west to east) within the treeline and the Ticknick Stream that flows along the south eastern portion of the subject site. These watercourses ultimately outfall to the Shanganagh River, which leads to the marine environment within Killiney Bay, proximate to Rockabill to Dalkey SAC.

5.4.1 Zone of Influence

Given the scale of the proposed development and the proximity of the Carrickmines Stream and Ticknick Stream, out of an abundance of caution, it is considered that the ZoI of the proposed project extends beyond the site outline to the marine environment to include Rockabill to Dalkey Island SAC, due to the direct hydrological pathway to the marine environment. In the absence of mitigation, there is the potential for dust, pollution and contaminated surface water runoff to enter the Carrickmines Stream and Ticknick Stream with the potential for downstream impacts on Rockabill to Dalkey Island SAC.

In the interest of carrying out a thorough assessment, the area of assessment for designated sites was expanded beyond the ZoI to include designated sites within 15km of the proposed development site, and sites beyond 15km with the potential for a hydrological connection. This was done in the interest of ensuring that any pathways, however indirect or remote, were taken into account.

5.4.2 Designated Sites

As can be seen from Figures 5-2 (SAC's within 15km), 5-3 (SPA's within 15km), 5-4 (NHA and pNHA within 15km), 5-5 (Watercourses proximate to the site.), there are five European sites (Ballyman Glen SAC, 4.7km, South Dublin Bay SAC, 4.7km, Knocksink Wood SAC, 4.9km, Rockabill to Dalkey Island SAC, 4.9km, and South Dublin Bay and River Tolka Estuary, 4.7km) within 5km. The distance and details of all the conservation sites within 15km of and those with the potential for direct or indirect pathways to the proposed development are seen in Table 5.3a and Table 5.3b. It is important to note that the nearest site with a direct hydrological pathway downstream is a minimum of 2 km (Loughlinstown Woods pNHA).

Significant settlement, dilution and mixing would occur within the marine environment prior to reaching the designated sites within the marine environment. However, given the proximity of Rockabill to Dalkey Islands SAC and the mobile nature of Harbour Porpoise (*Phocoena phocoena*) one of its features of interest, it is considered that there is a direct pathway to Rockabill to Dalkey Islands SAC via the Carrickmines Stream and Ticknick Stream which enters the marine environment approximately 1.5 km from this SAC. As outlined in the accompanying NIS, mitigation measures will need to be in place to ensure that the proposed works do not impact on the integrity of Rockabill to Dalkey Island SAC.

Site Code	NATURA 2000 Site	Distance	Direct Pathway
Special Areas of Conservation			
IE000713	Ballyman Glen SAC	4.7 km	No
IE000210	South Dublin Bay SAC	4.7 km	No
IE000725	Knocksink Wood SAC	4.9 km	No
IE003000	Rockabill to Dalkey Island SAC	4.9 km	**Yes**
IE002122	Wicklow Mountains SAC	6.6 km	No
IE000714	Bray Head SAC	7.8 km	No
IE000206	North Dublin Bay SAC	10.2 km	No
IE000719	Glen of the Downs SAC	12.1 km	No
IE001209	Glenasmole Valley SAC	12.2 km	No
IE000202	Howth Head SAC	13.2 km	No
Special Protection Area			
IE004024	South Dublin Bay and River Tolka Estuary SPA	4.7 km	No
IE004172	Dalkey Islands SPA	5.3 km	No
IE004040	Wicklow Mountains SPA	6.6 km	No
IE004006	North Bull Island SPA	10.2 km	No
IE004016	Howth Head Coast SPA	14.1 km	No

Table 5.3a European sites within 15km of the proposed development

Designation	Site Name	Distance	Direct Pathway
pNHA	Dingle Glen	1.3 km	**No**
pNHA	Loughlinstown Woods	2 km	**Yes**
pNHA	Dalkey Coastal Zone and Killiney Hill	2.9 km	**No**
pNHA	Ballbetagh Bog	3.7 km	**No**
pNHA	Fitzsimons Wood	4.3 km	**No**
pNHA	Ballyman Glen	4.6 km	**No**
pNHA	South Dublin Bay	4.8 km	**No**
pNHA	Knocksink Wood	4.9 km	**No**
pNHA	Powerscourt Woodland	6.4 km	**No**
pNHA	Booterstown Marsh	6.5 km	**No**
pNHA	Dargle River Valley	7 km	**No**
pNHA	Bray Head	7.8 km	**No**
pNHA	Great Sugar Loaf	8 km	**No**
pNHA	Glencree Valley	9 km	**No**
pNHA	Kilmacanoge Marsh	9.4 km	**No**
pNHA	Dolphins, Dublin Docks	10 km	**No**
pNHA	North Dublin Bay	10.2 km	**No**
pNHA	Grand Canal	10.3 km	**No**
pNHA	Powerscourt Waterfall	10.5 km	**No**
pNHA	Dodder Valley	11.3 km	**No**
pNHA	Royal Canal	11.5 km	**No**
pNHA	Glen of the Downs	12.2 km	**No**
pNHA	Glenasmole Valley	12.2 km	**No**
pNHA	Howth Head	13.2 km	**No**
Ramsar	Sandymount Strand / Tolka Estuary	4.7 km	**No**
Ramsar	North Bull Island	10.3 km	**No**

Table 5.3b Nationally designated sites within 15km of the proposed development

Figure 5.1 Site outline and location

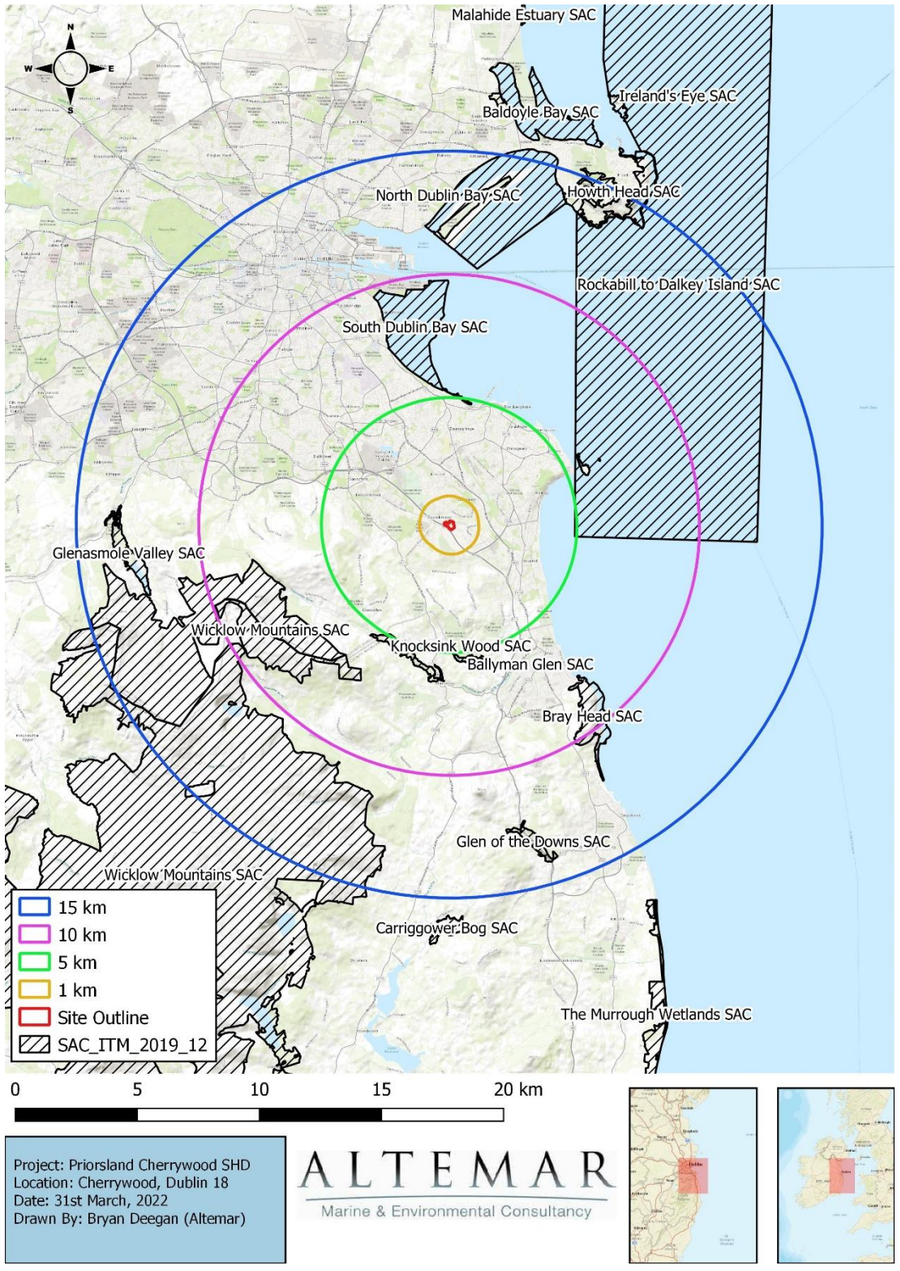


Figure 5.2 SACs within 15km of the proposed site

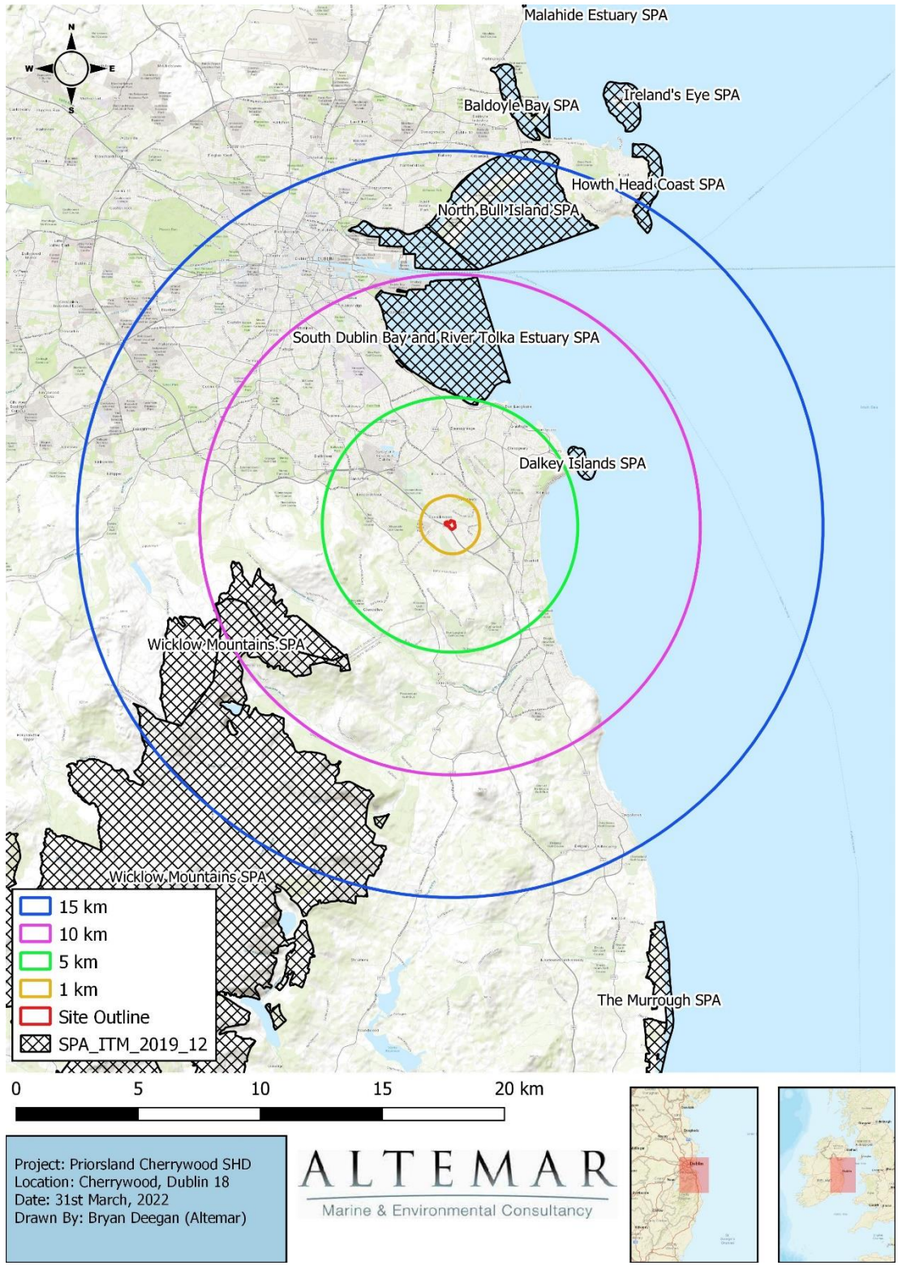


Figure 5.3 SPAs within 15km of the proposed site

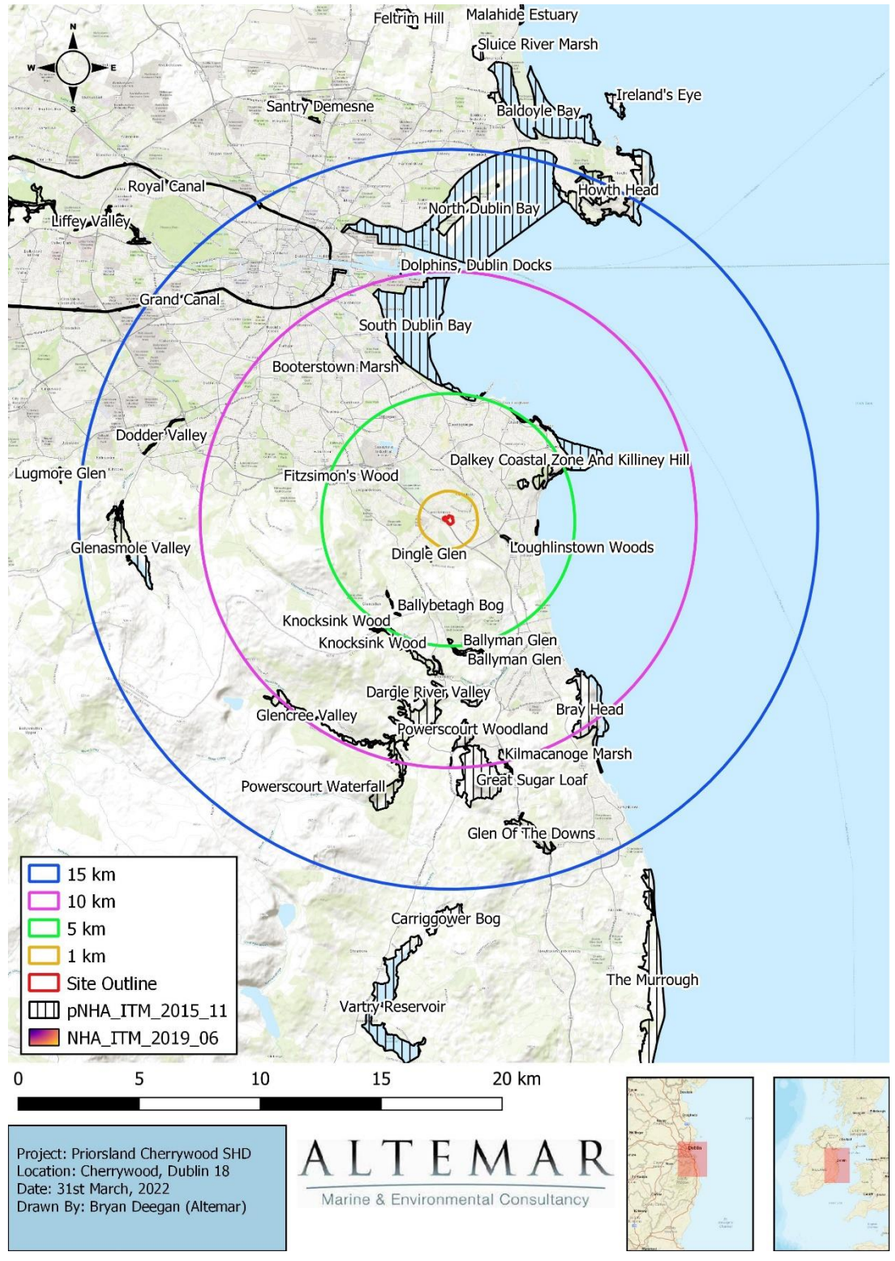


Figure 5.4 NHAs and pNHA's within 15km of the proposed site

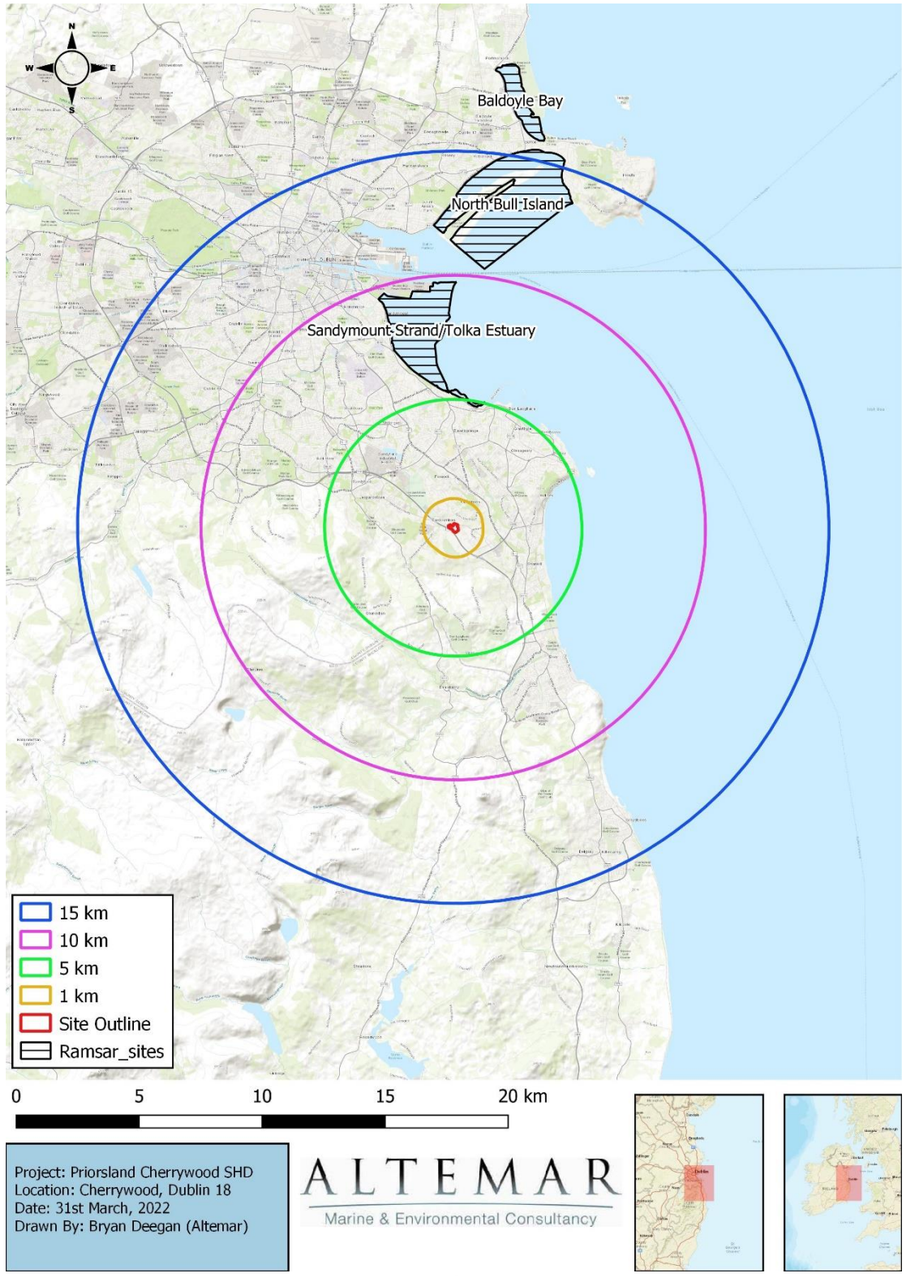


Figure 5.5 Ramsar sites within 15km of the proposed site

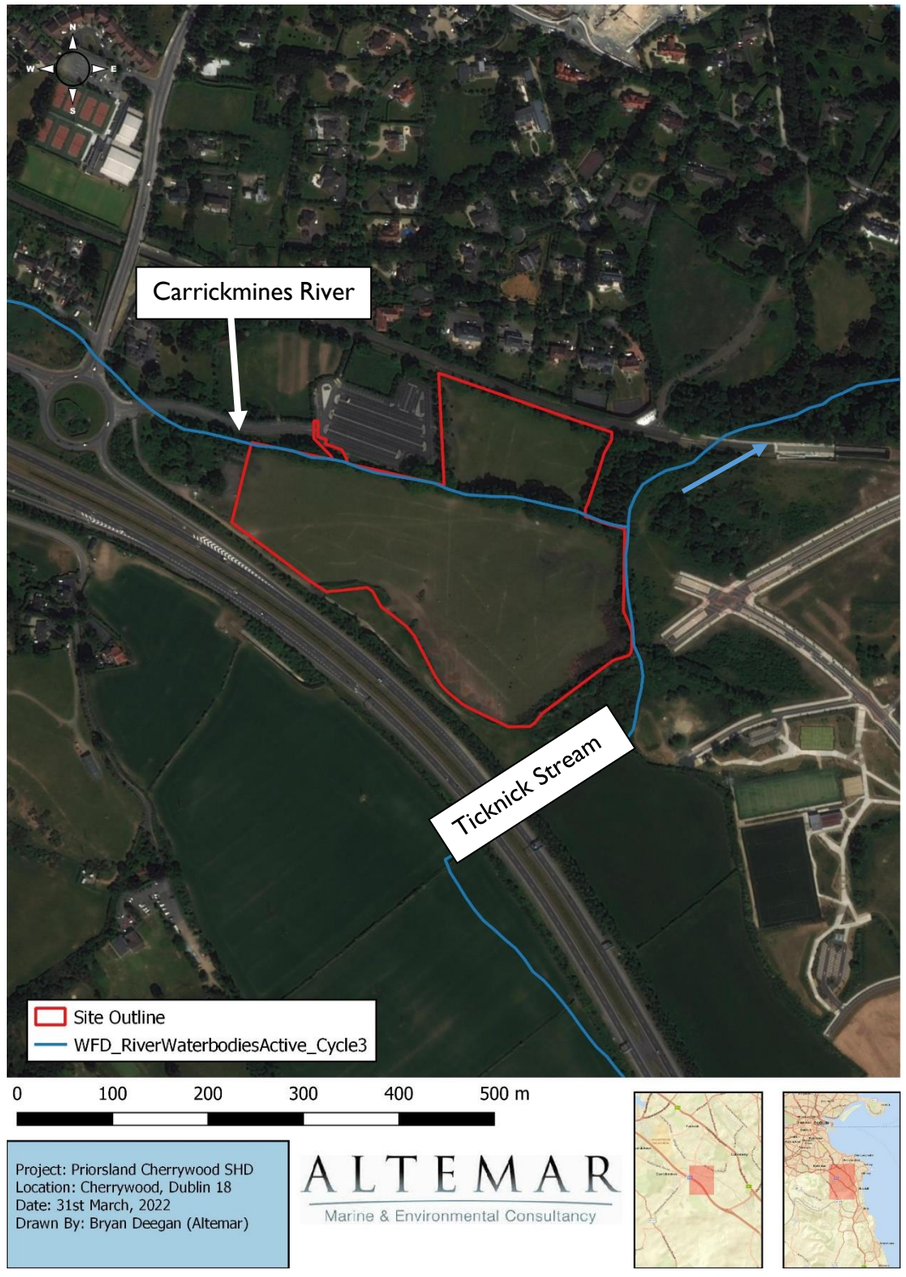


Figure 5.6 Waterbodies within/proximate to the proposed site

Figure 5.7 Waterbodies and SACs proximate to the proposed site

Figure 5.8 Waterbodies and SPAs proximate to the proposed site

Figure 5.9 Waterbodies and pNHAs proximate to the proposed site

Figure 5.10 Waterbodies and Ramsar sites proximate to the proposed site

5.4.3 Species Data

It should be noted that no species of conservation importance were noted on site, based on NPWS and NBDC records as fine resolution. Two 2 km^2 grids, reference numbers O22G and O22H, based on the Ordnance Survey Ireland (OSI) Irish Grid classification system, was assessed. Two reference grids were assessed as the subject site does not fall entirely into one reference grid. Species recorded within these grids are seen in Table 5.4. No species of conservation importance have been noted within the site outline from the data gathered from the National Biodiversity Data Centre.

Species name	Designation
Reference Grid O22G	
Common Frog (*Rana temporaria*)	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Barn Owl (*Tyto alba*)	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Barn Swallow (*Hirundo rustica*)	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Kestrel (*Falco tinnunculus)*	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Linnet (*Carduelis cannabina)*	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Pheasant (*Phasianus colchicus)*	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Common Starling (*Sturnus vulgaris)*	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Swift (*Apus apus*)	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Wood Pigeon (*Columba palumbus*)	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Eurasian Curlew (*Numenius arquata)*	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
House Martin (*Delichon urbicum)*	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
House Sparrow (*Passer domesticus)*	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Northern Lapwing (*Vanellus vanellus)*	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Northern Wheatear (*Oenanthe oenanthe)*	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Northern Wheatear (*Oenanthe oenanthe)*	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Peregrine Falcon (*Falco peregrinus)*	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species
Sand Martin (*Riparia riparia*)	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Yellowhammer (*Emberiza citrinella)*	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Butterfly-bush (*Buddleja davidii)*	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Giant Hogweed (*Heracleum mantegazzianum)*	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Sycamore (*Acer pseudoplatanus)*	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Three-cornered Garlic (*Allium triquetrum)*	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Traveller's-joy (*Clematis vitalba*)	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Moss Carder-bee (*Bombus (Thoracombus) muscorum*)	Threatened Species: Near threatened
Endive Pellia (*Pellia endiviifolia*)	Threatened Species: Least concern
Greasewort (*Aneura pinguis*)	Threatened Species: Least concern
Jenkins' Spire Snail (*Potamopyrgus antipodarum*)	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Common Feather-moss (*Eurhynchium praelongum*)	Threatened Species: Least concern
Fern-leaved Hook-moss (*Cratoneuron filicinum*)	Threatened Species: Least concern
Fox-tail Feather-moss (*Thamnobryum alopecurum*)	Threatened Species: Least concern
Hart's-tongue Thyme-moss (*Plagiomnium undulatum*)	Threatened Species: Least concern
Olive Beard-moss (*Didymodon tophaceus)*	Threatened Species: Least concern
Pointed Spear-moss (*Calliergonella cuspidata*)	Threatened Species: Least concern
River Feather-moss (*Brachythecium rivulare*)	Threatened Species: Least concern
Rough-stalked Feather-moss (Brachythecium ru*tabulum*)	Threatened Species: Least concern
Variable Forklet-moss (*Dicranella varia*)	Threatened Species: Least concern
Whorled Tufa-moss (*Eucladium verticillatum)*	Threatened Species: Least concern
Yellow Feather-moss (*Homalothecium lutescens*)	Threatened Species: Least concern
Brown Rat (*Rattus norvegicus*)	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Eastern Grey Squirrel (*Sciurus carolinensis)*	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> EU Regulation No. 1143/2014 || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)

Species name	Designation
Reference Grid O22G	
Eurasian Badger (*Meles meles*)	Protected Species: Wildlife Acts
Eurasian Pygmy Shrew (*Sorex minutus)*	Protected Species: Wildlife Acts
European Rabbit (*Oryctolagus cuniculus)*	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
House Mouse (*Mus musculus*)	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species
Sika Deer (Cervus ni*ppon*)	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland) || Wildlife Acts
West European Hedgehog (*Erinaceus europaeus*)	Protected Species: Wildlife Acts
Species Name	**Designation**
Reference Grid – O22H	
Common Frog (*Rana temporaria)*	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex V || Protected Species: Wildlife Acts
Barn Swallow (*Hirundo rustica*)	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Black-headed Gull (*Larus ridibundus)*	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Common Coot (*Fulica atra*)	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Kestrel (*Falco tinnunculus)*	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Linnet (*Carduelis cannabina)*	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Redshank (*Tringa totanus)*	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Common Starling (*Sturnus vulgaris)*	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Swift (*Apus apus*)	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Common Wood Pigeon (*Columba palumbus*)	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Eurasian Oystercatcher (*Haematopus ostralegus*)	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Eurasian Teal (*Anas crecca*)	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Eurasian Wigeon (*Anas penelope)*	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
European Golden Plover (*Pluvialis apricaria*)	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Greater Scaup (*Aythya marila*)	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Protected Species: EU Birds Directive >> Annex III, Section III Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Herring Gull (*Larus argentatus*)	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
House Martin (*Delichon urbicum)*	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
House Sparrow (*Passer domesticus)*	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Little Egret (*Egretta garzetta*)	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species
Little Grebe (*Tachybaptus ruficollis)*	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Mallard (*Anas platyrhynchos*)	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Mediterranean Gull (*Larus melanocephalus)*	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Mew Gull (*Larus canus*)	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Northern Lapwing (*Vanellus vanellus)*	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Peregrine Falcon (*Falco peregrinus)*	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex I Bird Species
Rock Pigeon (*Columba livia*)	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species
Tufted Duck (*Aythya fuligula*)	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section II Bird Species || Threatened Species: Birds of Conservation Concern || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
American Skunk-cabbage (*Lysichiton americanus*)	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species || Invasive Species: Invasive Species >> EU Regulation No. 1143/2014 || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Butterfly-bush (*Buddleja davidii)*	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Common Broomrape (*Orobanche minor*)	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species

Species Name	Designation
Cornflower (*Centaurea cyanus*)	Threatened Species: Regionally Extinct
Floating Pennywort (*Hydrocotyle ranunculoides*)	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Giant Hogweed (*Heracleum mantegazzianum)*	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Hairy Rocket (*Erucastrum gallicum)*	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Himalayan Honeysuckle (*Leycesteria formosa*)	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Nuttall's Waterweed (*Elodea nuttallii)*	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Three-cornered Garlic (*Allium triquetrum)*	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Traveller's-joy (*Clematis vitalba*)	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Small Heath (*Coenonympha pamphilus)*	Threatened Species: Near threatened
Large Red Tailed Bumble Bee (*Bombus (Melanobombus) lapidarius)*	Threatened Species: Near threatened
Moss Carder-bee (*Bombus (Thoracombus) muscorum)*	Threatened Species: Near threatened
Bifid Crestwort (*Lophocolea bidentata)*	Threatened Species: Least concern
Conocephalum salebrosum	Threatened Species: Least concern
Endive Pellia (*Pellia endiviifolia*)	Threatened Species: Least concern
Forked Veilwort (*Metzgeria furcata)*	Threatened Species: Least concern
Overleaf Pellia (*Pellia epiphylla*)	Threatened Species: Least concern
White Earwort (*Diplophyllum albicans)*	Threatened Species: Least concern
Common Feather-moss (*Eurhynchium praelongum*)	Threatened Species: Least concern
Common Striated Feather-moss (*Eurhynchium striatum*)	Threatened Species: Least concern
Common Tamarisk-moss (*Thuidium tamariscinum*)	Threatened Species: Least concern
Elegant Silk-moss (*Pseudotaxiphyllum elegans*)	Threatened Species: Least concern
Fern-leaved Hook-moss (*Cratoneuron filicinum*)	Threatened Species: Least concern
Fox-tail Feather-moss (*Thamnobryum alopecurum*)	Threatened Species: Least concern
Rusty Feather-moss (*Sciuro-hypnum plumosum)*	Threatened Species: Least concern
Swan's-neck Thyme-moss (*Mnium hornum*)	Threatened Species: Least concern
Swartz's Feather-moss (*Oxyrrhynchium hians*)	Threatened Species: Least concern
Brown Long-eared Bat (*Plecotus auritus)*	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Brown Rat (*Rattus norvegicus*)	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Daubenton's Bat (*Myotis daubentonii)*	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Eastern Grey Squirrel (*Sciurus carolinensis)*	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> High Impact Invasive Species || Invasive Species: Invasive Species >> EU Regulation No. 1143/2014 || Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Eurasian Badger (*Meles meles*)	Protected Species: Wildlife Acts
European Otter (*Lutra lutra*)	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex II || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Lesser Noctule (*Nyctalus leisleri)*	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Natterer's Bat (*Myotis nattereri)*	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Pipistrelle (*Pipistrellus sensu lato*)	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Soprano Pipistrelle (*Pipistrellus pygmaeus)*	Protected Species: EU Habitats Directive || Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
West European Hedgehog (*Erinaceus europaeus*)	Protected Species: Wildlife Acts

Table 5.4a National Biodiversity Data Centre Records – 2km^2 grids

Common Frog (*Rana temporaria*), West European Hedgehog (*Erinaceus europaeus*), Badger (*Meles meles*), Sika Deer (*Cervus nippon*), Moschatel (*Adoxa moschatellina*), Sharp-leaved Fluellen (*Kickxia elatine*), Otter (*Lutra lutra*), Small Cudweed (*Filago minima*).

Table 5.4b Species found by NPWS within 5km

Cherrywood Strategic Development Zone Biodiversity Plan
The Cherrywood Strategic Development Zone (SDZ) Biodiversity Plan was prepared by Scott Cawley Ltd. to accompany the Cherrywood Planning Scheme. This Plan '*This Plan forms part of the draft Planning Scheme Documentation and should be read alongside maps and sections of the Scheme where appropriate. The function of this Plan is to provide a summary of the strategy behind the design of the Planning Scheme in terms of the retention, protection and management of ecological resources. Its objectives are to achieve the following during the implementation of the draft Planning Scheme: a) Avoid or minimise the disturbance to or loss of semi-natural habitats; b) Avoid or minimise the disturbance to or loss of protected flora and fauna; c) To encourage retention of existing habitats of ecological importance as part of green infrastructure and hence create ecological corridors; d) To promote management of retained and newly created habitats in order to maximise their biodiversity potential and minimise the net loss of biodiversity in the area.*'

This Plan outlines the following species and habitats noted proximate to the Priorsland site:

Treelines

'*Treelines are often hedgerows that have had their ground and sub-canopy removed by overgrazing, poor management and wind erosion. The main treelines were found at Tully Church, Lehaunstown Park and near Priorsland. The 2007 County habitat survey notes this as a hedgerow but it was regarded that this hedge was too gappy and lacking an understory to be called a hedgerow.*'

Breeding Birds

'*The author recorded Barn Owl Tyto alba at fields at Priorsland in the northwest of the SDZ lands in 2006. This rare owl is now threatened by loss of habitat and roost sites. Initial examination of buildings at Lehaunstown Park concluded that these open buildings being regarded to be potentially excellent breeding sites. However neither the owners nor an examination of the buildings suggested that Barn Owls were using them.*'

Otters

'Clear evidence for otters was recorded in - both the Carrickmines River valley and along Bride's Glen. Spraints were recorded on rocks in both streams as shown below, at intervals of one sprainting site every c.150 metres. No evidence for holts were recorded in the SDZ lands although these can be very difficult to locate as they can be within dense scrub, tree roots and bankside vegetation.'

Badgers

Sixteen badger setts were identified within the Cherrywood SDZ lands, one of which (a single entrance outlier sett) was noted within close proximity to the northeast boundary of the subject site.

Bats

All of Ireland's bat species, with the exception of Nathusius' Pipistrelle (*Pipistrellus nathusii*) and Lesser Horseshoe Bat (*Rhinolopus hipposideros*), were recorded within the Cherrywood SDZ Lands during surveys undertaken to inform the Cherrywood Planning Scheme Biodiversity Plan[1] (Dun Laoghaire-Rathdown County Council, 2014). This Biodiversity Plan outlines the following:
'*Roosts were recorded at several locations in the SDZ lands but it is thought that bats may make occasional use of many more trees and structures than were recorded in the surveys in 2010. All bat surveys represent snapshots of bat activity and small roosts used by low numbers of individual bats may remain undetected despite repeated attempts to look for them.*'

The Biodiversity Plan indicates that the Priorsland lands were surveyed by Scott Cawley Ltd. in 2006. The following results were noted:

- **Results of Daytime internal / external surveys:** No exterior or interior evidence for bats in main house or outbuildings. Evidence for pipistrelle and Brown long-eared bats using stable block.
- **Results of Dusk / Dawn Surveys:** Unknown number of Common pipistrelle bats recorded entering roosts under eaves on the North-East corner and South-East corner of the main house.

The Biodiversity Plan outlines the following in relation to potential bat roosts:
'*Potential roosts within trees were not directly surveyed but groups of trees or isolated mature trees were surveyed if they appeared to offer high roosting potential for bats. Roosting potential for trees was based on the following characteristics:*
Natural holes, Cracks/splits in major limbs, Loose bark, Behind dense, thick-stemmed ivy, Hollows/cavities, Within dense epicormic growth, Bird and bat boxes (from BCT, 2008)
The best examples were the line of trees (including Turkey Oaks Quercus cerris) near Priorsland, trees in Druid's Glen and those surrounding Lehaunstown Park. Due to the difficulties in detecting tree roosts using standard techniques, it will be important to adopt a precautionary approach with regard to future development affecting these trees.'
Following the surveys completed in 2010, it was confirmed that a bat roost was present in Priorsland House.

[1] https://www.dlrcoco.ie/sites/default/files/atoms/files/cherrywood_biodiversity.pdf

5.4.4 Site survey

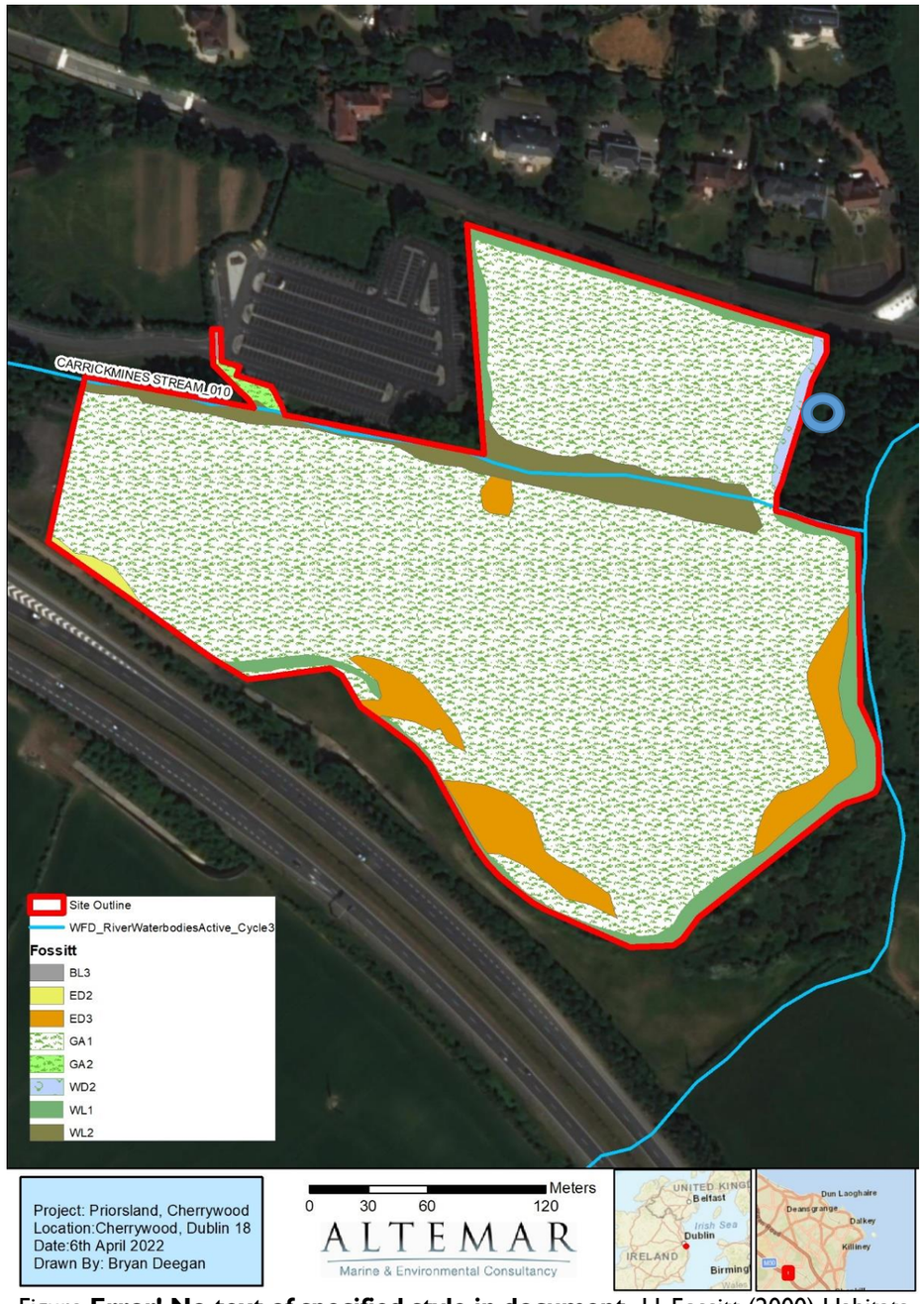


Figure **Error! No text of specified style in document.**.11 Fossitt (2000) Habitats within the proposed development (hedgerows blue circle)

Site visits were carried out on the 20th September 2020, 9th July 2021, 2nd April 2022. The site consists of two unmanaged fields that are being grazed by horses, which are surrounded primarily by hedgerows and bisected by a treeline which contains a watercourse (Carrickmines Stream). The Ticknick Stream is on the south eastern boundary. The Fossitt (2000) habitat map seen in Figure 5.11 is based on the site visit on the 2nd April 2022. This included flora and habitat assessments. The following habitat types (Fossitt, 2000) were noted within the proposed development site:

- Improved Agricultural Grassland (GA1)
- Hedgerow (WL1)
- Treelines (WL2)
- Spoil and Bare Ground (ED2)
- Recolonising Bare Ground (ED3)
- Watercourses (FW)
- Amenity Grassland (GA2)
- Scrub (WS1)

Improved Agricultural Grassland (GA1)

The two fields on site consists primary of unmanaged Improved Agricultural Grassland (GA1) that is being grazed by horses. Species within the Improved Agricultural Grassland included rape (*Brassica napus*), clovers (*Trifolium sp*.), common ragwort (*Jacobaea vulgaris*), nettle (*Urtica dioica*), lesser burdock (*Arctium minus*), plantain (*Plantago lanceolata*), creeping buttercup (*Ranunculus repens*), spear thistle (*Cirsium vulgare*), docks (*Rumex sp*.), common napweed (*Centaurea nigra*), fairy flax (*Linum catharticum*) and self-heal (*Prunella vulgaris*).

Plate 5.1. Improved Agricultural Grassland (GA1)

Plate 5. 2. Hedgerows (WL1)

Amenity Grassland (GA2)

A small patch of well maintained amenity grassland was observed within the site outline, to the south of the Carrickmines Luas Park and Ride. Species included clovers (*Trifolium sp*.), nettle (*Urtica dioica*), lesser plantain (*Plantago lanceolata*), creeping buttercup (*Ranunculus repens*), spear thistle (Cirsium vulgare), daisy (Bellis perennis) and docks (Rumex sp.).

Hedgerows (WL1)

Hedgerows are located around the majority of the perimeter of the site. These hedgerows appear to not have been maintained in recent years and have a bramble scrub at their base in many locations. Species included in the hedgerows were bramble (*Rubus fruticosus agg*.), elder (*Sambucus nigra*), hawthorn (*Crataegus monogyna*), holly (*Ilex aquifolium*), oak (*Quercus sp*.), sycamore (*Acer pseudoplatanus*), European ash (*Fraxinus excelsior*), beech (Fagus sylvatica), blackthorn (*Prunus spinosa*), wych elm (*Ulmus glabra*), dog-rose (*Rosa canina*), gorse (*Ulex europaeus*), honeysuckle (*Lonicera periclymenum*), cleavers (*Galium aparine*) Hart's-tongue (*Asplenium scolopendrium*) and ivy (*Hedera helix*).

Treelines (WL2)

A single treeline forms a prominent biodiversity feature on the site. This treeline which bisects the two fields, is dominated by mature Turkey Oaks (*Quercus cerris*) where the ground flora is limited. However, the section to the west of the oaks particularly on the western portion of the treeline which borders the LUAS park contains the species outlined within the hedgerows above but the trees are of larger size. Importantly this treeline also contains the Carrickmines River and would be considered to be the most important habitat area within the proposed development site.

Plate 5.3. (right). Mature Turkey Oak treeline.

Plate 5.4. Turkey Oaks clad in ivy (left) (i.e. bat roosting potential).

Watercourses (FW)
The Carrickmines River and the Ticknick Stream are located within the proposed development site. The Ticknick Stream, is located on the south eastern boundary, within the hedgerow area and flows in a southerly direction. The Carrickmines Stream (Plate 5) runs west-east alongside a treeline of Turkey Oaks, in the centre of the site. The Carrickmines Stream and treeline in this part of the site are considered to be of significant local biodiversity importance. This section of the river would be classed as an eroding upland river due to the relatively fast flow and lack of significant deposition. However, there are distinct areas of pools, riffles and glides which would be importanct for biodiversity of the watercourse. The WFD status for the watercourse is moderate. Both otter (*Lutra lutra*) and brown trout (*Salmo trutta*) have been recorded downstream of the proposed development site. The watercourse (IE_EA_10C040350) has been a moderate water quality status under the Waterframework Directive and provides an important biodiversity corridor within the Dun Laoghaire Rathdown County Council area. The riparian strip of vegetarion would also deemed to be important as it would protect the watercourse and biodiversity from disturbance, overheating during summer months and act as a biodiversity corridor.

Recolonising Bare Ground (ED3) and Spoil and Bare Ground (ED2)
Section of the site appear to have been over grazed and other areas have undergone minor soil movements/deposition. Species included nettle (*Urtica dioica*), rosebay willowherb (*Chamaenerion angustifolium*), willow (Salix. Sp.), cow parsley (*Anthriscus sylvestris*) and docks (*Rumex sp*.)

Plate 5.5. Carrickmines River

Mixed Broadleaved/Conifer Woodland (WD2)
To the east of the northern field (on the site boundary) is a small area of woodland. Species included were bramble (*Rubus fruticosus agg*.), elder (*Sambucus nigra*), hawthorn (*Crataegus monogyna*), holly (*Ilex aquifolium*), sycamore (*Acer pseudoplatanus*), European ash (*Fraxinus excelsior*), hazel (Corylus avellana), Norway spruce (*Picea abies*) dog-rose (Rosa canina), honeysuckle (*Lonicera periclymenum*), Hart's-tongue (Asplenium scolopendrium), and ivy (Hedera helix). Of particular importance within this habitat is a badger sett (*Meles meles*), which was first outlined in the Cherrywood SDZ Biodiversity Action Plan. This was shown to be active and trails were also noted in the grassland in the south east corner of the northern field. Scott Cawley also recorded the sett as being active in 2019. This habitat would also be considered to be of importance as it also forms a biodiversity corridor associated with the Carrickmines River.

Scrub (WS1)

Bramble (*Rubus fruticosus agg*.) scrub was located along the fringe of hedgerows , Areas of older scrub included areas blackthorn (*Prunus spinosa*).

Terrestrial Mammals
No badger setts or otter holts were noted within the site outline. Evidence of fox (*Vulpes vulpes*) activity was noted on site. No evidence of otter (*Lutra lutra*) activity was noted on site. Several mammal trails were noted in the south eastern corner of the northern field. There is a badger sett within 30m of the site outline to the east of the northern field in the woodland. Grey squirrel (*Sciurus carolinensis*) were also noted on site. This is considered to be an invasive species.

Amphibians and Reptiles
No amphibians or reptiles were noted on site. No ponds were noted on site. Two streams were noted on site and it is possible that frogs may be present on site.

Bats
The bat assessment is seen in Appendix 5.1. There were no seasonal or climatic constraints as survey was undertaken within the active bat season in good weather conditions with surveying temperatures of greater than 10^{o}C. Soprano Pipistrelle and Leisler's bats were noted on site. No definitive bat roosts were noted on site and no bats were observed emerging from onsite trees. However, the Turkey Oaks on site are considered to have moderate bat roosting potential.

Birds
The following bird species were noted on site (Table 5.5) during Altemar site visits. As outlined in Appendix 5.2 '*44 bird species were recorded in the survey area covered by these 22 winter bird surveys. A good proportion of the species utilizing the mature hedgerow habitat bordering the fields on the site. In the context of wintering bird species that are red listed as species of conservation concern in the revised Birdwatch Ireland List of birds of conservation concern in Ireland (2020-2026) Redwing, Snipe and Lapwing were recorded. Four gull species listed in the amber wintering species category were recorded, these being Herring, Lesser black-backed, Common and Black-headed Gull. Results from the surveys suggest that the site is not an ex-situ foraging or roosting site for species of qualifying interest from nearby Special protection areas (SPA's).*'

Common Name	Scientific Name	Conservation Status[2]		Common Name	Scientific Name	Conservation Status
Woodpigeon	*Columba palumbus*	Green		Chaffinch	Fringilla coelebs	Green
Robin	*Erithacus rubecula*	Green		Hooded Crow	*Corvus cornix*	Green
Great Tit	*Parus major*	Green		Magpie	*Pica*	Green
Wren	*Troglodytes*	Green		Blackbird	Turdus merula	Green
Rook	*Corvus frugilegus*	Green		Song Thrush	*Turdus philomelos*	Green
Wren	*Troglodytes*	Green		Blue Tit	*Cyanistes caeruleus*	Green
Jackdaw	*Corvus monedula*	Green		Coal Tit	*Periparus ater*	Green
Robin	*Erithacus rubecula*	Green		Raven	*Corvus corax*	Green

Table 5.5 Species of Birds noted during on-site surveys

Flora
No flora of conservation importance were noted on site.

Invasive Species
No invasive plant or animal species listed under the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011) Section 49, the Third Schedule: Part 1 Plants, Third Schedule: Part 2A Animals were noted on site. No terrestrial or aquatic invasive species such as Japanese knotweed, giant rhubarb, Himalayan balsam, giant hogweed etc. that could hinder removal of soil from the site during groundworks were noted.

Discussion Species and habitats
As can be seen from Figure 5.11 the proposed development site consists primarily of Improved Agricultural Grassland (GA1), Hedgerow (WL1), Treelines (WL2), Scrub (WS1). Of significant importance are the watercourses and the associated riparian corridors and woodland. This importance is primarily as these areas form important biodiversity corridors for biodiversity. It should be noted however that no flora species of conservation importance or invasive species were noted on site by the NPWS or NBDC or during site surveys. No amphibians or reptiles were noted on site but the site is likely to have frogs on site dure to the presence of watercourses. No resting or breeding places of terrestrial mammals of conservation importance were noted on site. However, a badger sett is located proximate to the site and it is likely that the badgers utilise the northern field for foraging as distinct trails were noted in the grassland proximate to the woodland. The site would be considered to be locally important for bats with two species being noted on site and several trees of bat roosting potential are noted on site. Bat roosts were not confirmed on site.

[2] Birds of Conservation Concern in Ireland 2020-2026 https://birdwatchireland.ie/app/uploads/2021/04/BOCCI4-leaflet-2-1.pdf

5.5 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The development will comprise a mixed-use village centre and residential development of 443 no. units comprising 6 no. blocks (A-F) of apartments (up to 5 storeys with basement/undercroft parking) providing 402 no. apartments units (146 no. 1-beds; 218 no. 2-beds and 38 no. 3-beds), and 41 no. houses (19 no. 3-beds and 22 no. 4-beds). All apartments provided with private balconies/terraces. Provision of indoor residential facilities to serve apartment residents.

The Village Centre and non-residential elements will comprise a supermarket, local retail/retail service units, non-retail commercial units, creche, gym, community space, and offices (High Intensity Employment) use.

Provision of car/bicycle/motorcycle parking; ESB sub-stations; bin storages areas, and all associated plant areas.

Provision of the first phase of Priorsland Park (on lands within the applicant's ownership) and other public and communal open spaces.

Construction of Castle Street through the subject lands and two road bridges across the Carrickmines Stream, one to serve the future school site/ park, the second to provide pedestrian and cyclist access to the Carrickmines Luas station and future Transport Interchange to the north. Provision of an additional pedestrian bridge to the park. Provision of an acoustic barrier along the southern/western edge of the site.

All associated site development works, landscaping, boundary treatments and services provision.

A more detailed description is outlined in Chapter 3.
The following connections to existing public drainage and water supply services works are proposed:

1) A new 300mm diameter foul water connection is proposed to connect to the existing 750mm diameter foul water sewer that runs from east to west through the site parallel to the Carrickmines River
2) A new 225mm diameter surface water outfall is proposed to discharge surface water to the Ticknick Stream to the east of the site.
3) A new 225mm diameter potable water service connection is proposed to connect to the existing 300mm diameter water main on Castle Street to the east of the proposed development site. It is noted that recent planning application DZ20A/0399 has been approved/granted by DLRCC which includes for the extension of Castle Street up to the proposed development site. This also includes a planning condition that stipulates the completion of all service routes associated with this road extension.

The following in-ground, on site drainage and water supply services works are proposed:

1) Foul water:
   a) An in-ground gravity foul drainage network along the exterior of the buildings underneath the proposed road network on site is proposed.
   b) Foul drainage from the shared basement under Plot A and Plot B will be pumped to the proposed external in-ground gravity foul drainage system.
   c) All other foul drainage from each of the buildings on site will discharge by gravity to the proposed external in-ground gravity foul drainage system.

2) Surface Water:
   a) Proposed road gullies and other surface channel drains will connect to tree root structured cell systems or to a stone storage layer within the pavement build-up in hard standing areas.
   b) Drainage networks will be attenuated via attenuation tanks. The attenuation tanks will ultimately outfall to engineered swales or a detention basin/regional pond. The surface water from the ponds will then outfall to the Ticknick Stream at an attenuated rate of 1l/s/ha, as per the requirements of the Cherrywood Planning Scheme Chapter 4.
   c) Surface water within carparks will pass through a petrol interceptor prior to discharge.
   d) SuDS measures have been adopted including incorporation of green roofs to the local authority standard requirements.
   e) An in-ground gravity surface water network along the exterior of the buildings underneath the proposed road network on site is proposed.
   f) Surface water drainage from the shared basement under Plot A and Plot B will be pumped to the proposed external in-ground gravity foul water drainage system as per the requirements of the *Greater Dublin Regional Code of Practice for Drainage Works*.
   g) All other surface water drainage from each of the buildings on site will discharge by gravity to the proposed external in-ground gravity surface water drainage system.

3) Potable Water:
   a) An in-ground pressurised watermain network along the exterior of the buildings underneath the proposed road network on site is proposed.
   b) Metered connections will be provided from this network to each building.
   c) Sluice valves, air valves, scour valves and hydrants will be provided to meet the requirements of Irish Water and the Building Regulations.

The following flood mitigation works are proposed:

a) Finished Floor Levels (FFLs) of the ground floor of the proposed buildings on the site have been set at above the flood levels from the adjacent Carrickmines Stream, and flood modelling has shown that no buildings are at risk of flooding. Basements are included in the development and entrance levels to these basements will be above the Q1000 flood level;
b) Surface water flows will be attenuated on site and the runoff rate from the site will not be greater than the runoff rate agreed with DLRCC, in order to reduce the risk of flooding elsewhere. Runoff from the site will be limited to 1 l/s/ha as per the Cherrywood SDZ;
c) The surface water drainage systems within the blocks include attention tanks to limit flows to the external network. Block A and B will be a pumped, while other units will discharge by gravity;
d) It is proposed that the proposed development will incorporate a mixture of extensive and intensive green roof systems. This will provide a degree of attenuation for rainfall and additionally will reduce surface water being discharged to the carrier drainage system through evapotranspiration;
e) The 1650mm diameter Flood Relief Culvert to the north of the Carrickmines Stream will be extended will be constructed in the Interim period as far as the boundary with the third-party lands to the east. An alternative, additional floodwater culvert south of the river will be constructed and will operate in the interim. This will improve conveyance of floodwaters away from the site.

There are various drainage and water supply services works proposed within the proposed buildings. These are not discussed in detail since there it is considered that there is no direct effect on the environment.

Further details regarding proposed drainage are detailed in the Punch Consulting Engineers Engineering Planning Report and associated drawings. Refer to the Site-Specific Flood Risk Assessment for further information on flood modelling carried out for the site and flood mitigation measures proposed.

5.6 POTENTIAL IMPACTS

This section of the biodiversity chapter provides a description of the potential impacts that the proposed development may have on biodiversity in the absence of mitigation The proposed development will involve the removal of terrestrial habitats on site, re-profiling, excavations, in-stream works and the construction of roads, dwellings and associated services. It should be noted that prior to the design of the proposed project, discussions took place between 1 Carrickmines Land Limited and Altemar in relation to the bats and watercourses on site, the badger sett in the neighbouring woodland and the proposed landscaping and lighting plans.

Construction Phase

In the absence of mitigation, the construction of the proposed development would potentially impact on the existing ecology of the site and the surrounding area. These potential construction impacts would include impacts that may arise during the site clearance, re-profiling of the site, in-stream works and the building phases of the proposed development. Construction phase mitigation measures are required on site particularly as reprofiling of the site and instream works are proposed, which could lead to silt laden and contaminated runoff entering the watercourses and drainage networks. In addition, the Carrickmines River traverses through the subject site and the Ticknick Stream flows along the south eastern boundary of the site. There is potential for silt laden runoff and contamination to enter these watercourses with potential for downstream impacts which could potentially enter the marine environment.

Designated conservation sites within 15km

The proposed development is not within a designated conservation site. It should be noted that the proposed development site could potentially impact on the Carrickmines Stream and Ticknick Stream, leading silt and pollution to enter the marine environment. Construction phase and operational phase mitigation measures are required on site, particularly in relation to the protection of the water quality entering the watercourses. There is potential for silt laden runoff and contamination to enter the watercourse with potential for downstream impacts on the Rockabill to Dalkey Island SAC, as the watercourse enters the marine environment approximately 1.4 km from this SAC. The Loughlinstown Woods pNHA is also downstream of the proposed works.

Impacts in the absence of mitigation: negative; minor adverse; international, short term, not significant. Mitigation is required as outlined in section 5.11.

Terrestrial Ecology

No mammals of conservation importance would be significantly impacted by the proposed development. Loss of habitat and habitat fragmentation may temporarily affect badgers in the adjacent woodland and common mammalian species. However it should be noted that the works will not impact on the badger sett in the adjacent woodland and significant openspace is located within the northern field. However, the foraging areas of the badgers in the adjacent woodland may be temporarily impacted by works on site. There is also potential for species of conservation importance to enter the proposed development site between the time of survey and the commencement of the development.

Impacts in the absence of mitigation: negative; slight, site, short term, not significant. Mitigation is required as outlined in section 5.11.

Amphibians and reptiles.

Frogs and reptiles were not observed on site. However, frogs are likely to occur on site. The common lizard may occur on site but, was not observed. There is potential for the works to impact on the habitats on site that could potentially support frogs either by direct destruction of the habitats or by onsite pollution or silt ingress.

Impacts in the absence of mitigation: negative; slight; short term, not significant. Mitigation is required as outlined in section 5.11.

Bat Fauna.

Without bat mitigation measures, the proposed development will potentially impact on bats through the increased lighting on site. Numerous trees of bat roosting potential are located within the main treeline on site and the majority of these trees are to be retained. Lighting during construction has the potential to impact on bat foraging.

Impacts in the absence of mitigation: negative; minor adverse, site, short term, not significant. Mitigation is required as outlined in section 5.11.

Avian Ecology

Site clearance will result in a reduction in the vegetation cover and removal of trees and hedgerows would result in a nesting and foraging resource loss for the bird species noted on site. Clearance works on site during bird nesting season could impact on bird population within the proposed development site. Dust from reprofiling works could potentially impact on vegetation and nesting birds on site within the remaining hedgerows.

Impacts in the absence of mitigation: negative; minor adverse, site, short term, not significant. Mitigation is required as outlined in section 5.11.

Aquatic Ecology

The Carrickmines Stream traverses through the subject site and the Ticknick Stream flows along the eastern boundary of the subject site. In the absence of mitigation runoff during site clearance, re-profiling, the construction of project elements could impact on the watercourse, with potential downstream impacts on instream biodiversity including otter and trout, in addition to aquatic biodiversity in the marine environment. The contamination of the watercourse could potentially impact negatively on the biodiversity within the watercourses and within the shallow marine environment.

Impacts in the absence of mitigation: negative; slight, short term, not significant. Mitigation is required as outlined in section 5.11.

Operational Phase

Once constructed, all onsite drainage will be connected to separate foul and surface water systems. Surface water runoff will comply with SUDS. Surface water drainage will be directed to the Ticknick Stream. The biodiversity value of the site would be expected to improve as the landscaping matures. It would be expected that the ecological impacts in the long term would be neutral, once landscaping has established due to the implementation of a reduction in tunnelling which would encourage instream biodiversity.

Designated Conservation sites within 15km

Once the proposed development is complete and in the operational phase, the surface water run off will discharge to the Ticknick Stream, after on site attenuation and foul water from the site will be discharged to Shanganagh WwTP where it will be treated at discharged to the Irish Sea. Petrochemical interception will be in place.

Impacts in the absence of mitigation: neutral

Terrestrial Ecology

Lighting and increased human presence/disturbance may impact on the potential for the site to accommodate terrestrial mammals of conservation importance. It should be noted that significant dialogue has gone into retaining biodiversity corridors on site and minimising light spill info open space areas, hedgerows and treelines on site. Landscaping on site will improve the biodiversity value of the site.

Impacts in the absence of mitigation: negative; slight, site, long term, not significant. Mitigation is required as outlined in section 5.11.

Amphibians and reptiles.

Frogs and reptiles were not observed on site. The common lizard may occur on site but, was not observed. The additional habitat complexity including areas of additional water features could potentially support frogs.

Impacts in the absence of mitigation: neutral-positive; slight; longterm term, not significant. Mitigation is required as outlined in section 5.11.

Bat Fauna.

The proposed lighting strategy on site was discussed and kept minimal within the riparian corridor and in openspace areas. Increased lighting and disturbance on site, particularly in the vicinity of the riparian corridor and Turkey Oaks, could lead to reduced foraging on site.

Impacts in the absence of mitigation: minor adverse; slight; long term, not significant. Mitigation is required as outlined in section 5.11.

Avian Ecology

There is potential for avian biodiversity to be impacted by the artificial lighting on site. The proposed lighting strategy has been discussed and modified to reduce the potential impact on hedgerows and birds. This has included only lighting areas where required and not lighting public open spaces unless necessary. In addition, the lighting strategy has included significant planting of native trees in openspace areas to encourage birds on site. Maintenance of the native hedgerows on site during bird nesting season could potentially impact on nesting birds.

Impacts in the absence of mitigation: negative; minor adverse, short term, not significant. Mitigation is required only in relation to bird nesting as outlined in section 5.11.

Aquatic Ecology

In the absence of standard operational mitigation there is potential silt and petrochemicals to enter the onsite watercourse or surface water networks that lead to the marine environment. The contamination of watercourses and surfaces water networks could potentially impact negatively on the biodiversity within the watercourses and within the shallow marine environment.

Impacts in the absence of mitigation: negative; slight, short term, not significant. Mitigation is required as outlined in section 5.11.

Terrestrial Ecology

As the landscaping elements improve with maturity it would be expected that the biodiversity value of the site to birds and flora would also increase.

Impacts in the absence of mitigation: negative; slight, short term, not significant. Mitigation is required as outlined in section 5.11.

5.7 POTENTIAL CUMULATIVE IMPACTS

Ref. No.	Address	Proposal
DZ20A/0399	Site in townlands of Laughanstown and Brennanstown	Residential development - 136 no. dwellings (total gross floor area of c.15,910 sqm) in a mixture of houses, duplexes, and apartments.
DZ20A/0552	Site in townlands of Laughanstown and Brennanstown	Residential development - 163 no. dwellings in a mixture of houses, duplexes, and apartments.
DZ21A/0334	Site in townlands of Laughanstown and Brennanstown	Residential development - 482 no. dwellings in a mixture of houses, duplexes, and apartments.
DA21/0664	Site in townlands of Laughanstown and Brennanstown	Residential development - 47 apartments with communal space
DZ21A/1042	Townlands of Laughanstown, Brennanstown and Cherrywood	Residential development – 122 dwellings
DZ21A/0699	Townlands of Laughanstown, Brennanstown and Cherrywood	Minor Amendments to DZ20A/0552
DZ21A/1069	Site in townlands of Laughanstown and Brennanstown	Minor Amendments to DZ20A/0399
DZ19A/0597	Development Area 8 -Tully, Cherrywood SDZ, Includes the Res 2 plots ''T9'' and ''T10''	Residential development comprising of 184 dwellings
DZ18A/0208	Site approx. 6.57ha in area and generally bounded by, Lehaunstown Lane to the west, Carrickmines Stream (partly) to the south, and Cabinteely Stream, (partly) to the east that is, located within the townland of, Brennanstown, Dublin 18	Residential Development comprising of: • 360 no units • childcare facility
DZ19A/0863	Site measuring approximately 8.24 ha in area generally bounded by Lehaunstown Lane to the west, Carrickmines Stream (partly) to the south and, Cabinteely Stream (partly) to the east and is located within the townland of, Brennanstown, Dublin 18	Residential development comprising of: • 342 new residential dwellings, • Childcare Facility 249sq.m. (GFA), • Delivery of the Cherrywood SDZ Planning Scheme's Druid's Glen Distributor Road (also known as Q to P3), measuring approximately 390 m in length to include the construction / completion of the part approved 3-span bridge (Option 1) over the Cabinteely Stream under Planning Ref. DZ16A/0587 (ABP Ref. PL06D.247915).
DZ18A/1129	Site (c.0.95ha) at Laughanstown & Brennanstown, Dublin 18 (Development Areas 1 & 8)	• Construction of an attenuation pond (detention basin) with associated outfall to Ticknick stream • Infilling of the existing temporary attenuation pond (north of Mercer Link Road, constructed as part of the Phase 1 Roads and Infrastructure works permitted under Reg. Ref. DZ15A/0758) Construction of a new stormwater outfall pipe from Beckett Park attenuation system to Ticknick stream
DZ15A/0758	Lands in the townlands of Cherrywood, Laughanstown, Brennanstown, Loughlinstown and Glebe	Roads and infrastructure (phase 1) to form part of public road network providing access and services for the future development of the adjoining SDZ lands. The total road length proposed is c.5.4kms, of which c.4.1kms is new road and c.1.3kms relates to works to existing roads.
D10A/0164	Carrickmines(Priorsland), East of Glenamuck Road, North of M50, & South of Luas Line B1 (Currently under construction)	Park and Ride (temporary) 6 year permission for 350 space park and ride facility with access off existing Carrickmines roundabout. Development will also include pedestrian access to Carrickmines Luas stop (currently under construction).
DZ16A/0585	Off Glenamuck Road, adjacent the Carrickmines roundabout and M50 interchange Carrickmines Dublin	Permission for retention (temporary for 3 years) for park and ride facility previously granted permission under Reg. Ref. D10A/0164.
DZ17A/0114	Lands at Priorsland, Glenamuck Road North, Carrickmines, Dublin 18	Permanent park and ride facility
DZ19A/0683	Lands at Priorsland, Glenamuck Road North, Carrickmines, Dublin 18	Permission for retention (temporary for 3 years) for park and ride facility previously granted permission under Reg. Ref. D10A/0164.
DZ15A/0813	Laughanstown, Dublin 18, (Tully Park)	Permission granted for a public park known as Tully Park
DZ15A/0814	Laughanstown, Dublin 18, (Beckett Park)	Planning permission granted for a public park known as Beckett Park
DZ16A/0570	Lands in the townlands of Ticknick, Co Dublin and Laughanstown, Dublin 18	Planning permission granted for a public park known as Ticknick Park
DZ17A/0862	Lands in the townlands of Cherrywood, Dublin 18	Permission for Mixed Use Town Centre development, including amendments to Tully Park entrance

DZ18A/0458	Lands in the townland of Laughanstown, Dublin 18	Permission granted for Tully Primary School
DZ19A/0874	Ticknick, Co. Dublin, and Laughanstown, Dublin 18	Split decision - Permission granted for revised proposals for previously approved pavilion building at Ticknick Park, and permission refused for a temporary car park off Lehaunstown Lane.
DZ20A/0478	Laughanstown and Cherrywood, Dublin 18	Permission granted for the provision of a temporary car park for approximately 75 cars, 3 coaches and 4 motorcycles on lands at Laughanstown (on a site of c.0.6 ha) west of Lehaunstown Park (a Protected Structure RPS No. 026-093). The proposed carpark is a temporary facility (0-3 years) and is to serve the Ticknick Park development.
DZ20A/0946	Lands known as Tully Park Laughanstown, Dublin 18	Permission granted for amendments to Tully Park.

Table 5.6 Approved planning applications located in close proximity to the subject site

The above projects, including ecological assessments, were reviewed. No project would be seen to have a cumulative impact with the proposed project.

No significant effects are likely from any cumulative impacts.

5.8 MITIGATION MEASURES

Construction Phase Mitigation

- All enabling, riparian, drainage and instream works are to be carried out in consultation with the project ecologist.
- A final CEMP and instream works methodology statement will be submitted to Inland Fisheries Ireland at least three weeks prior ro the commencment of enabling works on site. This will include the name and details of the Ecological Clerk of Works. The ecological clerk of works will have previous experience of the installation of bridges and culverts in addition to the use of instream flumes during instream works.
- All instream works methodologies will have prior approval of Inland Fisheries Ireland.
- An arborist will place a tree ptotection zone at the initial phase of the project prior to machinery commencing enabling works on site. This will assist in protecting the main waterourse on site from impacts.
- The Carrickmines Stream and Ticknick Stream will be protected from dust, silt and surface water throughout the works.
- Local silt traps established throughout site.
- Mitigation measures on site include dust control, stockpiling away from watercourse and drains
- Stockpiling of loose materials will be kept to a minimum of 20m from watercourses and drains.
- Stockpiles and runoff areas following clearance will have suitable barriers to prevent runoff of fines into the drainage system and watercourses.
- Fuel, oil and chemical storage will be sited within a bunded area. The bund will be at least 50m away from drains, ditches or the watercourse, excavations and other locations where it may cause pollution.
- Bunds will be kept clean and spills within the bund area will be cleaned immediately to prevent groundwater contamination. Any water-filled excavations, including the attenuation tank during construction, that require pumping will not directly discharge to the stream. Prior to discharge of water from excavations adequate filtration will be provided to ensure no deterioration of water quality.
- De-stocking of the Carrickmines Stream and Ticknick Stream are to be carried out prior to the commencement of works (if required by IFI) and upstream and downstream permeable barriers to remain in place until construction is completed.
- In stream works to be carried out in full consultation with and to the advice of Inland Fisheries Ireland and the project ecologist.
- Staging of project to initially stabilise, isolate, fence off watercourse on site.
- Any in-stream works are to be carried out “in the dry” with temporary diversions in place. Given the restricted nature of the site due to trees this may involve instream diversions through the use of flumes to allow for the culvert to be placed under the stream.
- Mitigation measures on site include dust control, stockpiling away from watercourses and drains
- During the construction works silt traps will be put in place in the vicinity of all runoff channels the stream to prevent sediment entering the watercourse.
- Petrochemical interception and bunds will be in the refuelling area
- Planting in the vicinity of the stream crossings should be put in place as soon as possible to allow biodiversity corridors to establish.
- On-site inspections to be carried out by project ecologist.
- No discharges will be to the watercourse during and post works
- Silt traps established throughout site including a double silt fence between the site and the watercourse.
- Sufficient onsite cleaning of vehicles prior to leaving the site and on nearby roads, will be carried out, particularly during groundworks.

- The Site Manager will be responsible for the pollution prevention programme and will ensure that at least daily checks are carried out to ensure compliance. A record of these checks will be maintained.
- The site compound will include a dedicated bund for the storage of dangerous substances including fuels, oils etc. Refuelling of vehicles/machinery will only be carried out within the bunded area.
- A project ecologist will be appointed and be consulted in relation to all onsite drainage during construction works.
- Dewatering of excavations may be necessary. Appropriate monitoring of groundwater levels during site works will be undertaken. Standard construction phase filtering of surface water for suspended solids will be carried out. Unfiltered surface water discharges or runoff are not permitted from the site into the Carrickmines Stream or Ticknick Stream during the works. Trenched double silt fencing shall be put in place along boundary of the proposed development site with 10m buffer from the Carrickmines Stream and Ticknick Stream. This fencing must be in place as one of the first stages on site and prior to the full site clearance. Clearance of scrub in these areas will be monitored by the project ecologist while on site. The silt fencing will act as a temporary sediment control device to protect the watercourse from sediment and potential site water runoff but also act as a tree protection zone for the riparian buffer. The fencing will be inspected twice daily, based on site and weather conditions, for any signs of contamination or excessive silt deposits.
- Concrete trucks, cement mixers or drums/bins are only permitted to wash out in designated wash out area greater than 50m from sensitive receptors including drains and drainage ditches.
- Spill containment equipment shall be available for use in the event of an emergency. The spill containment equipment shall be replenished if used and shall be checked on a scheduled basis.
- All site personnel will be trained in the importance of good environmental practices including reporting to the site manager when pollution, or the potential for pollution, is suspected. All persons working on-site will receive work specific induction in relation to surface water management and run off controls. Daily environmental toolbox talks / briefing sessions will be conducted to outline the relevant environmental control measures and to identify any environment risk areas/works.
- Environmental risks due to construction and operation of the proposed development do potentially exist, particularly in relation runoff from sloping site, drains that could lead to the Carrickmines Stream and Ticknick Stream. Ecological supervision will be required during demolition, excavation and enabling works stages. Silt interception measures will need to be in place to ensure that the watercourses are not impacted during works and in particular during the site clearance, instream works and reprofiling stages. Landscaping of the grassed areas of the site proximate to the Carrickmines Stream and Ticknick Stream should take place immediately following re-profiling, to act as a buffer to protect the watercourse.
- Daily turbidity monitoring of the Carrickmines Stream and Ticknick Stream should take place during works in consultation with the project ecologist. This monitoring will be particularly important following high rainfall events. It is recommended that sufficient baseline readings are made prior to construction. Monitoring will take place upstream, within the works area and immediately downstream of the works. This will include the taking of digital photograph images that will be catalogued so that the dates of the creation of the images can be inspected by the project ecologist and Inland Fisheries Ireland. Monitoring will take place at least 2 times per working day within the range of 11-1pm and 3-5 pm. This will ensure that works that are being carried out during the day are assessed, rather than monitoring is carried out early in the morning when impacts may be minimal as works may not have commenced on site.
- maintenance of any drainage structures (e.g. de-silting operations) must not result in the release of contaminated water to the surface water network.
- no entry of solids to the associated stream or drainage network during the connection of pipework to the existing surface water system
- Landscaping of the Riparian corridor will be carried out to the satisfaction of IFI and the biodiversity officer of DLR.

Air & Dust

Dust may enter the Carrickmines Stream and Ticknick Stream via air or surface water with potential downstream impacts. Mitigation measures will be carried out reduce dust emissions to a level that avoids the possibility of adverse effects on the Carrickmines Stream and Ticknick Stream. The main activities that may give rise to dust emissions during construction include the following:

- Demolition
- Excavation of material;
- Materials handling and storage;
- Movement of vehicles (particularly HGV's) and mobile plant.
- Contaminated surface runoff

Mitigation measures to be in place:

- Maintain the existing 10m buffer with the Carrickmines Stream and Ticknick Stream with a double layer of silt fences
- Consultation will be carried with an ecologist throughout the construction phase;
- Trucks leaving the site with excavated material will be covered so as to avoid dust emissions along the haulage routes.
- Speed limits on site (15kmh) to reduce dust generation and mobilisation.
- The stream is to be protected from dust on site. This may require additional measures in the vicinity of the building during demolition e.g. placing of terram/protective material over the stream.

- *Site Management*
- Regular inspections of the site and boundary should be carried out to monitor dust, records and notes on these inspections should be logged.
- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.

Monitoring

- Undertake daily on-site and off-site inspection, where receptors are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces within 100 m of site boundary, integrity of the silt control measures, with cleaning and / or repair to be provided if necessary.

Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Fully enclose specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.
- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- Maintain a vegetated strip and vehicle exclusion zone between the works and the Carrickmines Stream and Ticknick Stream in consultation with the project ecologist.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste

- Avoid bonfires and burning of waste materials.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.
- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust.
- Due to the proximity of the Carrickmines Stream and Ticknick Stream, an ecologist will oversee works in particular the excavation of material from the perimeter of the site.

Birds

- “Relevant guidelines and legislation (Section 40 of the Wildlife Acts, 1976 to 2012) Should this not be possible, a pre-works check by a qualified ecologist should be undertaken to ensure nesting birds are absent. This would include nesting gulls on buildings if present.
- 30 Nest boxes placed on site to compensate for resource loss.

- Removal of potential nesting habitats outside of bird breeding season (March to August inclusive). Should this not be possible, a pre-works check by a qualified ecologist should be undertaken to ensure nesting birds are absent

Bats

- Pre Construction inspection of any trees to be felled for bats
- NPWS will be notified and conditions carried out if bats found in any trees to be felled.
- Lighting at all stages should be done sensitively on site with no direct lighting of hedgerows and treelines.

Mammals

- A preconstruction mammal inspection will be carried out.
- Lighting on site during construction will be directed downwards and internally to the site to the satisfaction of the project ecologist.

Table 5.7 Mitigation measures

5.9 RESIDUAL IMPACTS

Based on the implementation of the mitigation measures above there will be no significant impact on biodiversity as a result of the proposed development. The successful implementation of the measures outlined in the EIAR will be essential to the successful mitigation/offsetting of the loss of biodiversity on site.

The proposed development has satisfactorily addressed the current ecology on site into its design so that application of the mitigation measures outlined in this EIAR will help reduce its impact on the biodiversity to an adequate level. The integrity of the Carrickmines River, the Ticknick Stream and the treeline of Turkey Oaks will be retained. Mitigation measures will prevent significant downstream impacts from works on site. Where possible, biodiversity retention and enhancement measures have been implemented into design to enhance the overall biodiversity value of the site. As a result of the loss of certain biodiversity features on site of low biodiversity importance and the introduction of new buildings and increased human disturbance, in addition to the implementation of a sensitive landscaping strategy, with biodiversity enhancement measures it is considered that the overall impact on the ecology of the proposed development will result in a long term minor adverse not significant residual impact on the existing ecology of the site and locality overall. This is primarily as a result of the loss of some terrestrial habitats on site, increased disturbance in the area supported by the retention of key biodiversity areas and the creation of additional terrestrial biodiversity features, mitigation measures, and a sensitive lighting strategy. With bat mitigation measures the proposed development will potentially reduce its impact on local bat populations. If bat mitigation measures are strictly applied, the potential impact of the proposed development will be Permanent minor adverse impact. Therefore, the Residual Impact of the proposed development will be minor adverse, permanent, not significant, likely impact on biodiversity.

5.10 MONITORING

Pre-construction surveys will be carried out for terrestrial mammals and bats. During construction an Ecologist will monitor the site from pre-construction surveys, during Construction Phases and Post Construction. The watercourses on site will be monitored daily for turbidity for the length of the construction period.

5.11 'DO NOTHING' SCENARIO

In the absence of development on site it would be expected that the site would become increasingly overgrown and the biodiversity value of the site could improve.

5.12 DIFFICULTIES IN COMPILING INFORMATION

No difficulties were encountered during the preparation of the biodiversity Chapter.

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6.0 SOILS AND GEOLOGY

6.1 INTRODUCTION

This section of the Environmental Impact Statement (EIS) was undertaken PUNCH Consulting Engineers to assess the impact of the proposed Priorsland Development within the Cherrywood SDZ on the surrounding soils, geology and groundwater environment.

The potential impacts and mitigation measures the construction and post development activities may have on soils, geology and groundwater are set out in the following sections. In summary, there are no likely significant impacts predicted on the soils, geology and groundwater environment associated with the proposed development of the site.

6.2 METHODOLOGY

The assessment of the potential impact of the activity on water and hydrology was carried out according to the methodology specified in the following guidance documents:

1) Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Statements (2017);

The principal attributes (and impacts) to be assessed include the following:

1) Geological heritage sites in the vicinity of the perimeter of the subject site;
2) Landfills, industrial sites in the vicinity of the site and the potential risk of encountering contaminated ground;
3) The quality, drainage characteristics and range of agricultural uses of soil around the subject site;
4) Quarries or mines in the vicinity, the potential implications (if any) for existing activities and extractable reserves;
5) The extent of topsoil and subsoil cover and the potential use of this material on site or requirement to remove it off-site as waste for disposal or recovery;
6) High yielding water supply springs/ wells in the vicinity of the subject site to within a 2 km radius and the potential for increased risk presented by the proposed development;
7) Classification (regionally important, locally important) and extent of aquifers underlying the study area perimeter and increased risks presented to them by construction and operation related activities associated with aspects such as for example removal of subsoil cover, removal of aquifer (in whole or part), drawdown in water levels, alteration in established flow regimes, change in groundwater quality;
8) Natural hydrogeological/ karst features in the area and potential for increased risk presented by the activities at the proposed development site; and
9) Groundwater-fed ecosystems and the increased risk presented by the construction and operational phases of the proposed development both spatially and temporally.

The following sources of information were consulted to establish the baseline environment:

1) The Geological Survey of Ireland (GSI) online well card and groundwater records for the area were inspected, with reference to hydrology and hydrogeology;
2) EPA water quality monitoring data in the area;
3) EPA Geoportal website;
4) Site Investigation, IGSL Limited, Lands at Priorsland, Cherrywood, Report Reference No. 21319 dated 1st January 2019.

From the GSI /EPA website, the following information was obtained:

1) Soil Map;
2) Bedrock Geology Maps;
3) Quaternary (Subsoils) Maps;
4) Well Card Database (Groundwater Wells);
5) Historical Geological 6 inch:1-mile maps;
6) Database of Site Investigations/Surveys;
7) Waste sites, mine sites and industrial locations; and
8) Geological heritage locations.

6.3 RECEIVING ENVIRONMENT

Soils

There are 2no. soil types noted at the proposed development site, as per Teagasc soil classification mapping accessible from Geological Survey Ireland Spatial Resources. These are Alluvial (mineral) and Deep well drained mineral (Mainly acidic). Refer **Error! Reference source not found.** below.

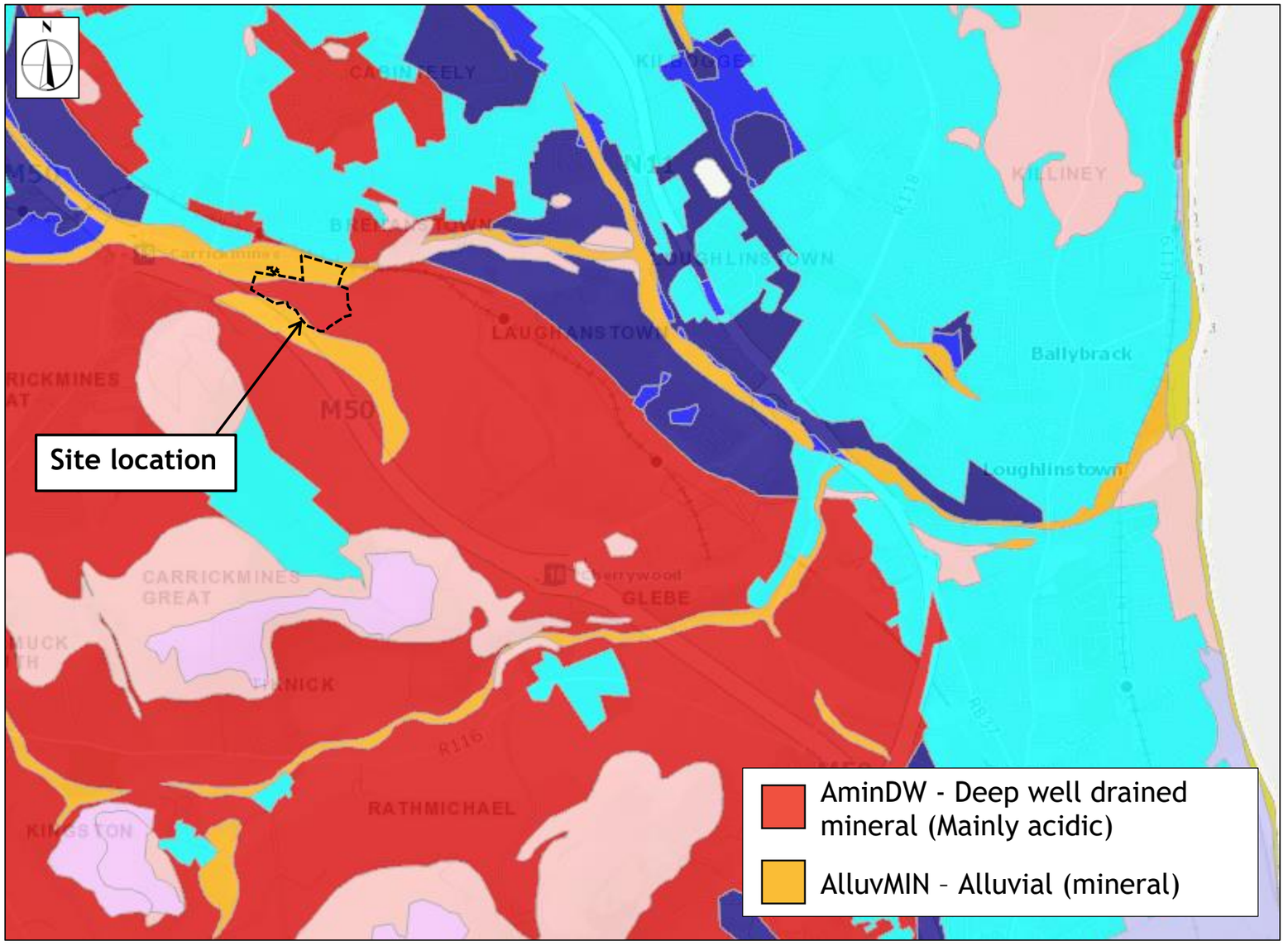

Figure 6.1: Teagasc soil classification mapping accessible from Geological Survey Ireland Spatial Resources

Geology

The GSI quaternary maps for the region indicate that the soil type for the region is till derived from granites. Refer to **Error! Reference source not found.** below.

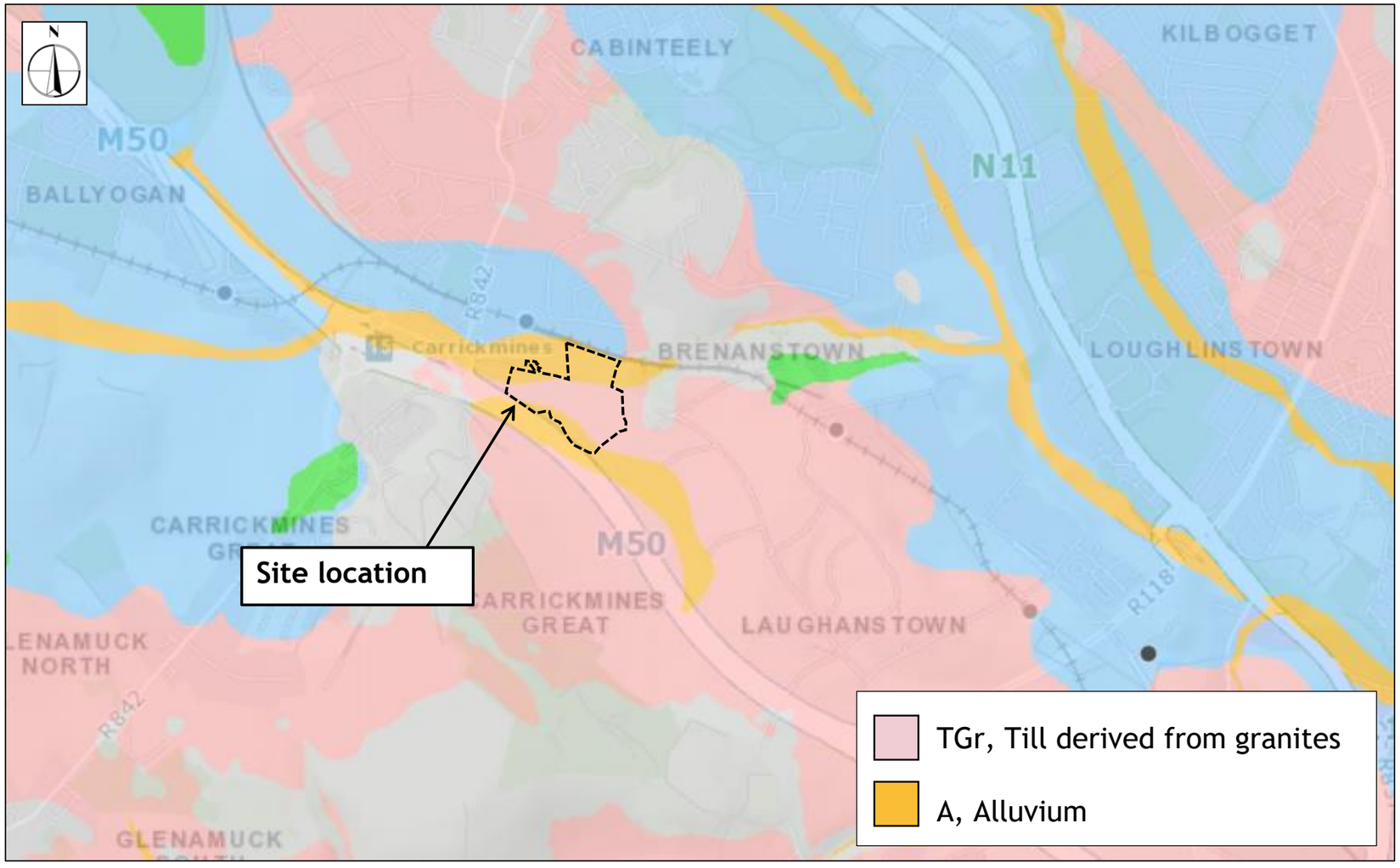

Figure 6.2: Quaternary Sediments mapping accessible from Geological Survey Ireland Spatial Resources

The site investigation records for the site also indicate that the natural soils on site are generally clay, with a mixture of gravelly silts and clays underlain by sandy gravel with cobbles and boulders.

The national draft generalised bedrock map shows that the underlying bedrock for the majority of the site is fine to coarse-grained Granite. The eastern-most point of the lands extends into bedrock consisting of Granite with microcline phenocrysts.
The lands are not located in a GSI or Environmental Protection Agency (EPA) source protection area.

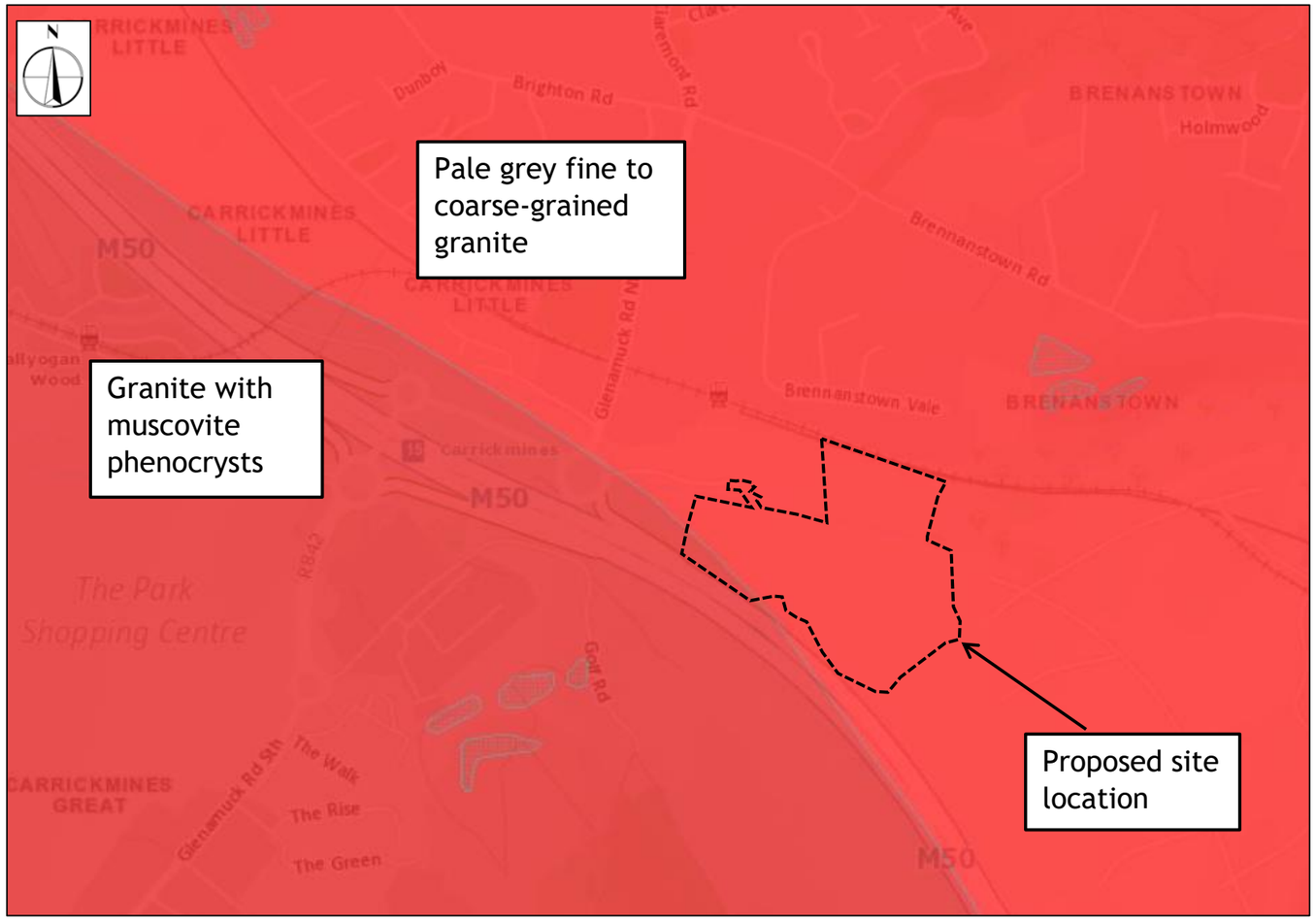

Figure 6.3: GSI Bedrock Map, extract from www.gsi.ie

There are two watercourses within the Priorsland site: the Carrickmines River and its tributary, the Ticknick Stream.
GSI data show that the Priorsland site is within an area of high groundwater vulnerability (shown in orange in **Error! Reference source not found.**. This indicates that the area has a high likelihood of groundwater contamination and deters development that carries significant potential to contaminate to locate within the area.

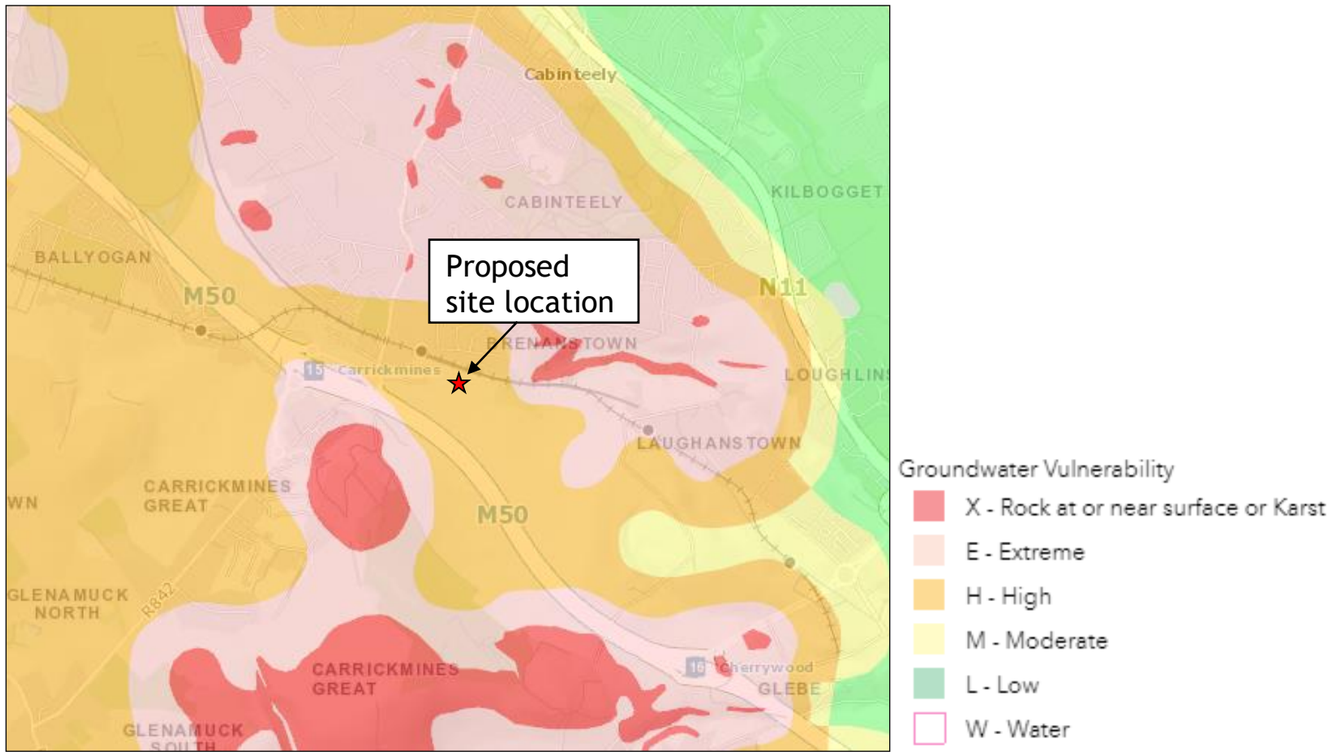

Figure 6.4: National Vulnerability Map, extract from www.gsi.ie

6.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The development will comprise a mixed-use village centre and residential development of 443 no. units comprising 6 no. blocks (A-F) of apartments (up to 5 storeys with basement/undercroft parking) providing 402 no. apartments units (146 no. 1-beds; 218 no. 2-beds and 38 no. 3-beds), and 41 no. houses (19 no. 3-beds and 22 no. 4-beds). All apartments provided with private balconies/terraces. Provision of indoor residential facilities to serve apartment residents. The Village Centre and non-residential elements will comprise a supermarket, local retail/retail service units, non-retail commercial units, creche, gym, community space, and offices (High Intensity Employment) use. Provision of car/bicycle/motorcycle parking; ESB sub-stations; bin storages areas, and all associated plant areas. Provision of the first phase of Priorsland Park (on lands within the applicant's ownership) and other public and communal open spaces. Construction of Castle Street through the subject lands and two road bridges across the Carrickmines Stream, one to serve the future school site/ park, the second to provide pedestrian and cyclist access to the Carrickmines Luas station and future Transport Interchange to the north. Provision of an additional pedestrian bridge to the park. Provision of an acoustic barrier along the southern/western edge of the site. All associated site development works, landscaping, boundary treatments and services provision.

The proposed development in relation to soils and geology will comprise:

1) Removal of existing topsoil
2) Reprofiling and importing fill to build levels on site
3) The construction of multi storey buildings above a basement car park for Plots A and B.
4) The construction of multi storey buildings above a ground floor slab for Plots C, D, E and F.
5) The construction of terraced houses
6) Excavation for installation of services, pavements and landscaping on existing and imported fill

6.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

Construction Phase – Interim:

Stripping Topsoil
Full topsoil removal will be required to implement the required works. Topsoil that can be reused for landscaping works will be stockpiled on site. The remaining topsoil will be removed from site.

Excavation of Subsoil Layers
Minor subsoil removal will be required where works require excavation to install foundations and services and other works. The impact of this is expected to be minimal.

Imported Fill
Imported fill for the site is expected to be approximately 36,470m^3, in order to raise the average site elevation, form the Flood Containment Zone in accordance with the CPS requirements and mitigate risk of potential flooding from the Carrickmines River and Ticknick Stream.

Construction Traffic
Construction traffic will be in operation during the proposed works. This will comprise construction workers, temporary special construction vehicles, cranes, and excavation machinery. Their impact on the land and soil is expected to be limited to their operations related to the construction works, and therefore is expected to be short term in nature.

Accidental Spills and Leaks
During construction of the development, there is a potential risk from accidental pollution incidences from the following sources: spillage or leakage of oils and fuels stored on site; spillage or leakage of oils and fuels from construction machinery or site vehicles; spillage of oil or fuel from refuelling machinery on site; and the use of concrete and cement during appropriate foundation and sub-structure construction.
Accidental spillages may result in contamination of soils and groundwater underlying the site should contaminants migrate through the subsoils and impact underlying groundwater. Soil stripping and excavation for drainage lines will also reduce the thickness of subsoils in localised areas.
Concrete (specifically, the cement component) is highly alkaline and any spillage which migrates though the subsoil would be detrimental to groundwater quality.

Geological Environment
There are no likely significant impacts on the geological environment associated with the proposed development of the site.

Construction Phase – Permanent:

The construction works associated with progressing with the permanent scenario are limited and small in scale compared to the preceding interim construction phase. The construction works required to progress from the temporary construction access only phase to the permanent Castle Street operational access phase are limited primarily to the following:

1. Completion of Castle Street extension to the as-built Phase 1 roadworks at junction with Barrington Road, including roadworks and associated drainage and utility/service arrangements.
2. Construction of the associated single span bridge structure over the Ticknick Stream.
3. Minor line-marking, signage and wayfinding elements associated with the establishment of the bus gate to the Transport Interchange at the Carrickmines Luas Stop.

We note a recent planning application DZ20A/0399 has been approved/granted by DLRCC which includes for the extension of Castle Street up to the proposed development site. As per the associated planning grant conditions, it is a requirement for the adjacent developer to complete the full extension of Castle Street to the Client's Priorsland site boundary which will alleviate any issues with access through the main Cherrywood SDZ route.

It is also noted that the permanent trunk watermain diversion and the completion of the northern flood relief culvert are the responsibility of third-party developers as these works lie within adjacent landowner properties.

Stripping Topsoil
Full topsoil removal will be required to implement the required Castle Street extension works. Topsoil that can be reused for landscaping works will be stockpiled on site. The remaining topsoil we be removed from site.
Please note that topsoil removal will not be carried out in designated areas of protection as identified in Chapter 5 the Cherrywood Planning Scheme (CPS), including the mature tree line along Carrickmines River, the riparian habitat associated with the Carrickmines river and Ticknick Stream watercourses and the protected hedgerow in the southeast corner of the site. Refer to CPS Map 5.2 for further illustration.

Excavation of Subsoil Layers
Minor subsoil removal will be required where works require excavation to install bridge foundations and services and other works. The impact of this is expected to be minimal.

Imported Fill
Imported fill for the site is expected to be minimal given that the regrading of the entire site will be nominally completed during the interim construction phase.

Construction Traffic
Construction traffic will be in operation during the proposed works. This will comprise construction workers, temporary special construction vehicles, cranes, and excavation machinery. Their impact on the land and soil is expected to be limited to their operations related to the construction works, and therefore is expected to be short term in nature. The scale of construction traffic will be reflective of the scale of the construction works, which is very small relative to the interim construction works (as outlined above).

Accidental Spills and Leaks
During construction of the development, there is a potential risk from accidental pollution incidences from the following sources: spillage or leakage of oils and fuels stored on site; spillage or leakage of oils and fuels from construction machinery or site vehicles; spillage of oil or fuel from refuelling machinery on site; and the use of concrete and cement during appropriate foundation and sub-structure construction.
Accidental spillages may result in contamination of soils and groundwater underlying the site should contaminants migrate through the subsoils and impact underlying groundwater. Soil stripping and excavation for drainage lines will also reduce the thickness of subsoils in localised areas.
Concrete (specifically, the cement component) is highly alkaline and any spillage which migrates though the subsoil would be detrimental to groundwater quality.

Geological Environment
There are no likely significant impacts on the geological environment associated with the proposed development of the site.

Operational Phase – Interim:
At operational phase, impacts on land and soils from the development will be limited to risk of fuel or oil leaks from vehicles using the road network or the carparks.

Operational Phase – Permanent:
From an operational perspective, the only significant variance between the interim and permanent scenarios is the completion of the eastward connection to Castle Street/Barrington Road and the establishment of the permanent access arrangements including bus gate operations to the Transport Interchange at the Carrickmines Luas Stop. Therefore, at the permanent operational phase, impacts on land and soils from the development will be limited to risk of fuel or oil leaks from vehicles using the road network or the carparks.

6.6 MITIGATION MEASURES

Construction Phase – Interim:

Stripping of Topsoil
The proposed site will require full topsoil stripping. Any temporary storage of soil required will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment; the material will also be stored away from any surface water drains. Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust. The soil will be stored in accordance with TII's Specification for Road Works Series 600.
Please note that topsoil removal will not be carried out in designated areas of protection as identified in Chapter 5 the Cherrywood Planning Scheme (CPS), including the mature tree line along Carrickmines River, the riparian habitat associated with the Carrickmines river and Ticknick Stream watercourses and the protected hedgerow in the southeast corner of the site. Refer to CPS Map 5.2 for further illustration.

Excavation of Subsoil Layers
All excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contaminants in order to ensure that historical pollution of the soil has not occurred at the proposed development site. Should it be determined that any of the soil excavated is contaminated, this will be managed according to best practice and disposed of accordingly by a licensed waste disposal contractor.

Imported Fill
Imported fill for the site is expected to be approximately 36,470m^3. The majority of the developments also under construction within the Cherrywood SDZ are net cut sites, so the fill will come from other areas within the Cherrywood SDZ. All fill materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contaminants in order to ensure that historical pollution of the soil has not occurred at the proposed development site. Should it be determined that any of the soil excavated is contaminated, this will be managed according to best practice and disposed of accordingly by a licensed waste disposal contractor.
Spoil and imported fill material will be distributed within the lands made available (LMA) to the extent practical. This requires proper placement of the spoil and fill material within the LMA using techniques to avoid or minimize environmental disturbance, such as vegetation impacts. If the spoil material cannot be completely distributed within the LMA, spoil disposal sites will be required.
Objectives:

- To ensure that all spoil shall be controlled to protect environment
- To ensure proper disposal of all spoil in the spoil disposal site in construction stage.

Management Measures:

- Identify an area to dispose of the spoil within the lands made available where possible
- Designate an area for temporary stockpiling if required, temporary stockpiles to be covered with 1.5mm thick polyethylene membrane
- All topsoil to be stored in stockpiles of 1m sloped to ensure no water can pond, they shall be kept weed free and planted with sterile Italian Ryegrass if they are to be in place for over 12 months
- Send samples of the material away for classification in the LoW.
- If no area can be identified for the disposal of spoil on site, material to be disposed of in accordance with the relevant statutory requirements.

Construction Traffic
Construction traffic effects on the underlying soils can be controlled through the use of stabilisation of soils to mitigate any significant effect on the ground. Soil strengthening geogrids and soil separating geotextiles will be used as required.
Works will be undertaken in accordance with local council requirements.

Accidental Spills and Leaks
To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be bunded to a volume of 110% of the capacity of the largest tank/ container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) shall be diverted for collection and safe disposal.
Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in a designated area (or where possible off the site) which will be away from nearby surface water gulleys or drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.

All ready-mixed concrete will be brought to site by truck. It is recommended that a suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. The pouring of concrete will take place within a designated area using a geo-synthetic material to prevent concrete runoff into the soil/ groundwater media. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility off site.
In the case of drummed fuel or other chemicals which may be used during construction containers should be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.
Potentially contaminated groundwater and polluted surface water generated during construction activities will not be discharged directly to ground or surface drainage. Welfare facilities will be provided for construction operatives but are only likely to comprise individual 'portaloos' with no connection to the foul sewer expected.

Geological Environment
The implementation of the operational phase mitigation measures highlighted above will ensure that the soils geology and hydrogeological environment is not adversely impacted during normal and/ or emergency conditions during the operational phase.

Construction Phase – Permanent:

Stripping of Topsoil
The construction works associated with progressing with the permanent scenario are limited and small in scale compared to the preceding interim construction phase. The proposed construction site extents (comprising principally of the Castle Street connection works) will require full topsoil stripping. Any temporary storage of soil required will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment; the material will also be stored away from any surface water drains. Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust. The soil will be stored in accordance with TII's Specification for Road Works Series 600.

Excavation of Subsoil Layers
All excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contaminants in order to ensure that historical pollution of the soil has not occurred at the proposed development site. Should it be determined that any of the soil excavated is contaminated, this will be managed according to best practice and disposed of accordingly by a licensed waste disposal contractor.

Imported Fill
Imported fill for the site is expected to be minimal as the vast majority of site regrading works will be completed in the Interim Construction Phase. All fill materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contaminants in order to ensure that historical pollution of the soil has not occurred at the proposed development site. Should it be determined that any of the soil excavated is contaminated, this will be managed according to best practice and disposed of accordingly by a licensed waste disposal contractor.

Construction Traffic
Construction traffic effects on the underlying soils can be controlled through the use of stabilisation of soils to mitigate any significant effect on the ground. Soil strengthening geogrids and soil separating geotextiles will be used as required.
Works will be undertaken in accordance with local council requirements.

Accidental Spills and Leaks
To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be bunded to a volume of 110% of the capacity of the largest tank/ container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) shall be diverted for collection and safe disposal.
Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in a designated area (or where possible off the site) which will be away from nearby surface water gulleys or drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.
All ready-mixed concrete will be brought to site by truck. It is recommended that a suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. The pouring of concrete will take place within a designated area using a geo-synthetic material to prevent concrete runoff into the soil/ groundwater media. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility off site.

In the case of drummed fuel or other chemicals which may be used during construction containers should be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.
Potentially contaminated groundwater and polluted surface water generated during construction activities will not be discharged directly to ground or surface drainage. Welfare facilities will be provided for construction operatives but are only likely to comprise individual 'portaloos' with no connection to the foul sewer expected.

Geological Environment
The implementation of the construction phase mitigation measures highlighted above will ensure that the soils geology and hydrogeological environment is not adversely impacted during normal and/ or emergency conditions during the operational phase.

Operational Phase – Interim:
All drainage from within the car parks will be collected by gullies and drainage pipelines to petrol interceptors prior to discharge to the surface water network. Surface water will be intercepted by SuDS. Water will be attenuated settled via the detention basins prior to discharge from site. All surface water and foul water pipes will be tested to ensure they do not leak prior to completion of the construction phase. Therefore, the hydrology and geology on site will not be affected during the operational stage of the development.

Operational Phase – Construction:
As per the interim scenario, all drainage from within the car parks will be collected by gullies and drainage pipelines to petrol interceptors prior to discharge to the surface water network. Surface water will be intercepted by SuDS. Water will be attenuated settled via the detention basins prior to discharge from site. All surface water and foul water pipes will be tested to ensure they do not leak prior to completion of the construction phase. Therefore, the hydrology and geology on site will not be affected during the operational stage of the development.

'Do Nothing' Scenario:
Under a 'Do Nothing' scenario, there would be no change in the site's current use, and there would no change to the impacts to the soil and geological environment over the existing scenario.

6.7 PREDICTED IMPACT OF THE PROPOSED DEVELOPMENT

Construction Phase - Interim
The predicted impact at construction phase is limited to the excavations required to construct the various pad foundations and basement car park, as well as to install the proposed works. If mitigation elements are implemented, then the risk of impact is negligible. The filling of the lands are inherent to the requirements of the CPS given the requirement to form a Flood Containment Zone through Priorsland and to mitigate flood risk for the proposed development and a granted under the approved Cherrywood Strategic Development Zone.

Construction Phase - Permanent
The predicted impact at construction phase is limited to the excavations required to construct the Castle Street connection and the associated Ticknick Stream bridge structure. If mitigation elements are implemented, then the risk of impact is negligible. Please note that the form of construction of the Ticknick Stream bridge crossing is a clear spanning bridge with appropriate freeboard and riparian setback in accordance with Inland Fisheries Ireland requirements.

Operational Phase - Interim
As long as relevant impact mitigation measures are implemented, the impact on the operational phase would be negligible.

Operational Phase - Permanent
As long as relevant impact mitigation measures are implemented, the impact on the operational phase would be negligible.

'Do Nothing' Scenario
Under a 'Do Nothing' scenario, there would be no change in the site's current use, and there would no change to the impacts to the soil and geological environment over the existing scenario.

6.8 MONITORING

Construction stage elements should be monitored by the contractor for compliance with all relevant standards.
The operational phase of the proposed development should be monitored by the management company(s) for the various plots on site.

6.9 REINSTATEMENT

Any environmental impact should be rectified as soon as is practical.

6.10 INTERACTIONS AND POTENTIAL CUMULATIVE IMPACTS

There is potential for land and soils to interact with other environmental elements. These interactions are listed below.

Interactions

Traffic and Transportation

Construction traffic will have an impact on the land and soils as well as on the traffic on the local road network. The requirement for circa 36,470m^3 will require circa 4,000 deliveries of imported fill material to site.
There is no anticipated cumulative effect as the construction stage is finite and the permanent design for the site will protect the existing soil and geological environment insofar as possible under the inherent need to raise the levels of the development lands due to the required flood solution as dictated by the Cherrywood Planning Scheme Chapter 4.

Water and Hydrology

Any environmentally damaging fluids will have an effect on the surrounding hydrological network. This is discussed further in the hydrology section. There is no anticipated cumulative effect as the construction stage is finite and the permanent design will protect the existing soil and geological environment through the implementation of the proposed stormwater and foul sewer drainage arrangements. The planning proposals are consistent with the relevant requirements for these services as evidenced by the completed Stage 1 Stormwater Audit and Irish Water Statement of Design Acceptance.
Please note that the Site Investigations have indicated water table levels ranging from 1.7m to 3.4m bgl throughout the site extents. Please note that the basement construction proposed will have a formation level of approx. 59.0mOD, which equates to and excavation of typically 3.6m deep at the location of the proposed basement footprint. Such a localised intrusion into the water table is considered negligible in that minimal change to the groundwater flows, levels and volumes post-completion of the works are anticipated when compared to the predevelopment scenario.

Waste Management

There will be an interaction with waste management for the construction stage. Waste should be stored on site in a designated area and removed from site regularly. Contaminated materials are to be bunded prior to removal from site so as not to have damaging effects on the soils and geology underneath.
During the operational stage, runoff from waste storage areas will be collected by gullies and discharged to the foul drainage system on site. This drainage shall not be allowed drain to ground or to the surface water network.

Noise and Vibration

The earthworks on site will require construction vehicles which will be in have an impact on the land and soils as well as on the noise on the local environment. There is no anticipated cumulative effect as the construction stage is finite.

Air Quality

The earthworks and construction work on site have potential to have an impact on the land and soils as well as on the air quality on the local environment. There is no anticipated cumulative effect as the construction stage is finite.

Flora and Fauna

The earthworks and construction work on site have potential to have an impact on the land and soils as well as on the flora and fauna within the local environment. Please note that topsoil removal will not be carried out in designated areas of protection as identified in Chapter 5 the Cherrywood Planning Scheme (CPS), including the mature tree line along Carrickmines River, the riparian habitat associated with the Carrickmines river and Ticknick Stream watercourses and the protected hedgerow in the southeast corner of the site. Refer to CPS Map 5.2 for further illustration.
Therefore there is no anticipated cumulative effect in excess of the granted Cherrywood SDZ as the construction stage is finite.

POTENTIAL CUMULATIVE IMPACTS

There are no anticipated cumulative impacts.

7.0 MATERIAL ASSETS: WATER SERVICES, DRAINAGE AND FLOOD RISK

7.1 INTRODUCTION

This chapter of the EIAR comprises an assessment of the likely impact of the proposed development on the drainage and water supply material assets, as well as identifying proposed mitigation measures to minimise any impacts. Impact on the flood regime effected by the proposed development is also addressed in this chapter.

7.2 METHODOLOGY

The assessment of the potential impact of the activity on water and hydrology was carried out according to the methodology specified in the following guidance documents:

1) Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Statements (2017);
2) EPA Advice Notes on Current Practice (in the Preparation of EIS) (2003)

The following sources of information were consulted to establish the baseline environment:-

1) The Planning System and Flood Risk Management – Guidelines for Planning Authorities - Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW);
2) The Geological Survey of Ireland (GSI) well card and groundwater records for the area were inspected, with reference to hydrology;
3) Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (CIRIA 532, 2001);
4) Base maps – Ordnance Survey of Ireland;
5) Flood Hazard Maps and flooding information for Ireland, www.floodmaps.ie - Office of Public Works (OPW);
6) CFRAM/ PFRA Maps (OPW);
7) Geological Survey of Ireland (GSI) maps on superficial deposits.
8) IGSL Priorsland Site Investigation Report January 2019
9) Cherrywood Planning Scheme April 2014 (As amended by An Bord Pleanála approved amendments on 14th June 2017)

7.3 RECEIVING ENVIRONMENT

The receiving environment comprises the existing services within the vicinity of the development and 2no. water courses that line and pass through the site boundary.

The following drainage and water supply services are present within and adjacent to the site:

1) Foul water:
   a) A 750mm concrete public sewer runs from east to west through the site, parallel to the Carrickmines River.
   b) A 225mm diameter uPVC public sewer connects from a housing estate to the north of the development into the 750mm sewer within the proposed development site.

2) Surface Water:
   a) As the Priorsland site is a greenfield site, there is no existing surface water drainage system within the site boundary. A surface water drainage system has been developed to the east of the site, as per Planning Application Reference: DZ15A/0758. However, due to the flow path and levels of the Carrickmines River and Ticknick Stream it is not feasible to propose a gravity connection to the existing drainage system to the east of the Priorsland site.

3) Potable Water:
   a) 300mm nominal diameter HDPE watermain is located at Castle Street to the east of the Ticknick Stream.
   b) 33” trunk watermain running from south to north through the site boundary

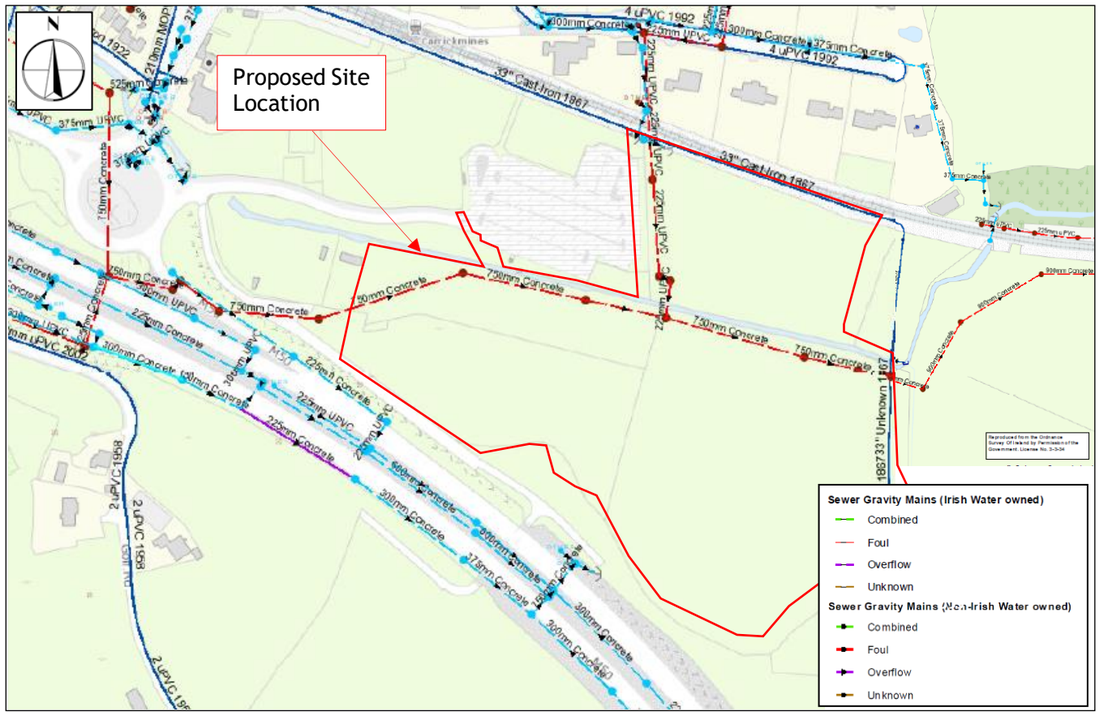

Figure 7.1: Existing Public Watermain & Foul Drainage in the Vicinity of the Priorsland Site (Irish Water Records)

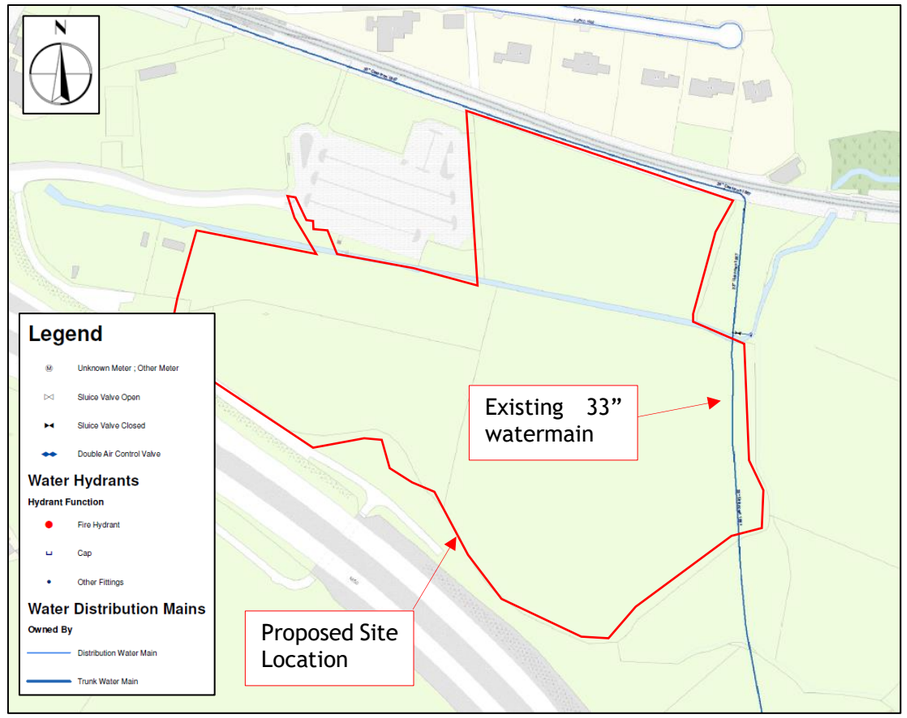

Figure 7.2: Location of Existing 33" Watermain at Priorsland (Irish Water Records)

The following water courses are present within and adjacent to the site:

1) Carrickmines River
   a) The Carrickmines river runs through the site, to the north of the proposed development, from west to east.
   b) As per CFRAMS flood mapping for the site, the site of the proposed development is shown as being located in the fluvial Flood Zone A (the 1 in 100-year flood zone). This flooding emanates from the Carrickmines River and flows in across the site in a southerly direction.
   c) CFRAMS flood depth mapping shows floodwaters to be less than 250 mm at the site during a 1 in 100-year event and less than 500 mm for the 1 in 1000-year event at the development site.

2) Ticknick Stream
   a) The Ticknick stream runs along the eastern border of the site, from south to north. It then joins the Carrickmines river at a point adjacent to the north east corner of the development site.

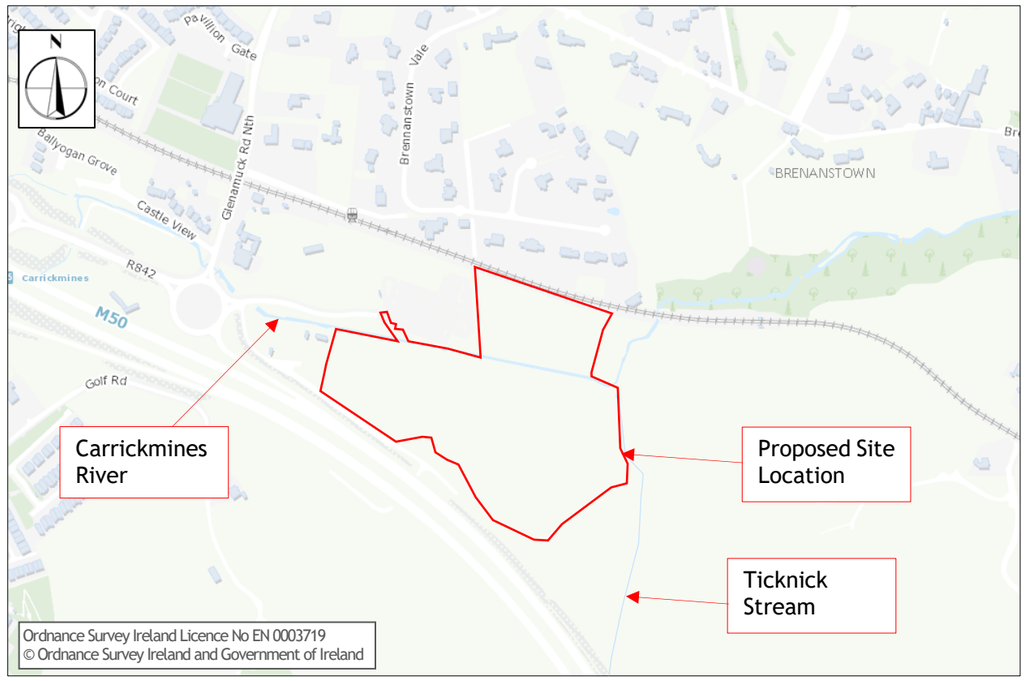

Figure 7.3: Water Courses in the vicinity of the Proposed Development

7.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The development will comprise a mixed-use village centre and residential development of 443 no. units comprising 6 no. blocks (A-F) of apartments (up to 5 storeys with basement/undercroft parking) providing 402 no. apartments units (146 no. 1-beds; 218 no. 2-beds and 38 no. 3-beds), and 41 no. houses (19 no. 3-beds and 22 no. 4-beds). All apartments provided with private balconies/terraces. Provision of indoor residential facilities to serve apartment residents.

The Village Centre and non-residential elements will comprise a supermarket, local retail/retail service units, non-retail commercial units, creche, gym, community space, and offices (High Intensity Employment) use.

Provision of car/bicycle/motorcycle parking; ESB sub-stations; bin storages areas, and all associated plant areas.

Provision of the first phase of Priorsland Park (on lands within the applicant's ownership) and other public and communal open spaces.

Construction of Castle Street through the subject lands and two road bridges across the Carrickmines Stream, one to serve the future school site/ park, the second to provide pedestrian and cyclist access to the Carrickmines Luas station and future Transport Interchange to the north. Provision of an additional pedestrian bridge to the park. Provision of an acoustic barrier along the southern/western edge of the site.

All associated site development works, landscaping, boundary treatments and services provision.

The following connections to existing public drainage and water supply services works are proposed:

1) A new 300mm diameter foul water connection is proposed to connect to the existing 750mm diameter foul water sewer that runs from east to west through the site parallel to the Carrickmines River
2) A new 225mm diameter surface water outfall is proposed to discharge surface water to the Ticknick Stream to the east of the site.
3) A new 225mm diameter potable water service connection is proposed to connect to the existing 300mm diameter water main on Castle Street to the east of the proposed development site. It is noted that recent planning application DZ20A/0399 has been approved/granted by DLRCC which includes for the extension of Castle Street up to the proposed development site. This also includes a planning condition that stipulates the completion of all service routes associated with this road extension.

The following in-ground, on site drainage and water supply services works are proposed:

1) Foul water:
   a) An in-ground gravity foul drainage network along the exterior of the buildings underneath the proposed road network on site is proposed.
   b) Foul drainage from the shared basement under Plot A and Plot B will be pumped to the proposed external in-ground gravity foul drainage system.
   c) All other foul drainage from each of the buildings on site will discharge by gravity to the proposed external in-ground gravity foul drainage system.

2) Surface Water:
   a) Proposed road gullies and other surface channel drains will connect to tree root structured cell systems or to a stone storage layer within the pavement build-up in hard standing areas.
   b) Drainage networks will be attenuated via attenuation tanks. The attenuation tanks will ultimately outfall to engineered swales or a detention basin/regional pond. The surface water from the ponds will then outfall to the Ticknick Stream at an attenuated rate of 1l/s/ha, as per the requirements of the Cherrywood Planning Scheme Chapter 4.
   c) Surface water within carparks will pass through a petrol interceptor prior to discharge.
   d) SuDS measures have been adopted including incorporation of green roofs to the local authority standard requirements.
   e) An in-ground gravity surface water network along the exterior of the buildings underneath the proposed road network on site is proposed.
   f) Surface water drainage from the shared basement under Plot A and Plot B will be pumped to the proposed external in-ground gravity foul water drainage system as per the requirements of the *Greater Dublin Regional Code of Practice for Drainage Works*.
   g) All other surface water drainage from each of the buildings on site will discharge by gravity to the proposed external in-ground gravity surface water drainage system.

3) Potable Water:
   a) An in-ground pressurised watermain network along the exterior of the buildings underneath the proposed road network on site is proposed.
   b) Metered connections will be provided from this network to each building.
   c) Sluice valves, air valves, scour valves and hydrants will be provided to meet the requirements of Irish Water and the Building Regulations.

The following flood mitigation works are proposed:

a) Finished Floor Levels (FFLs) of the ground floor of the proposed buildings on the site have been set at above the flood levels from the adjacent Carrickmines Stream, and flood modelling has shown that no buildings are at risk of flooding. Basements are included in the development and entrance levels to these basements will be above the Q1000 flood level;
b) Surface water flows will be attenuated on site and the runoff rate from the site will not be greater than the runoff rate agreed with DLRCC, in order to reduce the risk of flooding elsewhere. Runoff from the site will be limited to 1 l/s/ha as per the Cherrywood SDZ;
c) The surface water drainage systems within the blocks include attention tanks to limit flows to the external network. Block A and B will be a pumped, while other units will discharge by gravity;
d) It is proposed that the proposed development will incorporate a mixture of extensive and intensive green roof systems. This will provide a degree of attenuation for rainfall and additionally will reduce surface water being discharged to the carrier drainage system through evapotranspiration;
e) The 1650mm diameter Flood Relief Culvert to the north of the Carrickmines Stream will be extended will be constructed in the **Interim period** as far as the boundary with the third-party lands to the east. An alternative, additional floodwater culvert south of the river will be constructed and will operate in the interim. This will improve conveyance of floodwaters away from the site.

There are various drainage and water supply services works proposed within the proposed buildings. These are not discussed in detail since there it is considered that there is no direct effect on the environment.

Refer to the Engineering Planning Report and drainage drawings for further details regarding proposed drainage and water supply. Refer to the Site-Specific Flood Risk Assessment for further information on flood modelling carried out for the site and flood mitigation measures proposed.

7.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

Construction – Interim

During the construction phase of the proposed development with the proposed interim arrangement, there are several potential processes that could impact the existing surface water, foul water and watermain networks including the Carrickmines stream and Ticknick stream watercourses:

1) Topsoil stripping and cut/fill earthworks activities may cause an elevated silt load to the adjacent watercourses,

2) Hydrocarbons may be released into networks from accidental spills,
3) The construction of the proposed in-ground services will require the excavation, removal and reinstatement of existing natural and man-made ground,
4) There is potential for existing infrastructure to conflict with proposed excavation works, by existing infrastructure being close to the proposed works,
5) Construction of 2 no. vehicular bridge structures over the Carrickmines River/Flood Containment Zone.
6) The permanent floodwater culvert north of the stream will be constructed in the Interim period as far as the boundary with the third-party lands to the east. The alternative floodwater culvert south of the river will be constructed and will operate in the interim.

Construction – Permanent
During the construction phase of the proposed permanent arrangement, there are a number of potential processes that could impact the existing watermain networks and the Ticknick stream watercourses:
1) The permanent floodwater culvert north of the stream will be completed when the remainder of the culvert is completed on the adjoining lands by others.
2) The diversion of the existing 33" DCC trunk watermain that will be carried out by others in adjacent lands will require the public water network to be suspended for a period to allow connection into the existing network with the diverted line. It will also involve installation of the diverted watermain under the Carrickmines River and Ticknick Stream at isolated locations.
3) Construction of 1 no. vehicular bridge structure over the Ticknick Stream forming the extension of Castle Street into the Priorsland Area.

Operational – Interim
If the material assets are not constructed appropriately, then there is a risk of pipe leakage.

Operational – Permanent
As per the interim arrangement, if the material assets are not constructed appropriately, then there is a risk of pipe leakage.

Do Nothing Scenario

If the proposed works are not implemented, then the existing ground levels will remain as per existing, the Carrickmines river flood plain will remain unaltered and existing services will remain in place. Under a 'Do Nothing' scenario there would be no change in the site's current use, and the impacts to the water environment would be insignificant. The site in its existing greenfield state does not give rise to any significant emissions to any surface water bodies or foul network system.

7.6 MITIGATION MEASURES

Construction – Interim
Surveys will be undertaken to ascertain the exact location of all infrastructure. The material assets are to be constructed in accordance with all relevant Dun Laoghaire Rathdown County Council and Irish Water standards.

The contractor for the proposed works will be required to implement the following measures to protect the Carrickmines river and Ticknick stream watercourses:
1) Discharge permits & licenses
2) Preparing appropriate construction method statements
3) Settlement ponds
4) A "no-go" zone is to be implemented where-by the watercourses will be fenced off so construction vehicles will not impose on sensitive areas.
5) Bunding of hydrocarbons or any liquids that could adversely affect the receiving environment
6) Compliance and adherence to best practise as outlined in the Inland Fisheries Ireland guideline document 'Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters (2016)'.

These measures will be addressed within the Contractors method statements for the works.

The contractor is to conduct the works in accordance with all relevant local authority requirements, and health and safety legislation.

Construction – Permanent
As per above, the contractor for the proposed works will be required to implement the following measures to protect the Carrickmines river and Ticknick stream watercourses:
1) Discharge permits & licenses
2) Preparing appropriate construction method statements

3) Settlement ponds
4) A “no-go” zone is to be implemented where-by the watercourses will be fenced off so construction vehicles will not impose on sensitive areas.
5) Bunding of hydrocarbons or any liquids that could adversely affect the receiving environment
6) Compliance and adherence to best practise as outlined in the Inland Fisheries Ireland guideline document ‘Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters (2016)’.

These measures will be addressed within the Contractors method statements for the works.

The contractor is to conduct the works in accordance with all relevant local authority requirements, and health and safety legislation.

Operational – Interim
The Carrickmines River and Ticknick Stream watercourses will be protected during the operational phase through the implementation of sustainable drainage systems (SuDS) on site conforming to the various Cherrywood Planning Scheme (CPS) requirements as outlined in the Specific Objectives set out in Chapter 4 Section 4.1.2 of the CPS. These SuDS measures will intercept and attenuate surface water on site. The surface water will be passed through petrol interceptors and other SuDS measures that will clean the surface water. The water will be discharged to the Ticknick Stream at a rate of 1l/s/ha.

The material assets (surface water, foul water and watermain networks) will be pressure tested to relevant Dun Laoghaire Rathdown County Council and Irish Water standards prior to completion of the works. The drainage networks will also be CCTV surveyed and reviewed to ensure there are no defects. These test measures will ensure to a reasonable degree that the pipes have been installed to the required standard and the risk of leakage will be greatly reduced.

Operational – Permanent
As per the interim arrangement, as there will be no alteration to the proposed drainage systems and watermain systems, the Carrickmines River and Ticknick Stream watercourses will be protected during the operational phase through the implementation of sustainable drainage systems (SuDS) on site conforming to the various Cherrywood Planning Scheme (CPS) requirements as outlined in the Specific Objectives set out in Chapter 4 Section 4.1.2 of the CPS. These SuDS measures will intercept and attenuate surface water on site. The surface water will be passed through petrol interceptors and other SuDS measures that will clean the surface water. The water will be discharged to the Ticknick Stream at a rate of 1l/s/ha.

The material assets (surface water, foul water and watermain networks) will be pressure tested to relevant Dun Laoghaire Rathdown County Council and Irish Water standards prior to completion of the works. The drainage networks will also be CCTV surveyed and reviewed to ensure there are no defects. These test measures will ensure to a reasonable degree that the pipes have been installed to the required standard and the risk of leakage will be greatly reduced.

Do Nothing Scenario
Under a ‘Do Nothing’ scenario there would be no change in the site’s current use, and there would no change to the impacts to the water environment over the existing scenario.

7.7 PREDICTED IMPACT OF THE PROPOSED DEVELOPMENT

Construction – Interim
There are no predicted significant impacts arising from the construction phase due to the temporary nature of construction and the expected use of portable or temporary toilets only, which will be contracted out to an authorised disposal agent.

A wide range of mitigation measures have been specified for the construction and operational phases of the project. These mitigation methods seek to ensure that construction and operational discharges are controlled to prevent potential pollution impacts to all receiving surface water systems and their downstream catchment areas. Consequently, the mitigation measures detailed will also prevent potential impacts to the ecosystem of the Carrickmines river and the Ticknick stream.

Construction – Permanent
There are no predicted significant impacts arising from the construction phase due to the temporary nature of construction and the expected use of portable or temporary toilets only, which will be contracted out to an authorised disposal agent.

A wide range of mitigation measures have been specified for the construction and operational phases of the project. These mitigation methods seek to ensure that construction and operational discharges are controlled to prevent potential pollution impacts to all receiving surface water systems and their downstream catchment areas. Consequently, the mitigation measures detailed will also prevent potential impacts to the ecosystem of the Carrickmines river and the Ticknick stream.

Operational – Interim
No negative residual impacts are anticipated with the implementation of the construction and operational mitigation measures as stated.

Operational – Permanent
No negative residual impacts are anticipated with the implementation of the construction and operational mitigation measures as stated.

Do Nothing Scenario

Under a 'Do Nothing' scenario there would be no change in the site's current use, and there would no change to the impacts to the water environment over the existing scenario.

7.8 MONITORING

The construction of works should be monitored to ensure compliance with relevant local authority requirements, and health and safety legislation.

The operational phase of public works should be monitored by the local authority responsible for the respective asset.

The operational phase of private assets should be monitored by the management company for the building.

7.9 REINSTATEMENT

After construction, all assets are to be backfilled and reinstated in accordance with the design and relevant local authority and Irish Water requirements.

7.10 INTERACTIONS AND POTENTIAL CUMULATIVE IMPACTS

Interactions

Hydrology and Material Assets – Site Services, Drainage and Water Supply

The Material Assets – Site Services, Drainage and Water Supply requirement of the development is in part prescribed by the hydrological requirement for the development.

The proposed surface water network for the development has been designed to cater for the 1% AEP (1:100-year storm return period) storm, with 10% additional rainfall to allow for climate change. Discharge from the overall development will be limited to 1l/s/ha.

The stormwater from the site will be treated and attenuated via the SuDS measures outlined in the Engineering Planning Report and drainage drawings, in accordance with the requirements of the CPS, ensuring adequate water quality at the discharge point to Ticknick Stream.

Given the adherence to the CPS Specific Objectives relating to SuDS principles, there is no anticipated cumulative effect.

Similarly, interaction between hydrology and the proposed foul or potable water supply is not applicable or controlled as outlined in the sections above. As such, there is no anticipated cumulative effect.

Material Assets – Site Services, Communications, Electrical and Gas, and Material Assets – Site Services, Drainage and Water Supply

Drainage and water supply material assets should be co-ordinated with communications, electrical and gas material assets to ensure that there are no physical conflicts and that all necessary clearances are provided.

There is no anticipated cumulative effect.

Potential Cumulative Impacts

There are no anticipated cumulative effects.

8.0 NOISE & VIBRATION

8.1 INTRODUCTION

Planning Permission is currently being sought for a residential development to be located in Priorsland, Dublin that is proposed to be constructed on greenfield lands adjacent to the M50 within the Cherrywood Strategic development zone (SDZ). The proposed development is composed of terraced housing units, high rise apartment blocks, village centre facilities and parklands. The SDZ also provides for a primary school on the northern portion of the lands, which is to be developed by the Department of education at a later date.

CLV Consulting Limited has been engaged to conduct an assessment of the likely noise and vibration impact. This assessment has been detailed in the following sections.

8.2 METHODOLOGY

Primary Noise Sources of the Proposed Development

In consideration of any new development, the potential noise and vibration impact on the surroundings must be considered for each of two distinct stages: the short-term impact of the construction phase and the longer-term impact of the operational phase.

Development noise emissions during the construction phase will mostly be due to site clearance, landscaping and the construction of the various residential dwellings and buildings. Specific processes / equipment have been identified and are discussed in Section 1.5 of this chapter.

Development noise emissions during the operational phase of the project are expected to be from five primary sources as follows:

- ✓ Delivery Truck Events at Village Centre Retail Units
- ✓ Building Services
- ✓ Car Parking Activities
- ✓ Vehicular Traffic on New Development Internal Roads
- ✓ Additional Vehicular Traffic on Surrounding Roads

These sources are also discussed in in Section 1.5 of this chapter.

Interim / Permanent Scenarios

The proposed construction traffic access route to the Priorsland site will be via the existing access route/right of way to the west of the site and is a temporary ("Interim") arrangement only. This interim access represents an 'alternative use of infrastructure' pursuant to the adopted amendment to the SDZ which states the following in Section 7.2.2:

> *"However, it is acknowledged that there may be exceptional or unforeseen circumstances beyond the reasonable control of an individual developer or the local authority, whereby a piece of infrastructure necessary to progress the development of a Growth Area cannot be provided in the short to medium term (circa 0-3 years). In such instances, there may be an appropriate alternative utilising other infrastructure as provided for under the Planning Scheme, as an interim measure to facilitate the early delivery of housing, and early engagement with the Development Agency will be an essential prerequisite."*

Once the Castle Street extension becomes viable, and is completed in its entirety, that Level 2 route would become the standard, on-going access route for the Priorsland development. This will then service the residential/operational traffic associated with the development.

Construction Phase

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local authorities normally control construction activities by imposing limits on the hours of operation and may consider noise limits at their discretion.

In the absence of specific noise limits, appropriate criteria relating to permissible construction noise levels for a development of this scale may be found in the **British Standard BS 5228 - 1: 2009+A1: 2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise**.

The approach adopted here calls for the designation of a noise sensitive location into a specific category (A, B or C) based on exiting ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded, indicates a significant noise impact is associated with the construction activities.

Table 8.1 sets out the values which, when exceeded, indicate a significant effect at the facades of residential receptors as recommended by **BS 5228 - 1**. Please note that these are cumulative levels, i.e. the sum of both ambient and construction noise levels.

Assessment Category & Threshold Value Period (L_{Aeq})	Threshold Value, Decibels (dB)		
	Category A	Category B	Category C
Night-Time (23:00 to 07:00hrs)	45	50	55
Evenings & Weekends [D]	55	60	65
Daytime (07:00 - 19:00) & Saturdays (07:00 - 13:00)	65	70	75

Table 8.1 Example Threshold of Significant Effect at Dwellings

A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.

B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.

C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.

D) 19:00 - 23:00 weekdays, 13:00 - 23:00 Saturdays & 07:00 - 23:00 Sundays.

For the appropriate period (e.g. daytime), the ambient noise level is determined and rounded to the nearest 5dB. In this instance, properties in the vicinity of the development have daytime ambient noise levels in the range of 56 to 64dB L_{Aeq} (ref Section 8.3). These properties will therefore be afforded a Category A designation.

If the total noise level (i.e. construction noise plus existing ambient noise level) exceeds the appropriate category value (e.g. 65dB L_{Aeq} during daytime periods) then a relative noise impact is deemed to have occurred.

Operational Phase

Due consideration must be given to the nature of the primary noise sources when setting noise emissions criteria. In this instance, there are four primary sources of noise associated with the development once operational. Criteria for noise from all of these sources, will be considered in terms of the $L_{Aeq,T}$ parameter (the equivalent continuous sound level).

There is no Irish Standard containing guidance that is applicable in this instance. In the absence of such standards, best practice dictates that the potential noise impact of the proposed development is assessed against appropriate British and/or International Standards.

Appropriate guidance is contained within **BS8233 (2014): Guidance on Sound Insulation and Noise Reduction for Buildings**. This British Standard sets out recommended noise limits for indoor ambient noise levels in residential dwellings as detailed in Table 8.2 below.

Activity	Room Type	Design Criterion $L_{Aeq,T}$ (dB)	
		Daytime (07:00 – 23:00hrs)	Night Time (23:00 – 07:00hrs)
Resting / Sleeping Conditions	Living Rooms	35dB $L_{Aeq,16hr}$	-
	Bedrooms	35dB $L_{Aeq,16hr}$	30dB $L_{Aeq,8hr}$

Table 8.2 BS8233 (2014) Recommended Indoor Ambient Noise Levels

For the purposes of this assessment, it is necessary to derive external limits based on the internal criteria noted in the paragraph above. This is done by factoring in a degree of noise reduction afforded by an open window, which is defined in the standard as being 15dB.

Applying the 15dB factor to the values from the **BS8233** table, the following criteria would apply at the façades of the adjacent dwellings:

- Daytime (07:00 to 23:00 hours) 50dB $L_{Aeq,16hr}$
- Night-time (23:00 to 07:00 hours) 45dB $L_{Aeq,8hr}$

In order to assist with the interpretation of the noise associated with changes in noise level due to increases in road traffic, Table 8.3 offers guidance as to the likely impact associated with any particular relative change.

Change in Sound Level (dB L_{Aeq})	Subjective Reaction	Impact
< 3	Inaudible	Imperceptible
3 - 5	Perceptible	Slight
6 - 10	Up to a doubling of loudness	Moderate
11 - 15	Over a doubling of loudness	Significant
> 15		Profound

Table 8.3 Likely Impact Associated with Change in Noise Level

Vibration Guidelines

Vibration standards come in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. In both instances, it is appropriate to consider the magnitude of vibration in terms of Peak Particle Velocity (PPV).

It is acknowledged that humans are particularly sensitive to vibration stimuli and that any perception of vibration may lead to concern. In the case of road traffic, vibration is perceptible at around 0.5mm/s and may become disturbing or annoying at higher magnitudes. However, higher levels of vibration are typically tolerated for single events or events of short duration. For example, blasting and piling, two of the primary sources of vibration during construction, are typically tolerated at vibration levels up to 12mm/s and 5mm/s respectively. This guidance is applicable to the daytime only; it is unreasonable to expect people to be tolerant of such activities during the night.

Guidance relevant to acceptable vibration within buildings is contained in the following documents:

- **British Standard BS 7385 (1993): Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration**
- **British Standard BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites Part 2: Vibration**

BS 7385 states that there should typically be no cosmetic damage if transient vibration does not exceed 15mm/s at low frequencies rising to 20mm/s at 15Hz and 50mm/s at 40Hz and above. These guidelines relate to relatively modern buildings and should be reduced to 50% or less for more critical buildings.

BS 5228 recommends that, for soundly constructed residential property, light commercial buildings and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak particle velocity of 15mm/s at 4Hz increasing to 20mm/s at 15Hz and increasing to 50mm/s at 40Hz and above for intermittent vibration. For reinforced or framed structures or industrial and heavy commercial buildings and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak particle velocity of 50mm/s at 40Hz and above again for intermittent vibration. In the case of continuous vibration, it states that these figures may need to be reduced by up to 50%. Below these vibration magnitudes minor damage is unlikely, although where there is existing damage these limits may be reduced by up to 50%.

8.3 RECEIVING ENVIRONMENT

An environmental noise survey was conducted in order to quantify the existing noise environment. The survey was conducted in general accordance with **ISO 1996-2: 2017: Acoustics - Description, measurement and assessment of environmental noise**.

Specific details are set out in the following sub-sections:

Choice of Measurement Locations

Due to the relatively isolated location of the development, the number of nearby noise sensitive receptors are minimal. There are residences located adjacent to the north of the development immediately on the other side of the Luas line but this location is on the other side of the future primary school and park parcels, approximately 170m from the residential zone areas of the development. The next nearest noise sensitive receptors would be the dwellings located along Glenamuck Road approximately 180m to the northwest and a couple of detached dwellings located along Lehaustown Road approximately 550m to the east. Noise sensitive receptors located south of the M50 did not need to be considered due to the high ambient noise level environment controlled by the motorway.

Three measurement locations were therefore selected; each is described in turn below and shown in Figure 8.1.

Location 1 is located near the northern boundary of the proposed development adjacent to the Luas line and the Carrickmines Luas Park & Ride. The noise levels measured at this location would be indicative of the ambient noise environment of the detached dwellings located along the Luas line to the north of the development along Brennanstown Vale.

Location 2 is located adjacent to the nearest dwelling along Glenamuck Road to the development and would be indicative of the ambient noise environment of the detached dwellings located along this road.

Location 3 is located in the vicinity of the dwellings located along Lehaunstown Road and would be indicative of the ambient noise environment of the detached dwellings located in this area.

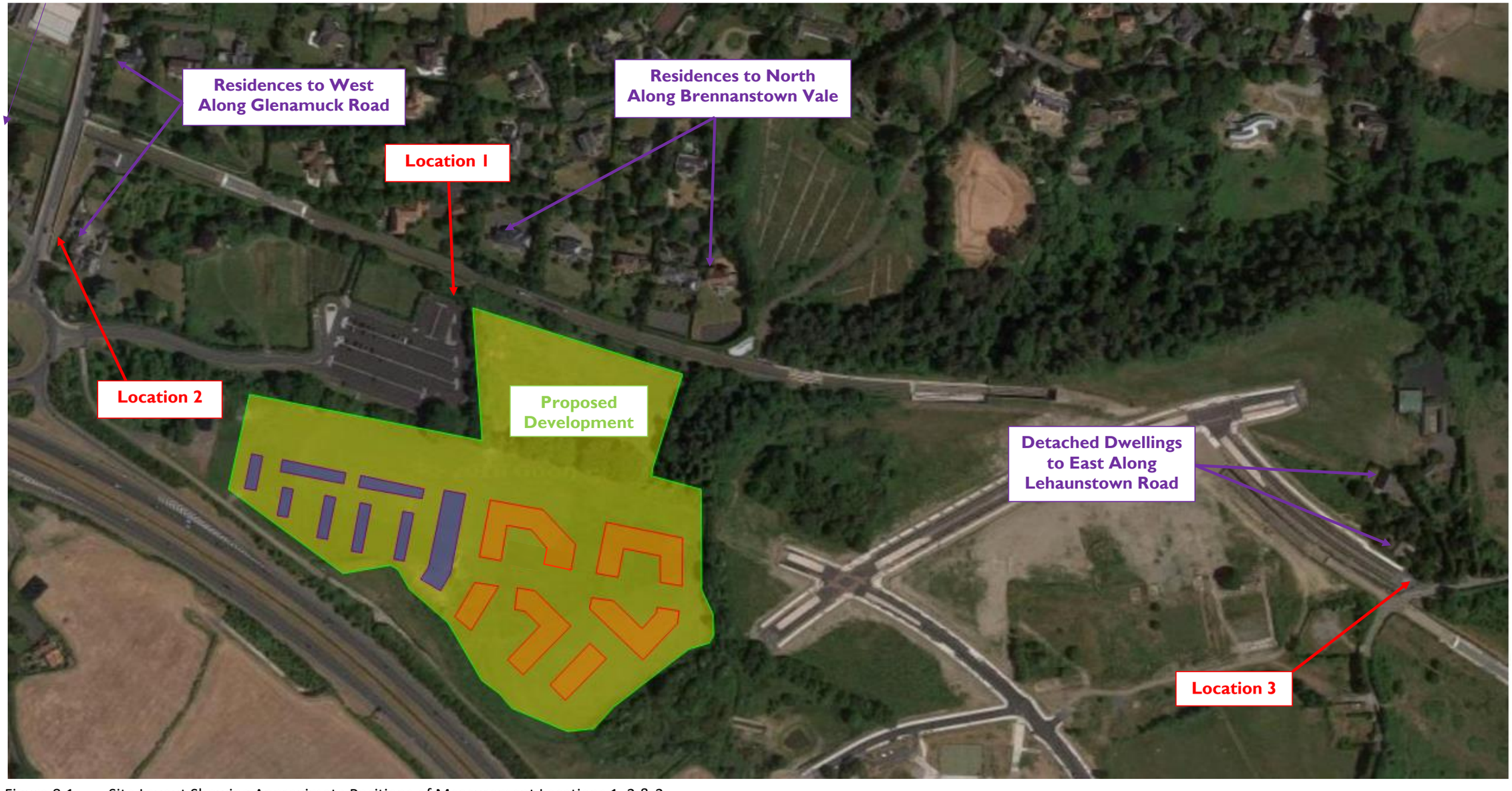

Figure 8.1 Site Layout Showing Approximate Positions of Measurement Locations 1, 2 & 3

Survey Periods

Noise measurements were conducted over the course of two survey periods as follows:

- Daytime 14:05 to 17:25hrs 14 January 2019
- Night-time 23:00 to 02:20hrs 14/15 January 2019

The daytime measurements cover a period that was selected in order to provide a typical snapshot of the existing noise climate, with the primary purpose being to ensure that the proposed noise criteria associated with the development are commensurate with the prevailing ambient environment.

The night-time period provides a measure of the existing background noise levels.

The weather during the daytime survey periods was dry and relatively calm. The weather during the night time survey was also dry and calm.

Personnel & Instrumentation

Brian S. Johnson (CLV) conducted the noise level measurements during all survey periods. He is an internationally experienced acoustic consultant who has been working in the fields of architectural / building acoustics and noise control since 1994. He has been based in America, Europe, Asia and holds a Certificate of Competence in Environmental Noise Measurements from the Institute of Acoustics.

The measurements were conducted using an NTI Audio type XL2 Sound Level Meter (Serial #A2A-10989-EO). It was fitted with a 90mm windshield and before and after the survey the measurement apparatus was check calibrated using a Casella Cel 120 Acoustic Calibrator (Serial #3921077). The microphone was positioned approximately 1.4m above the ground.

Procedure

Measurements were conducted at Locations 1 to 3 on a cyclical basis. Sample periods for the noise measurements were 15 minutes during both the daytime and night-time periods. The results were saved to the instrument memory for later analysis. All primary noise sources contributing to noise build-up were also noted.

Measurement Parameters

The noise survey results are presented in terms of the following five parameters:

L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.

L_{Amax} is the instantaneous maximum sound level measured during the sample period.

L_{Amin} is the instantaneous minimum sound level measured during the sample period.

L_{A10} is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.

L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The “A” suffix denotes the fact that the sound levels have been “A-weighted” in order to account for the non-linear nature of human hearing.

All sound levels in this report are expressed in terms of decibels (dB) relative to $2x10^{-5}$ Pa.

Measurement Results

<u>Location 1</u>

The survey results for Location 1 are summarised in Table 8.4 on the following page.

Time		Measured Noise Levels (dB re. $2x10^{-5}$ Pa)				
		L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}
Daytime	14:05 - 14:20	57	66	52	58	55
	15:20 - 15:35	57	66	54	59	56
	16:25 - 16:40	58	67	54	58	56
Night-time	23:00 - 23:15	52	65	47	53	49
	00:05 - 00:20	51	68	46	53	48
	01:20 - 01:35	50	55	45	51	46

Table 8.4 Summary of Measured Noise Levels at Location 1

During daytime monitoring periods, the dominant source of noise observed in the vicinity was dominated by traffic noise along the M50 along with contributions from occasional Luas events and very occasional car park noise. Daytime noise levels were very consistent and in the range of 57 to 58dB L_{Aeq} and 55 to 56dB L_{A90}.

The night-time noise measurements at this location were again dominated by traffic noise along the M50 along with contributions from occasional Luas events (during the first two measurement periods). Noise levels were in the range 50 to 52dB L_{Aeq} and 46 to 49dB L_{A90}.

Location 2

The survey results for Location 2 are summarised in Table 8.5 below.

Time		Measured Noise Levels (dB re. $2x10^{-5}$ Pa)				
		L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}
Daytime	14:25 - 14:40	62	75	54	65	58
	15:40 - 15:55	64	77	53	67	58
	16:45 - 17:00	62	78	54	66	58
Night-time	23:20 - 23:30	56	74	49	58	50
	00:25 - 00:40	55	75	48	58	49
	01:40 - 01:55	55	72	46	57	48

Table 8.5 Summary of Measured Noise Levels at Location 2

During daytime monitoring periods, the dominant source of noise observed in the vicinity was dominated by continuous traffic noise along the M50 and intermittent local traffic along Glenamuck Road along with contributions from occasional Luas events. Daytime noise levels were very consistent and in the range of 62 to 64dB L_{Aeq} and of the order of 58dB L_{A90}.

The night-time noise measurements at this location were again dominated by traffic noise along the M50 and Glenamuck Road along with contributions from occasional Luas events (during the first two measurement periods). Noise levels were in the range 55 to 56dB L_{Aeq} and 48 to 50dB L_{A90}.

Location 3

The survey results for Location 3 are summarised in Table 8.6 below.

Time		Measured Noise Levels (dB re. $2x10^{-5}$ Pa)				
		L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}
Daytime	14:55 - 15:10	57	76	49	57	51
	16:05 - 16:20	56	75	48	55	50
	17:10 - 17:25	56	75	50	56	51
Night-time	23:40 - 23:55	50	76	43	52	47
	00:50 - 01:10	49	74	43	50	46
	02:05 - 02:20	47	57	42	49	45

Table 8.6 Summary of Measured Noise Levels at Location 3

During daytime monitoring periods, the dominant source of noise observed in the vicinity was traffic noise along the M50 along with contributions from Luas events and very occasional local traffic events. Daytime noise levels were also very consistent at this location and in the range of 56 to 57dB L_{Aeq} and 50 to 51dB L_{A90}.

The night-time noise measurements at this location were again dominated by traffic noise along the M50 along with contributions from Luas events and a single local traffic event (during the first measurement period). Noise levels were in the range 47 to 50dB L_{Aeq} and 45 to 47dB L_{A90}.

8.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The development will comprise a mixed-use village centre and residential development of 443 no. units comprising 6 no. blocks of apartments (up to 5 storeys with basement/undercroft parking) providing 402 no. apartments units (146 no. 1-beds; 218 no. 2-beds and 38 no. 3-beds), and 41 no. houses (19 no. 3-beds and 22 no. 4-beds). All apartments provided with private balconies/terraces. Provision of indoor residential facilities to serve apartment residents.

The Village Centre and non-residential elements will comprise a supermarket, local retail/retail service units, non-retail commercial units, creche, gym, community space, and offices (High Intensity Employment) use.

Provision of car/bicycle/motorcycle parking; ESB sub-stations; bin storages areas, and all associated plant areas.

Provision of the first phase of Priorsland Park (on lands within the applicant's ownership) and other public and communal open spaces.

Construction of Castle Street through the subject lands and two road bridges across the Carrickmines Stream, one to serve the future school site/ park, the second to provide pedestrian and cyclist access to the Carrickmines Luas station and future Transport Interchange to the north. Provision of additional pedestrian bridge to the park. Provision of an acoustic barrier along the southern/western edge of the site.

All associated site development works, landscaping, boundary treatments and services provision.

It is proposed that construction traffic will access / exit the proposed development via an existing access route utilising the available wayleave immediately west of the application site (itself accessed via the M50 Southbound Roundabout).

A more detailed description is outlined in Chapter 3.

When considering a development of this nature, the potential noise & vibration impact on the surroundings must be considered for each of two distinct stages: the short term impact of the construction phase and the longer term impact of the operational phase.

The construction phase will involve demolition and earthworks throughout most of the site and the erection of all the new development buildings. This impact is short-term in nature and is assessed in the appropriate section of this document.

As identified in Section 8.2, five primary sources of noise in the operational context will be deemed long-term and are listed below:

- ✓ Delivery Truck Events at Village Centre Retail Units
- ✓ Building Services
- ✓ Car Parking Activities
- ✓ Vehicular Traffic on New Development Internal Roads
- ✓ Additional Vehicular Traffic on Surrounding Roads

8.5 POTENTIAL IMPACTS

As discussed in the previous section, the short term impact of both the construction phase and the longer term impact of the operational phase need to be considered. Given the nature of this development, it is unlikely that there will be any significant overlap of these phases.

All noise prediction calculations were conducted in general accordance with **ISO 9613: Acoustics – Attenuation of sound outdoors, Part 2: General method of calculation, 1996**.

Construction Phase

A variety of items of plant will be in use, such as excavators, lifting equipment, dumper trucks, compressors and generators. There will be vehicular movements to and from the site that will make use of both existing roads and the new internal roads.

Due to the nature of the activities undertaken on a large construction site, there is potential for generation of significant levels of noise. The flow of vehicular traffic to and from a construction site is also a potential source of relatively high noise levels. The potential for vibration at neighbouring sensitive locations during construction is typically limited to excavation works and lorry movements on uneven road surfaces. Taking into account the considerable distance between the sensitive locations to potential site access points from main routes via off Tully Vale Road and the current traffic use on surrounding roads, there is little likelihood of structural or even cosmetic damage to existing nearby dwellings. Due to the fact that the construction programme has been established in outline form only, it is difficult to calculate the actual magnitude of noise emissions to the local environment. However, it is possible to predict typical noise levels using guidance set out in **BS 5228 – 1: 2009+A1: 2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise**.

The Brennanstown Vale residential dwellings are located along the northern boundary of the site at a distance of approximately 170m from the residential development zone building facades (on average) at the nearest points. The next nearest noise sensitive receptors are the dwellings located along Glenamuck Road approximately 180m to the northwest and a couple of detached dwellings located along Lehaustown Road, approximately 550m to the east. In conducting construction noise emission calculations to each of these locations, we have used these distances which are estimated from the development location where construction works are expected to occur. It must be stated that for the majority of the time, plant and equipment will be at a greater distance from these noise sensitive locations than that used for the calculations and consequently will have lesser impact. Our assessment would therefore be representative of a "worst-case" scenario. The following assumptions have been made in the preparation of these construction noise predictions:

- a utilisation of equipment of 75% over a working day.
- construction site will be screened by site hoarding a minimum of 2m in height.

Phase	Plant Item (BS 5228 Ref.)	Plant Noise Level at 10m Distance[1] (dB L_{Aeq})	Predicted Noise Level At Brennanstown Vale Residences (dB $L_{Aeq,1hr}$)	Predicted Noise Level At Glenamuck Road Residences (dB $L_{Aeq,1hr}$)	Predicted Noise Level at Lehaunstown Road Residences (dB $L_{Aeq,1hr}$)
Site Preparation	Tracked excavator (C3.92)	76	49	49	39
	Dumper (C3.100)	74			
Foundation Laying	Compressor (C6.19)	72	48	47	38
	Poker Vibrator (C6.40)	73			
	Cement Mixers (C6.6)	71			
Steel Erection	Crane (C7.120)	76	48	48	40
	Lorry (C7.121)	70			
General Construction	Compressor (C7.70)	70	50	50	40
	Diesel Hoist (C7.97)	73			
	Pneumatic Circular Saw (C.79)	75			
	Generator (C7.51)	72			

[1] *Plant noise levels are derived from BS 5228: Part 1.*

Phase	Plant Item (BS 5228 Ref.)	Plant Noise Level at 10m Distance[1] (dB L_{Aeq})	Predicted Noise Level At Brennanstown Vale Residences (dB $L_{Aeq,1hr}$)	Predicted Noise Level At Glenamuck Road Residences (dB $L_{Aeq,1hr}$)	Predicted Noise Level at Lehaunstown Road Residences (dB $L_{Aeq,1hr}$)
Roadworks	Surfacing	73	44	44	34

Table 8.7 Construction Noise Emission Prediction Level Summary

All of the predicted noise levels in the table above are ≤50dB $L_{Aeq,1hr}$ and therefore well within the criterion of 65dB $L_{Aeq,1hr}$ for construction activities during a weekday. There should therefore be no disturbance caused to any of the adjacent noise sensitive receptors and there is no item of plant identified at this state that is expected to give rise to noise levels that would be considered out of the ordinary or in exceedance of the levels outlined in Table 8.1.

Regarding construction traffic, we understand that the interim approach will be to use the Right of Way to the west of the application site. As stated in the Chapter 11.0 Traffic and Transport chapter, the relative increase in traffic volumes as a result of construction vehicles visiting the site in the interim scenario is not considered to be excessive and will be spread out over the duration of the construction phases of the development. Given this situation and the relatively constant ambient noise level in the vicinity due to the presence of the M50, construction traffic shouldn't have impart any significant noise impact to the few dwellings at the bottom of Glenamuck Road North.

The permanent construction traffic approach will be to use Castle St as the primary entry point to the east once it is in operation. As stated in the Chapter 11.0 Traffic and Transport chapter, construction works associated with progressing with the permanent scenario are limited and small in scale compared to the preceding interim approach. As a significant area of the whole SDZ is as-yet undeveloped, it is likely therefore that there will be an amount of other construction traffic working on other nearby sites at the same time. Given these conditions and the minimal noise sensitive locations adjacent to Castle Street, construction traffic shouldn't impart any significant noise impact to this area either.

Notwithstanding the above, as with any construction project, the contractor will be obliged to prepare a comprehensive traffic management plan for the construction phase of the project. This plan will outline additional site specific measures to manage the expected construction traffic activity and noise during the construction period to further ensure that construction traffic won't cause any adverse noise impacts.

With respect to vibration impact, the potential for vibration at the majority of neighbouring sensitive locations during construction is typically limited to excavation works and lorry movements on uneven road surfaces (we note that there is no blasting planned in the site preparation for the development). The more significant of these is the vibration from excavation operations; the method of which will need to be selected and controlled to ensure there is no likelihood of structural or even cosmetic damage to existing neighbouring dwellings. However, the relative distance between the excavation areas and the existing residences is such that any ground borne vibration should be well below threshold limits.

Operational Phase

There are five primary sources of noise in the operational context:

- ✓ Delivery Truck Events at Village Centre Retail Units
- ✓ Building Services
- ✓ Car Parking Activities
- ✓ Vehicular Traffic on New Development Internal Roads
- ✓ Additional Vehicular Traffic on Surrounding Roads

Each of these primary noise sources is addressed in turn as follows.

Delivery Truck Events

Deliveries will be required for the anchor supermarket unit and the adjacent retail units that will be located in the northern Village Centre zone of the development. The supermarket will likely have regular deliveries that are made with large trucks which will occur in a dedicated service area located along its western façade. Deliveries to the retail units will likely be made by smaller lorries parked at the side of the internal roads.

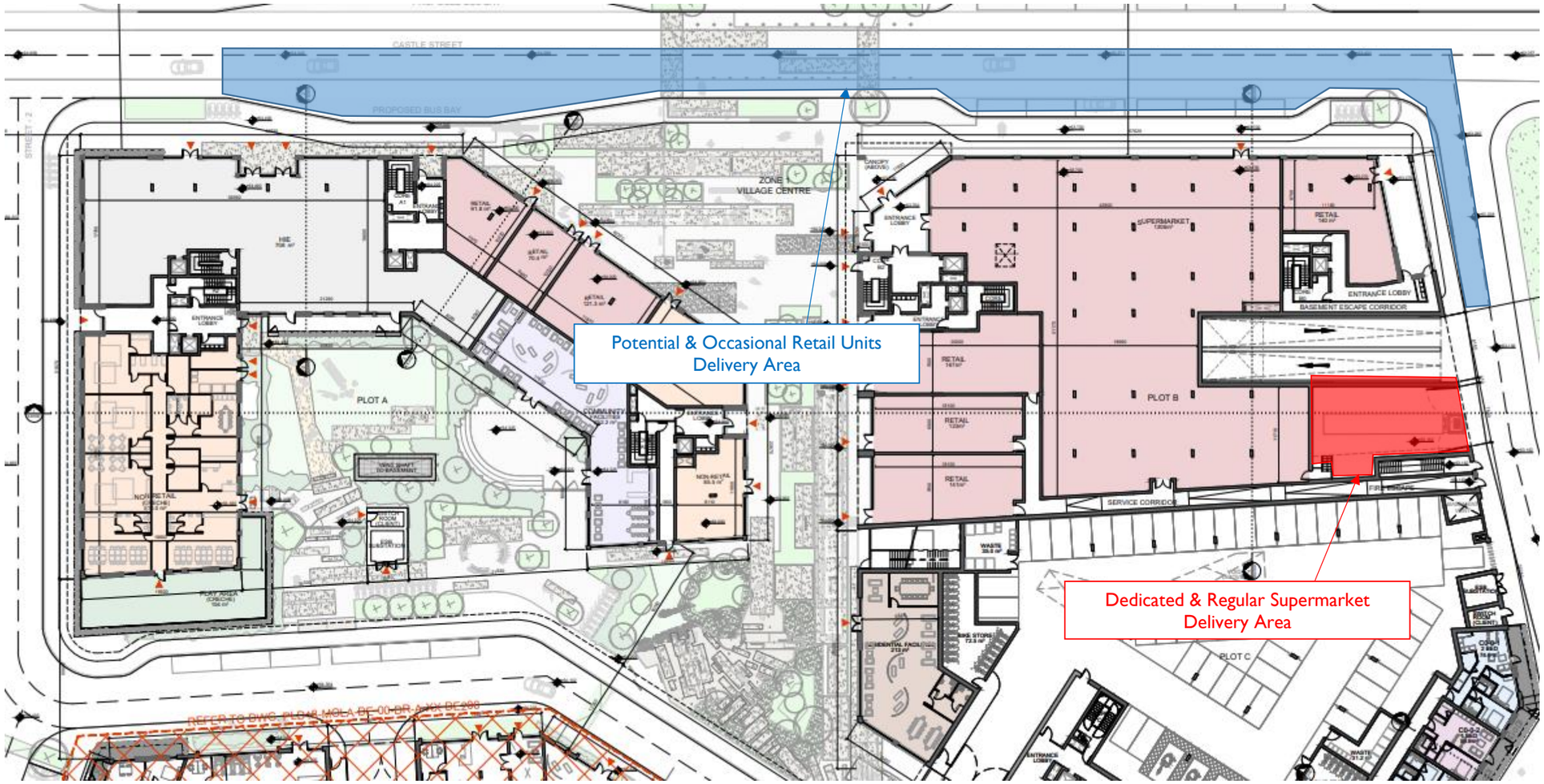

Figure 8.2 Retail Area Zone of Development

The noise level at a distance of 10m from a typical large supermarket delivery service yard is of the order of 64dB $L_{Aeq,1hr}$. This noise level includes the effects of reflections from building façades / service yard boundaries and contributions from all sources of delivery event noise, i.e. vehicles manoeuvring, air brakes, refrigeration units and trolleys. Noise levels from smaller delivery lorries are lower than this, the delivery periods are shorter in duration and would be expected to occur during daytime periods only. The worst-case condition from the large supermarket service yard is therefore considered as worst-case condition in this instance.

As discussed above, the loading area for the supermarket will be located at the western side of the building so would have direct line of sight with dwellings located to the north and west. Taking into account the delivery noise level referred to above as well as the distance between the loading bay and various receivers, the resultant noise levels at the façades of the nearest noise-sensitive locations have been calculated and

are predicted to be as follows:

- Brennanstown Vale Residential Dwellings to the North 43dB L_{Aeq}
- Glenamuck Road Residential Dwellings to the West 19dB L_{Aeq}
- Lehaunstown Road Residential Dwellings to the East 36dB L_{Aeq}

The noise levels at the nearest residential dwellings are predicted to be in the range of 19 to 43dB L_{Aeq} which is lower than both the daytime and night time criteria of 50dB L_{Aeq} and 45dB L_{Aeq} respectively as well as being significantly lower than the ambient noise levels at each of these locations during both periods.

No mitigation measures would therefore be required in respect of delivery truck events.

Building Services Plant

Once operational, the development will have various electrical and mechanical plant operating to service the Village Centre units and residential blocks, e.g. heating / refrigeration plant, pumps, etc. Most of this plant will be capable of generating noise to some degree. Some of this plant may operate 24-hours a day and, therefore, would be more noticeable during quiet periods (typically night-time). Plant with a direct line-of-sight to adjacent properties would potentially have the greatest impact.

It is expected that the majority of building services plant for this development will be located either internally or on building rooftops. Given that the building services plant design has not been completed at the planning stage, we would therefore recommend that the selected plant have a noise level no louder than 75dB L_{Aeq}[2] at a distance of 1m from the unit or building façade (or have noise control measures incorporated to achieve the same). In addition, a barrier screen wall should be provided to screen any noise producing mechanical equipment provided on the roof or if provided at ground level with direct line-of-sight with adjacent dwellings.

Taking into consideration this noise level along with the appropriate corrections for distance, screening, and the presence of nearby reflecting surfaces, the resultant noise levels at the façades of the nearest noise-sensitive locations have been calculated and are predicted to be as follows:

- Brennanstown Vale Residential Dwellings to the North 29dB L_{Aeq}
- Glenamuck Road Residential Dwellings to the West 29dB L_{Aeq}
- Lehaunstown Road Residential Dwellings to the East 19dB L_{Aeq}

The noise levels at the nearest residential dwellings are predicted to be in the range of 19 to 29dB L_{Aeq} which is lower than both the daytime and night time criteria of 50dB L_{Aeq} and 45dB L_{Aeq} respectively as well as being significantly lower than the ambient noise levels at each of these locations during both periods.

No further mitigation measures would therefore be required in respect of building services plant apart from the 75dB L_{Aeq} maximum noise level requirement for selected plant and provision of screening walls for plant with direct line of sight with the adjacent dwelling to the southeast.

Car Parking Activities

The car-parking facilities for the development will consist of both surface level spaces and enclosed car park areas. Given the large amount of land area that the development comprises, the vast majority of surface car park spaces will be in the interior of the development and therefore shielded by the development buildings themselves. The areas that are exposed will be along the northern portion of the residential dwelling zone (Zone 3) but these would likely experience minimal activity over the course of a given day.

[2] Note that noise levels for the selected building services plant will be determined by the design stage acoustic consultant and will likely be lower than this due to the necessity to achieve similar noise level criteria for residential spaces internally within the development so the 75dB L_{Aeq} at 1m level would therefore be considered appropriate to consider as a worst case condition for outward noise impact purposes.

Taking into account the shielding from the development and attenuation due to distance, noise levels from residential car parking along the vast majority of the development boundary are predicted to be ≤20dB L_{Aeq} at all nearby noise sensitive locations.

No mitigation measures would therefore be required in respect of car parking activities.

Vehicular Traffic on New Internal Road

The proposed development includes a new main access road (Castle Street) that runs through the centre of the development between the residential zones and the primary school and park area to the north.

The noise impact of this road on the nearest residential receptors in each case is addressed in the following paragraphs.

The noise level associated with an event of short duration, such as a vehicle drive-by, may be expressed in terms of its Sound Exposure Level[3] (SEL). The SEL can be used to calculate the contribution of an event or series of events to the overall noise level in a given period. The appropriate formula is given as follows:

$$L_{Aeq,T} = SEL + 10\log_{10}(N) - 10\log_{10}(T) \quad dB$$

where: $L_{Aeq,T}$ is the equivalent continuous sound level over the time period T (s);

SEL is the "A-weighted" Sound Exposure Level of the event under consideration (dB);

N is the number of events over the course of time period T.

The mean value of a Sound Exposure Level for a car movement, at low to moderate speeds, is of the order of 65dB(A) at a distance of 5m from the edge of the road. This figure is based on a series of measurements conducted under controlled conditions.

The Traffic & Transport report for the development estimates that 270 and 352 trip movements are expected to occur during the AM and PM peak hours respectively. In order to consider a worst case situation, we will use the 352 figure for our analysis.

Using the method outlined above, the PM peak hour noise level emission have been predicted at each of the three nearest noise sensitive locations. The results are shown in Table 8.8 below.

Description	Peak Hour Flow	Distance, m	$L_{Aeq,1hr}$, dB
Lahardane Hill Road Residences	352	170	30
Glenamuck Road Residences		180	30
Lehaunstown Road Residences		550	22

Table 8.8 Castle Street Peak-hour Noise Levels at Residences

In order to assess the impact of these noise levels, they are compared with measurements of the existing ambient noise level obtained during the environmental survey at each location in Table 8.9 below. The lowest daytime L_{Aeq} value has been used as a worst-case comparison in each instance.

[3] Defined as being the "A-weighted" equivalent continuous sound level which, when maintained for one second, contains the same quantity of sound energy as the actual time varying level of one event.

Description	Predicted / Measured Traffic Noise Levels (dB(A))				Impact
	Traffic	Ambient	Cumulative	Change	
Lahardane Hill Road Residences	30	57 - 58	57 - 58	Nil	Imperceptible.
Glenamuck Road Residences	30	62 - 64	62 - 64	Nil	Imperceptible.
Lehaunstown Road Residences	22	56 - 57	56 - 57	Nil	Imperceptible.

Table 8.9 Noise Impact of Castle Street Traffic on Adjacent Noise Sensitive Locations

As can be seen from the table, there is no expected change in noise level at any of the adjacent noise sensitive locations. The impact on cumulative noise levels is therefore considered to be imperceptible and negligible.

No additional mitigation measures would therefore be required in respect of vehicular traffic on the new internal road.

Additional Vehicular Traffic on Public Roads

The proposed development will introduce some additional traffic onto public roads in the locality of the site. This additional traffic will likely raise ambient noise levels in the vicinity of these roads by some degree once the development is operational.

Unfortunately, the only traffic flow volume data available is that contained in the Traffic & Transportation Chapter for the EIS report for the entire SDZ. The figures therefore include additional traffic flow increases for other elements of the SDZ development. However, these figures were considered and assessed as a worst case situation.

The below table summarises the traffic AADT figures for the various road links nearest to the development with and without Cherrywood for the opening year 2025 as well as the results of our change in noise level analysis.

Road Link	AADT For Opening Year 2025		Change in Noise Level (dB)
	Without Development	With Development	
M50 (Sandyford - Carrickmines)	85,318	101,442	+ 0.8dB
M50 (Carrickmines - Lehaunstown)	93,913	106,454	+ 0.5dB
M50 (Lehaunstown - Rathmichael)	74,512	86,472	+ 0.6dB
M11 (Rathmichael - Wilford)	119,306	136,108	+ 0.6dB
M11 (Wilford - Fassaroe)	102,532	117,220	+ 0.6dB
N11 (Brewery Rd - Leopardstown Rd)	58,977	74,160	+ 1.0dB

Road Link	AADT For Opening Year 2025		Change in Noise Level (dB)
	Without Development	With Development	
N11 (Leopardstown Rd - Kill Lane)	64,681	81,637	+ 1.0dB
N11 (Clonkeen Rd - Johnstown Rd)	41,780	49,137	+ 0.7dB
N11 (Clonkeen Rd - Johnstown Rd)	50,686	57,554	+ 0.6dB
N11 (Johnstown Rd - Wyattville Rd)	54,772	47,966	- 0.6dB
N11 (Wyattville Rd - Loughlinstown Rnd)	51,481	52,962	+ 0.1dB
M11 (Loughlinstown Rnd – M50/M11 Jn)	40,335	44,487	+ 0.4dB
Glenamuck Road South	25,155	29,151	+ 0.6dB
Glenamuck Road North	20,066	27,041	+ 1.3dB
Cornelscourt Hill	10,224	13,615	+ 1.2dB
Brighton Road	11,627	15,419	+ 1.2dB
Wyattville Road (N of Old Wyattsville Rd)	29,934	36,750	+ 0.9dB
Wyattville Road (S of Old Wyattsville Rd)	34,434	40,787	+ 0.7dB
Wyattville Road (N of Churchview Rd)	28,078	35,800	+ 1.1dB
Church Road	36,371	46,246	+ 1.0dB
Tully Vale Road	8,694	14,033	+ 2.0dB
WLR	31,352	37,498	+ 0.8dB

Table 8.10 Change in Traffic Noise Level for the Opening Year 2025

The differences between predicted traffic flows with and without the site are such that the resulting increase in noise levels is ≤2dB on all surrounding road networks.

Reference to Table 8.3 confirms that the impact of this increase would be considered imperceptible and therefore negligible. It should also be emphasised that these increases are in respect of the entire SDZ and not just the proposed development aspect.

No mitigation measures would therefore be required in respect of additional vehicular traffic on public roads.

8.6 POTENTIAL CUMULATIVE IMPACTS

The total level of combined noise emissions from the proposed development noise sources can be determined by summing together all of the individual contributions. The total levels of each are summarised and totalled in Table 8.11 below.

Noise Source	Noise Level Emission (dB $L_{Aeq,16hr}$)		
	Brennanstown Vale Residential Dwellings to North	**Glenamuck Road Residential Dwellings to West**	**Lehaunstown Road Residential Dwellings to East**
Delivery Truck Events	43	19	36
Building Services Plant	29	29	19
Car Parking Activities	< 20	< 20	< 20
Vehicular Traffic on New Internal Road	30	30	22
Cumulative Noise Level	**44**	**33**	**37**

Table 8.11 Proposed Development Cumulative Noise Level Emissions Summary

These cumulative noise levels are compared with the established project noise emission criteria in Table 8.12 below.

Location	Predicted Noise Level	Noise Emission Criteria	Compliant?
Brennanstown Vale Residential Dwellings to North	44dB L_{Aeq}	Daytime: 45 dB $L_{Aeq,16hr}$ Night Time: 50dB $L_{Aeq,8hr}$	Yes
Glenamuck Road Residential Dwellings to West	33dB L_{Aeq}		Yes
Lehaunstown Road Residential Dwellings to East	37dB L_{Aeq}		Yes

Table 8.12 Proposed Development Daytime Noise Emission Level Comparison with Established Criteria

As can be seen from the table above, the expected levels of noise emissions from the proposed development are within the established criteria at all nearby noise sensitive receptors during both daytime and night time periods. It should also be noted that the noise level conditions that were assessed and summarised in the table would be considered worst case in each instance. Furthermore, the predicted levels would also be below the ambient noise levels measured in the vicinity of each location.

There is therefore no significant noise impact that would be expected from the proposed development on any of the identified nearby noise sensitive receptors.

8.7 MITIGATION MEASURES

Construction Phase

The scheme contractor will be obliged to give due regard to **BS5228**, which offers detailed guidance on the control of noise from construction activities. In particular, it is proposed that various practices be adopted during construction, including:

- Limiting the hours during which site activities likely to create high levels of noise are permitted.
- Establishing channels of communication between the contractor/developer, local authority and residents.
- Appointing a site representative responsible for matters relating to noise.
- Ensuring all site access roads are kept as even as possible so as to mitigate the potential for vibration from lorries.
- Monitoring typical levels of noise during critical periods and at sensitive locations (on lands across the Luas line from the houses along Brennanstown Vale only).

Furthermore, it is envisaged that a variety of practicable noise control measures will be employed, including:

- Selection of plant with low inherent potential for generation of noise.
- Siting of noisy plant as far away from sensitive properties as permitted by site constraints.

Vibration from construction activities will be limited to the values set out in Table 8.13 but will likely be far below these values. It should be stressed that these limits are not absolute, but provide guidance as to magnitudes of vibration that are very unlikely to cause cosmetic damage. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Where there is existing damage, these limits may need to be reduced by up to 50%.

Allowable vibration (in terms of peak particle velocity) at the closest part of any sensitive property to the source of vibration, at a frequency of		
Less than 10Hz	**10 to 50Hz**	**50 to 100Hz (and above)**
3 mm/s	3 to 8 mm/s	8 to 10 mm/s

Table 8.13 Allowable Vibration During Construction Phase

Operational Phase

Delivery Truck Events

The noise impact assessment outlined in the previous section has demonstrated that no additional noise mitigation measures will be required in respect of delivery truck events.

Building Services Plant

The noise impact assessment outlined in the previous section has confirmed that the following additional mitigation measures should be provided in relation to building services plant:

Mitigation Measure 5.5.1: Selected building services plant should have a noise level no louder than 75dB L_{Aeq} at a distance of 1m from the unit or building façade (or have noise control measures incorporated to achieve the same).

Mitigation Measure 5.5.2: A barrier wall should be provided to screen any noise producing mechanical equipment provided on the roof (or if provided at ground level) with direct line-of-sight with adjacent dwellings.

Car Park Activity Noise

The noise impact assessment outlined in the previous section has demonstrated that additional noise mitigation measures will not be required in relation to car parking activities.

Vehicular Traffic on New Internal Road

The noise impact assessment outlined in the previous section has demonstrated that additional noise mitigation measures will not be required in relation to vehicular traffic on the development's new internal road.

Additional Vehicular Traffic on Public Roads

The noise impact assessment outlined in the previous section has demonstrated that additional noise mitigation measures will not be required in relation to additional vehicular traffic on public roads.

8.8 RESIDUAL IMPACTS

Construction Phase

The application of the practicable noise control measures listed in the previous section and controlled hours of working will ensure that the impact of construction noise and vibration is within the criteria limits established in this report, below ambient noise levels in the vicinity of all adjacent noise sensitive locations and minimised as far as practicable.

No significant residual noise or vibration impact from construction noise is therefore predicted.

Operational Phase

The provision of the two building services mitigation measures detailed in the previous section will ensure that the proposed development's cumulative residual noise levels detailed in Tables 8.11 & 8.12 are achieved. These levels are within the criteria limits established in this report and below ambient noise levels in the vicinity of all adjacent noise sensitive locations.

No significant residual noise or vibration impact from operational phase noise is therefore predicted.

8.9 M50 MOTORWAY INWARD NOISE IMPACT

Given the proximity of the M50 motorway, an inward noise impact from traffic noise on the nearby M50 motorway was also carried out in respect of the development. This assessment report has been provided in Appendix 8.1.

9.0 CLIMATE & AIR QUALITY

9.1 INTRODUCTION

This section of the Environmental Impact Assessment Report has been prepared to identify and assess the potential air quality and climatic impacts associated with the proposed development of a mixed-use village centre and residential development of 443 no. residential units at Priorsland, Cherrywood, Carrickmines, Co. Dublin during both the Construction and Operational Phases.

The proposed development will comprises of a mixed-use Village Centre and residential development, retail, high intensity employment and creche facilities. Parking is provided at ground floor level and underground car-parking. The project will also provide landscaping, services, roads, amenities and parking. It should be noted that the outline elements of the strategy will be updated post planning as the design evolves.

This document includes a comprehensive description of the existing air quality and climate at and in the vicinity of the subject site, a description of how the construction and operational phases of the development may impact existing air quality and finally; the mitigation measures that shall be implemented to control and minimise the impact that the development may have on local ambient air quality and reduce the impact on the local micro climate.

9.2 METHODOLOGY

The general assessment methodology of the potential impact of the proposed development on air quality and climate has been devised in accordance with:

- 2017 EPA Guidelines on information to be contained in Environmental Impact Assessment Reports.
- 2017 EC Guidance “Guidance on the preparation of the Environmental Impact Assessment Reports”
- Guidelines on Information to be Contained in an Environmental Impact Statement (EPA 2002).
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DoHPLG, August 2018).
- Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA 2003).
- Environmental Protection Agency, 2015. Revised Guidelines on the Information to be Contained in
- Environmental Impact Statements.
- Environmental Protection Agency, 2015. Draft Advice Notes for Preparation of Environmental Impact Statements.
- Environmental Impact Assessment (EIA), Guidance for Consent Authorities Regarding Sub-Threshold Development (DoEHLG 2003).
- Development Management Guidelines (DoEHLG, 2007).
- European Union (Planning & Development) (Environmental Impact Assessment Regulations 2018).

Baseline Environment
The existing ambient air quality in the vicinity of the site has been characterised with information obtained from a number of sources as follows:

• EPA Annual Air Quality in Ireland Reports;
• Site specific air quality monitoring.

The ambient air quality data collected and reviewed for the purpose of this study focused on the principal
substances (dust, vehicle exhaust emissions and boiler emissions) which may be released from the site during the construction and operation phases and which may exert an influence on local air quality.

Air Quality Standards and other Relevant Guidance
Air quality standards and guidelines are available from a number of sources. The guidelines and standards referenced in this report include those from Ireland and the European Union.

In order to reduce the risk to health from poor air quality, National and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set (Ref Table 9.1).

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the National Air Quality Standards Regulations 2011 (S.I No. 180 of 2011), which implement European Commission Directive 2008/50/EC which has set limit values for the pollutants SO_2, NO_2, PM_{10}, benzene and CO Council Directive 2008/50/EC combines the previous Air Quality Framework Directive (96/62/EC) and its subsequent daughter directives (including 1999/30/EC and 2000/69/EC). Provisions are also made for the inclusion of new ambient limit values relating to $PM_{2.5}$. The European 2008/50/EC Clean Air for Europe (CAFÉ) Directive is the current air quality directive for Europe which supersedes the European Directives 1999/30/EC and 2000/69/EC.

In order to assess a wider range of air pollutants in the development area it is necessary to review current air quality monitoring data from published sources such as the most recent EPA's 2020 Annual report entitled Air Quality in Ireland. This EPA report provides detailed monitoring data collected from a number of monitoring locations throughout Ireland on an annual basis to assess national compliance with National Air Quality Regulations. The location of the site in Priorsland, South County Dublin it is characterised as a Zone A area as defined by the EPA. Available EIAR climate & air quality characters for neighbouring sites have been reviewed in preparing this EIAR.

EU legislation on air quality requires that Member States divide their territory into zones for the assessment and management of air quality. The zones currently in place in Ireland in are as follows:

- Zone A is the Dublin conurbation,
- Zone B is the Cork conurbation
- Zone C comprising 23 large towns in Ireland with a population >15,000.
- Zone D is the remaining area of Ireland.

The zones changed on 1 January 2013 to reflect the results of the 2011 census.

The air quality in each zone is assessed and classified with respect to upper and lower assessment thresholds based on measurements over the previous five years. Upper and lower assessment thresholds are prescribed in the legislation for each pollutant. The number of monitoring locations required is dependent on population size and whether ambient air quality concentrations exceed the upper assessment threshold, are between the upper and lower assessment thresholds, or are below the lower assessment threshold. A summary of the Air Quality Standards Regulations 2011 is detailed below in Table 9.2.

POLLUTANT	REGULATION	LIMIT CRITERIA	TOLERANCE	LIMIT VALUE
NITROGEN DIOXIDE	2008/50/EC	Hourly limit for the protection of human health – not to be exceeded more than 18 times/year Annual limit for the protection of human health Annual limit for the protection of vegetation	40% until 2003 reducing linearly to 0% by 2010 40% until 2003 reducing linearly to 0% by 2010 None	200 µg/m^3 40 µg/m^3 400 µg/m^3 NO & NO_2
LEAD	2008/50/EC	Annual limit for the protection of human health	100%	0.5 µg/m^3
SULPHUR DIOXIDE	2008/50/EC	Hourly limit for protection of human health – not to be exceeded more than 24 times/year Daily limit for protection of human health – not to be exceeded more than 3 times/year Annual and Winter limit for the protection of ecosystems	150 µg/m3 NONE NONE	350 µg/m^3 125 µg/m^3 20 µg/m^3
PARTICULATE MATTER PM10	2008/50/EC	24-hour limit for protection of human health – not to be exceeded more than 35 times/year Annual limit for the protection of human health	50% 20%	50 µg/m^3 40 µg/m^3
PARTICULATE MATTER PM2.5 STAGE 1	2008/50/EC	Annual limit for the protection of human health	20% from June 2008. Decreasing linearly to 0% by 2015	25 µg/m^3
PARTICULATE MATTER PM2.5 STAGE 2	2008/50/EC	Annual limit for the protection of human health	NONE	20 µg/m^3
BENZENE	2008/50/EC	Annual limit for the protection of human health	20% until 2006. Decreasing linearly to 0% by 2010	5 µg/m^3
CARBON MONOXIDE	2008/50/EC	8-hour limit (on a rolling basis) for protection of human health	60%	10 µg/m^3
DUST DEPOSITION	German TA Luft Air Quality Standard [Note 1]	30 Day Average	NONE	350 mg/m^2/day

Table 9.1: Air Quality Standards Regulations 2011 (based on EU Council Directive 2008/50/EC)

Note 1: Dust levels in urban atmospheres can be influenced by industrial activities and transport sources. There are currently no national or European Union air quality standards with which these levels of dust deposition can be compared. However, a figure of 350 mg/m^2-day (as measured using Bergerhoff type dust deposit gauges as per German Standard Method for determination of dust deposition rate, *VDI 2129*) is commonly applied to ensure that no nuisance effects will result from industrial or construction activities.

Pollutant	EPA 2016 Assessment Classification
NO_2	
Zone A & B	Above lower assessment threshold
Zone C & D	Below lower assessment threshold
SO_2	
Zone A & B	Below lower assessment threshold
Zone C & D	Below lower assessment threshold
CO	
Zone A & B	Below lower assessment threshold
Zone C & D	Below lower assessment threshold
Ozone	
Zone A & B	Below long term objective
Zone C & D	Above long term objective
PM_{10}	
Zone A & B & C	Above lower assessment threshold
Zone D	Below lower assessment threshold
$PM_{2.5}$	
Zone A & B	Below lower assessment threshold
Zone C & D	Above lower assessment threshold
Benzene	
Zone A & B	Below lower assessment threshold
Zone C & D	Below lower assessment threshold
Heavy Metals (As, Ni, Cd, Pb)	
Zone A & B	Below lower assessment threshold
Zone C & D	Below lower assessment threshold
Pollutant	**EPA 2016 Assessment Classification**
Poly Aromatic Hydrocarbons (PAH)	Above lower assessment threshold
Zone A & C & D	Above upper assessment threshold
Zone B	

Table 9.2: EPA 2016 Assessment Zone Classification

Construction Impact Assessment Criteria

Transport Infrastructure Ireland's 'Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes' (Revision 1, 2011) states that "*it is very difficult to accurately quantify dust emissions arising from construction activities*" and that "*it is thus not possible to easily predict changes to dust soiling rates or PM_{10} concentrations.*" The guidance advises the use of a semi-quantitative approach to determine the likelihood of a significant impact which should be combined with an assessment of the proposed mitigation measures.

The construction assessment criteria, reproduced from the NRA guidance, are set out in Table 9.3 below.

Source		Potential distance for significant effects (distance from source)		
Scale	**Description**	**Soiling**	**PM_{10} [a]**	**Vegetation effects**
Major	Large construction sites, with high use of haul routes	100m	25m	25m
Moderate	Moderate sized construction sites, with moderate use of haul routes	50m	15m	15m
Minor	Minor construction sites, with limited use of haul routes	25m	10m	10m

Table 9.3: Assessment criteria for the impact of duct emissions from construction activities with standard mitigation in place (NRA, 2011)

The impact of construction related dust emissions is assessed by estimating the area over which there is a risk of significant impacts as per the NRA guidance.

Operational Impact Assessment Criteria

Climate has implications for many aspects of the environment from soils to biodiversity and land use practices. The proposed development may impact on both the macro-climate and micro-climate. The macro-climate is the climate of a large geographic area such as Ireland. The micro-climate refers to the climate in the immediate area. With respect to microclimate, green areas are considered to be sensitive to development. Development of any green area is generally associated with a reduction in the abundance of vegetation including trees and a reduction in the amount of open, undeveloped space. The removal of vegetation or the development of man-made structures in these areas can intensify the temperature gradient.

To assess the impacts of converting vegetative surfaces to hard-standing with residential buildings and its significance, the amount of vegetative surfaces associated with the proposed development that will be converted to residential buildings and hard-standing has been considered.

The impact of the proposed scheme upon the macro-climate is assessed through the consideration of the change in CO2 emissions that will occur due to the changes in traffic flow that occur in response to the proposed scheme. Ireland ratified the United Nations Framework Convention on Climate Change (UNFCCC) in April 1994 and the Kyoto Protocol in 1997 (FCCC 1997, 1999). For the purposes of the EU burden sharing agreement under Article 4 of the Kyoto Protocol, Ireland agreed to limit the net anthropogenic growth of the six GHGs under the Kyoto Protocol to 13% above the 1990 level over the period 2008 to 2012 (ERM 1998). The UNFCCC is continuing detailed negotiations in relation to GHGs reductions and in relation to technical issues such as Emission Trading and burden sharing. The most recent Conference of the Parties (COP24) to the agreement was convened in Katowice, Poland December 2018. COP24 was viewed as an important step towards the new 2015 agreement on climate change which was signed in Paris in late 2015. Contributions to greenhouse gas emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made on elevating adaption onto the same level as action to cut and curb emissions.

The EU, on the 23/24th of October 2014, agreed the “2030 Climate and Energy Policy Framework” (EU 2014). The European Council endorsed a binding EU target of at least a 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990. The target will be delivered collectively by the EU in the most cost-effective manner possible, with the reductions in the ETS and non-ETS sectors amounting to 43% and 30% by 2030 compared to 2005, respectively. Secondly, it was agreed that all Member States will participate in this effort, balancing considerations of fairness and solidarity. The policy also outlines, under “Renewables and Energy Efficiency”, an EU binding target of at least 27% for the share of renewable energy consumed in the EU in 2030.

In 1999, Ireland signed the Gothenburg Protocol to the 1979 UN Convention on Long Range Transboundary Air Pollution. The initial objective of the Protocol was to control and reduce emissions of Sulphur Dioxide (SO2), Nitrogen Oxides (NOX), Volatile Organic Compounds (VOCs) and Ammonia (NH3). To achieve the initial targets Ireland was obliged, by 2010, to meet national emission ceilings of 42 kt for SO2 (67% below 2001 levels), 65 kt for NOX (52% reduction), 55 kt for VOCs (37% reduction) and 116 kt for NH3 (6% reduction). In 2012, the Gothenburg Protocol was revised to include national emission reduction commitments for the main air pollutants to be achieved in 2020 and beyond and to include emission reduction commitments for PM2.5. In relation to Ireland, 2020 emission targets are 25 kt for SO2 (65% below 2005 levels), 65 kt for NOX (49% reduction), 43 kt for VOCs (25% reduction), 108 kt for NH3 (1% reduction) and 10 kt for PM2.5 (18% reduction). COM (2013) 917 Final is the “Proposal for a Council Decision for the acceptance of the Amendment to the 1999 Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution to Abate Acidification, Eutrophication and Ground level Ozone”.

European Commission Directive 2001/81/EC, the National Emissions Ceiling Directive (NECD), prescribes the same emission limits as the 1999 Gothenburg Protocol. A National Programme for the progressive reduction of emissions of these four transboundary pollutants has been in place since April 2005 (DEHLG 2004, 2007). The most recent data available from the EU in 2010 indicated that Ireland complied with the emissions ceilings for

SO2, VOCs and NH3 but failed to comply with the ceiling for NOX (EEA 2011). COM (2013) 920 Final is the "Proposal for a Directive on the reduction of national emissions of certain atmospheric pollutants and amending Directive 2003/35/EC". The proposal will apply the 2010 NECD limits until 2020 and establish new national emission reduction commitments which will be applicable from 2020 and 2030 for SO2, NOX, NMVOC, NH3, PM2.5 and CH4. In relation to Ireland, 2020-29 emission targets are for SO2 (65% below 2005 levels), for NOX (49% reduction), for VOCs (25% reduction), for NH3 (1% reduction) and for PM2.5 (18% reduction). In relation to 2030, Ireland's emission targets are for SO2 (83% below 2005 levels), for NOX (75% reduction), for VOCs (32% reduction), for NH3 (7% reduction), for PM2.5 (35% reduction) and for CH4 (7% reduction).

Guidance issued by the European Commission in 2013 entitled Guidance on "Integrating Climate Change and Biodiversity into Environmental Impact Assessment" has been applied to this assessment in order to determine the potential impacts the proposed developments may have a climate change and biodiversity.

9.3 RECEIVING ENVIRONMENT

Description of the Baseline Environment/Context

The proposed development is located off the M50 near junction 15. The M50 is located west and southwest of the site. The Carrickmines Luas Park & Ride line runs adjacent to the north-eastern site boundary. Agricultural land is bordering the eastern and southeast site boundaries.

The development area is located within a zone which includes a significant sources of transportation related air emissions principally from the M50 Motorway, N11 and local road infrastructure. It is noted that there are no major sources of industrial air emissions within 4km of the site.

Meteorological Data

A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM_{10}, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than $PM_{2.5}$) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles ($PM_{2.5}$ - PM_{10}) will increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

Description of Existing Climate

The nearest representative synoptic meteorological station to the subject site is at Dublin Airport which is located approximately 22km north of the site and as such, long-term measurements of wind speed/direction and air temperature for this location are representative of prevailing conditions experienced at the subject site. Recent meteorological data sets for Dublin Airport were obtained from Met Éireann for the purposes of this assessment study. The existing air quality environment is therefore principally defined by traffic from the M50, N11 and the Glenamuck Road. Fuel combustion for space heating for commercial activities and residential developments also contributed to the ambient air quality.

Rainfall

Precipitation data from the Casement Aerodrome meteorological station for the period 2011-2021 indicates a mean annual total of about 769.40 mm. This is within the expected range for most of the eastern half of the Ireland which has between 750 mm and 1000 mm of rainfall in the year.

Temperature

The annual mean temperature at Casement Aerodrome (2012-2021) is 9.8ºC. Given the relatively close proximity of this meteorological station to the proposed development site, similar conditions would be observed. Table 9.4 sets out meteorological data for Casement Aerodrome from 2012-2021.

Year	Period	Rainfall (mm)	Mean Temperature (ºC)
2012	Annual Mean	850	9.3
2013	Annual Mean	764	9.9
2014	Annual Mean	870	10.6
2015	Annual Mean	766	9.0
2016	Annual Mean	732	9.7
2017	Annual Mean	703	10.1
2018	Annual Mean	658	10.0
2019	Annual Mean	865	9.8
2020	Annual Mean	789	10.1
2021	Annual Mean	697	9.8
Mean		**769.40**	**9.8**

Table 9.4: Meteorological Data for Casement Aerodrome 2012-2021

Note 1: Data supplied by Met Eireann

Wind

Wind is of key importance for both the generation and dispersal of air pollutants. The windrose for Dublin Airport during five representative years (2014-2018) as presented below in Figure 9.1 indicates that the prevailing wind direction in the Dublin area. The mean annual wind speed in the Dublin area is approximately 5.7 m/s.

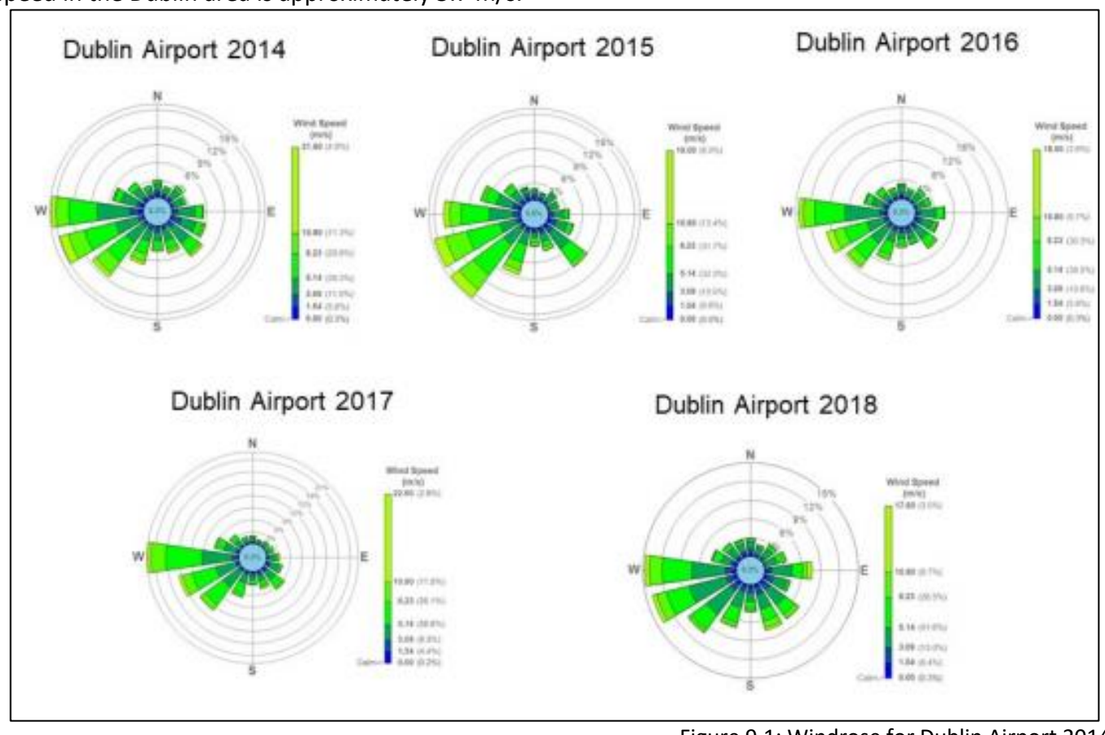

Figure 9.1: Windrose for Dublin Airport 2014-2018

Description of Existing Air Quality
The existing ambient air quality at and in the vicinity of the site is typical of a intermediate Urban location and as such, domestic and commercial heating sources and road traffic are identified as the dominant contributors of hydrocarbon, combustion gases and particulate emissions to ambient air quality. Available climate & air quality characters for neighbouring EIAR sites have been reviewed in preparing this EIAR. These characters have shown that the neighbouring development have a long-term and imperceptible impact at all of the receptors.

Trends in Air Quality
Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality "Air Quality in Ireland 2020 – Key Indicators of Ambient Air Quality" details the range and scope of monitoring undertaken throughout Ireland. EU legislation on air quality requires that Member States divide their territory into zones for the assessment and management of air quality. Four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2016).

Zone A is the Dublin conurbation, Zone B is the Cork conurbation with Zone C comprising 23 large towns in Ireland with a population >15,000. Zone D is the remaining area of Ireland. In terms of air quality monitoring, the proposed development is categorised as Zone A.

The most recent EPA publication includes a number of monitoring locations in Dublin City which would be broadly comparable to the expected air quality at the subject site. The various air quality monitoring stations within the Dublin area provides a comprehensive range of air quality monitoring data sets which have been selected as part of this assessment to describe the existing ambient air quality at the subject site.

Nitrogen Dioxide
The Air Quality Standards Regulations 2011 specify a limit value of 40 µg/m^3, for the protection of human health, over a calendar year. The standard, taken from the 2008 CAFÉ Directive 2000/69/EC, came into force in 2011.

Long term NO_2 monitoring was carried out at thirteen Zone A locations in 2020. The NO_2 average in 2013 for these sites ranged from 11-30 µg/m^3. Therefore, long term averages were below the annual average limit of 40 µg/m^3. There was no exceedance of the 1-hour limit value of 200 µg/m^3.

Sulphur Dioxide
The Air Quality Standards Regulations 2011 specify a daily limit value of 125 µg/m^3 for the protection of human health. The standard, taken from the 2008 CAFÉ Directive 2000/69/EC, came into force in 2011.

Long term SO_2 monitoring was carried out at five Zone A locations in 2020. The daily maximum SO_2 hourly averages in 2020 for these sites ranged from 1.4-5.2 µg/m^3. Therefore, long term averages were significantly below the daily limit of 125 µg/m^3. There was no exceedance of the hourly limit of 350 µg/m^3.

The annual mean SO_2 concentrations in Ireland have being slightly declining since 2003. This trend is reflective in the shift in fuel choice across Ireland in both residential heating and the energy production sector.

Carbon Monoxide
The Air Quality Standards Regulations 2011 specify an 8-hour limit value (on a rolling basis) for the protection of human health of 10mg/m^3. The standard, taken from the 2008 CAFÉ Directive 2000/69/EC, came into force in 2011.

Long term CO monitoring was carried out at two Zone A locations in 2020. The rolling 8-hour CO concentrations was 0.3mg/m^3 in 2020 at both locations. Therefore, long term averages were significantly below the 8-hour limit value (on a rolling basis) of 10 µg/m^3.

Particulate Matter PM_{10}
The Air Quality Standards Regulations 2011 specify a PM10 limit value of 40 µg/m^3 over a calendar year. The standard, taken from the 2008 CAFÉ Directive 2000/69/EC, came into force in 2011.

Long term PM10 monitoring was carried out at fifteen Zone A locations in 2020. The PM_{10} average in 2020 for these sites ranged from 10-20 µg/m^3. Therefore, long term averages were below the annual average limit of 40 µg/m^3.

Particulate Matter $PM_{2.5}$
The Air Quality Standards Regulations 2011 specify a $PM_{2.5}$ target value of 25 µg/m^3 over a calendar year to be met by 1 January 2010. From 1 January 2015 this target value shall become a limit value. Long term PM2.5 monitoring was carried out at fifteen Zone A locations in 2020. The $PM_{2.5}$ average in 2020 for these sites ranged from 6-9 µg/m^3. Therefore, long term averages were below the target value 20 µg/m^3.

Benzene
The Air Quality Standards Regulations 2011 specify a benzene limit value of 5 µg/m^3 over a calendar year. The standard, taken from the 2008 CAFÉ Directive 2000/69/EC, came into force in 2011. Long term benzene monitoring was carried out at one Zone A location in 2020. The benzene average in 2020 for this site was 0.52 µg/m^3. Therefore, long term averages were below the limit value 5 µg/m^3.

Table 9.5 below presents a summary of the 2021 Air Quality data obtained from the Dublin Zone A which may be considered to be broadly similar to that of the subject site in which the subject development site is located. Indeed, it is expected that the air quality at the subject site will be of a higher quality as it is further removed from the monitoring locations within the Dublin City Area.

Pollutant	Regulation	Limit type	Limit value	EPA monitoring data 2020
Nitrogen dioxide	2008/50/EC	Annual limit for protection of human health	40 µg/m^3	11-31 µg/m^3
Sulphur dioxide	2008/50/EC	Daily limit for protection of human health (not to be exceeded more than 3 times per year)	125 µg/m^3	1.4-5.2 µg/m^3
Carbon monoxide	2008/50/EC	8-hour limit (on a rolling basis) for protection of human health	10 mg/m^3	0.30 mg/m^3
Particulate matter (as PM10)	2008/50/EC	Annual limit for protection of human health	40 µg/m^3	10-20 µg/m^3
Particulate matter (as PM2.5)	2008/50/EC	Annual limit for protection of human health	20 µg/m^3	6-9 µg/m^3
Benzene	2008/50/EC	Annual limit for protection of human health	5 µg/m^3	0.52 µg/m^3

Table 9.5: Summary of the 2015 Air Quality data obtained from the Dublin Zone A

Baseline Air Quality Monitoring
A site specific short-term monitoring study was conducted for Nitrogen oxides, Sulphur dioxide and BTEX and Particulates (Benzene, Toluene, Ethylbenzene and Xylene). All pollutants were measured at the boundary locations (AQM1, AQM3, AQM7, AQM10 and AQM13) using passive diffusion tubes over a two week period. Figure 9.1 identifies the monitoring locations. The baseline survey was conducted during January 2019 when the potential for higher ambient levels of fossil fuel generated pollutants would be at a maximum.

These locations were chosen in order to obtain short-term sample concentrations for the identified parameters from the principal sources of pollution i.e. vehicle exhaust emissions and home heating emissions.

The survey was indicative only and results obtained cannot be used to demonstrate compliance with short-term or annual limit values detailed in Table 9.5 above. The survey does, however, aid in identifying the influence of sources in the vicinity of the proposed development site. The results from the monitoring surveys are presented in Table 9.6.

The concentrations of NO_2, SO_2 and Benzene measured during the short term measurement survey were significantly below their respective annual limit values and comparable with levels reported by the EPA.

Pollutant	Sample Period	Concentration µg/m^3					Criteria (Annual limit)
		Air Quality Monitoring Locations					
		AQM1	AQM3	AQM7	AQM10	AQM13	
Nitrogen dioxide	17.01.19 – 31.01.19	<5	<4	<4	<4	<4	40 µg/m^3(as annual average)
Sulphur dioxide	17.01.19 – 31.01.19	<3	<3	<3	<3	<3	125 µg/m^3(as annual average)
Benzene	17.01.19 – 31.01.19	<2	<2	<2	<2	<2	10 µg/m^3(as annual average)
Ethylbenzene	17.01.19 – 31.01.19	<2.5	<3	<3	<3	<3	N/A
Toulene	17.01.19 – 31.01.19	<9	<9	<9	<9	<9	N/A
m/p-Xylene	17.01.19 – 31.01.19	<3	<3	<3	<3	<3	N/A
o-Xylene	17.01.19 – 31.01.19	<2	<2	<2	<2	<2	N/A

Table 9.6 Results of passive diffusion tube monitoring at the proposed development site.

Note 1: < value indicates below Laboratory limit of detection

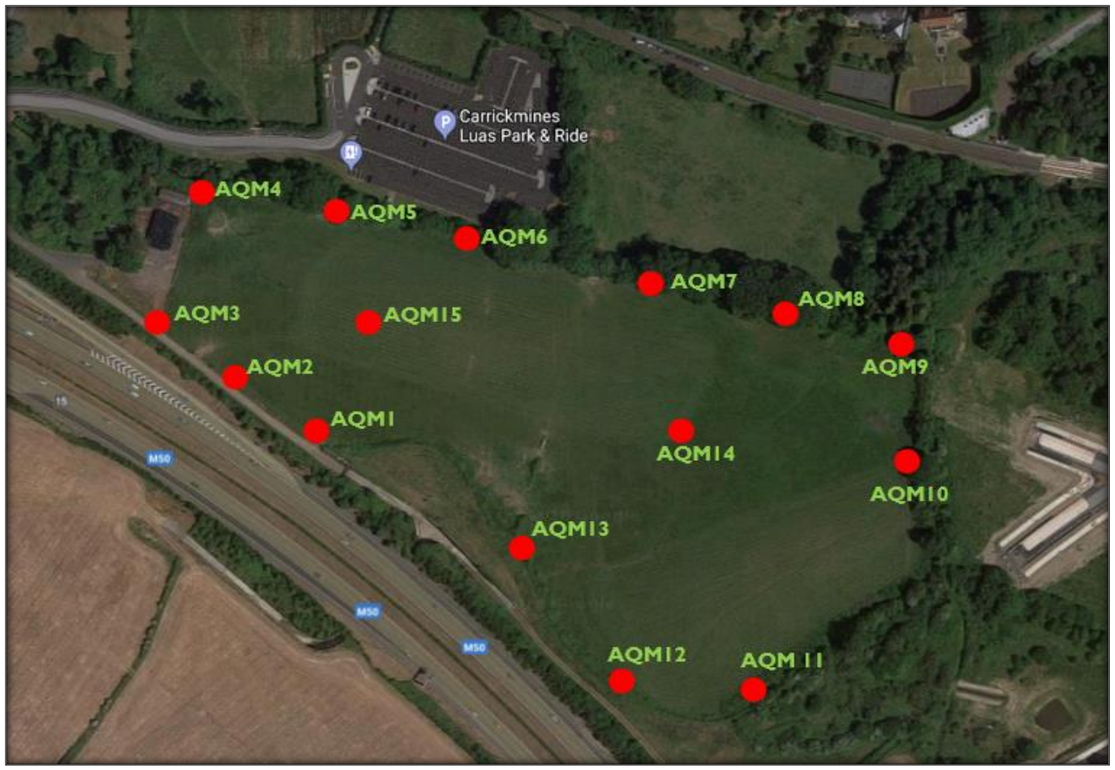

Figure 9.2 Baseline Air Quality Monitoring Locations AQM1 TO AQM15 Dust Levels Tested with DustTrak II Aerosol Monitor 8530.

AQM Location	Total Particulates mg/m^3/day
AQM1	0.015
AQM2	0.016
AQM3	0.019
AQM4	0.015
AQM5	0.018
AQM6	0.020
AQM7	0.020
AQM8	0.018
AQM9	0.019
AQM10	0.019
AQM11	0.021
AQM12	0.027
AQM13	0.018
AQM14	0.019
AQM15	0.010

Table 9.7 Total Particulates measured onsite

Significance
Based on published air quality data for the Zone A Dublin city area in the vicinity of the subject site together with site specific monitoring data, it may be concluded that the existing baseline air quality at the subject site may be characterised as being good with no exceedances of the Air Quality Regulations 2011 limit values of individual pollutants.
The quality of existing air quality at the subject site must be maintained and improved where possible as a result of the proposed development to ensure that local human health and the ecological environment is not adversely affected.

Sensitivity
The subject site shall be developed by ground clearance and site preparation works and the subsequent construction of residential units, a creche, retail/non retail units, roads, open spaces and landscaped areas. The principal local receptors are the Carrickmines Luas Park & Ride and the M50 Motorway.

9.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The development will comprise a mixed-use village centre and residential development of 443 no. units comprising 6 no. blocks (A-F) of apartments (up to 5 storeys with basement/undercroft parking) providing 402 no. apartments units (146 no. 1-beds; 218 no. 2-beds and 38 no. 3-beds), and 41 no. houses (19 no. 3-beds and 22 no. 4-beds). All apartments provided with private balconies/terraces. Provision of indoor residential facilities to serve apartment residents.

The Village Centre and non-residential elements will comprise a supermarket, local retail/retail service units, non-retail commercial units, creche, gym, community space, and offices (High Intensity Employment) use.

Provision of car/bicycle/motorcycle parking; ESB sub-stations; bin storages areas, and all associated plant areas.

Provision of the first phase of Priorsland Park (on lands within the applicant's ownership) and other public and communal open spaces.

Construction of Castle Street through the subject lands and two road bridges across the Carrickmines Stream, one to serve the future school site/ park, the second to provide pedestrian and cyclist access to the Carrickmines Luas station and future Transport Interchange to the north. Provision of an additional pedestrian bridge to the park. Provision of an acoustic barrier along the southern/western edge of the site.

All associated site development works, landscaping, boundary treatments and services provision.

When considering a development of this nature, the potential impact on air quality and climate must be considered for each distinct stage: the short (1-3 years) and medium term (3-5) impact of the construction phase and the longer term impact of the operational phase. The construction phase will be undertaken over a maximum 3 year period. It is important that there are no unacceptable decreases in ambient air quality levels predicted during the construction phases and during the operational phase.

9.5 POTENTIAL IMPACTS

Predicted Impact
Various elements of both the construction and operational phases of the proposed development have the potential to impact on the local receiving environment, on adjacent residential properties and on human health. The likely potential impacts for both construction and operation of the proposed scheme prior to mitigation are described in this section of the EIAR.

Construction Impacts - Interim
The development of the site will be conducted in the following phased stages:

- Enabling works - Site set up and Site clearance
- Construction works including site infrastructure, house building and landscaping

- Construction impacts associated with both of these phased stages are considered below.

Enabling Works – Site Set Up and Clearance
Works activities associated with the 'Site set up' will be undertaken prior to construction works commencing in each sub-phase. The setting up of the site shall involve the construction of site security hoarding and site compounds, site offices, materials and waste storage areas and staff welfare facilities. These temporary activities will have a minimal potential to generate fugitive dust emissions or combustion gas emissions.

Site clearance and ground excavation works will be undertaken in separate phases and these activities have the potential to generate fugitive windblown dust emissions rising from the operation of mechanical plant such as dozers, excavators and tipper trucks and the movement of these vehicles on exposed surfaces at the site. With regard to the phased development approach, only one phase at a time shall be developed with the remaining phased areas remaining generally undisturbed until such a time as they are developed. Infrastructural works will be required to facilitate site services but it is not predicted that there would be bulk excavations of stripped soils until such a time as the development of subsequent phases are commenced.

With regard to the volume of waste material (top and sub soils) generated during site clearance, there will be a requirement for HGV trucks. Top soils shall be stockpiled and covered on site for re-use during final landscaping works. Trucks shall be loaded with material on-site by mechanical excavators and loading shovels which will generate fugitive dust emissions as a result of the transfer of the excavated materials comprised principally of soils and stones from stockpile to truck. The movements of construction vehicles on the site shall also generate windblown dust emissions. Where dusty waste material is loaded onto exposed open trucks, fine dusts may be released as the truck travels along public roads.

The management of construction traffic on the public road network around the development will be a critical part of the overall project and must be actively managed by the Contractor. The proposed construction access route to the Priorsland site will be via the western route utilising the available legal right of way (via the M50 Southbound Roundabout).

The impact on local air quality during Site Set Up and Clearance will be temporary in nature and will result in a potentially minor impact on local air quality and sensitive receptors provided that all mitigation measures are implemented. Stockpiled topsoil's shall be covered to prevent their erosion and shall eventually be re-used in landscaping works on the site.

Building and Site Infrastructure Construction Works
The development relates to the construction of residential units in a mix of apartments, local retail/retail service units, non-retail commercial units, creche, gym, community space, offices, car parking and landscaping. The proposal includes for internal roads and streets along with appropriate hard and soft landscaping treatments.

During the construction phase there will be extensive site works, involving construction machinery, construction activities on site which have the potential to generate fugitive windblown dust emissions.

Construction equipment including generators and compressors will also give rise to some exhaust emissions. However, due to the size and nature of construction activities, exhaust emissions during construction will have a negligible impact on local air quality.
Construction traffic to and from the site shall result in a short term increase in the volume of diesel fuelled HGV's along the local road network which will generate additional hydrocarbon and particulate emissions from the vehicle exhausts. However, the activities detailed above will result in an imperceptible impact on local air quality and sensitive receptors.

Climate
During the construction phase, existing vegetated areas throughout the development site will be removed due to site clearance works and associated movement of construction traffic thus impacting the micro-climate. Whilst this will impact the evapotranspiration rates of vegetation, there will be no impact upon the moisture evaporation from the exposed soil. Therefore, there will be no significant impacts on microclimate.

CO_2 will be released into the atmosphere as a result of the movement of construction vehicles and use of plant. However emissions associated with such activities will occur over a short-term period (c. 3 years) which will not result in an adverse impact on the local micro or the broader macro climate.

Human Health
Best practice mitigation measures are proposed which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction/demolition of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health.

Construction Impacts – Permanent
The permanent predicted impacts are as described above for construction impacts interim.

Operational Phase – Interim

Air Quality
The operational phase of the proposed development will result in a slight impact on local air quality primarily as a result of the requirements of new buildings to be heated and with the increased traffic movements associated with the development. The Cherrywood SDZ planning permission granted in 2014 included an assessment of traffic impacts on the air quality. Therefore, it is assumed the Priorsland development does not require an individual DMRB screening Model as part of this application.

Traffic movements associated with the development have been evaluated and assessed as part of the Traffic Impact Assessment for the development which will include parking for vehicles which will enter and exit the site. The am and pm peak traffic movements will not result in an adverse impact on local air quality at any of the junctions and it is predicted that the impact of car engine exhaust emissions will have a negligible impact on local ambient air quality. Given the location of the Carrickmines Luas Park and Ride located opposite to the development, it is expected that a significant proportion of the commuting residents will avail of this and the local Dublin Bus services. The availability of public transport will significantly reduce the number of vehicles exiting and entering the development during am and pm peak times.

The design and construction of all buildings in accordance with National Building Regulations shall ensure that modern building materials are used and that they are designed to be thermally efficient resulting in a reduction in the volume of fossil fuels required to heat the buildings. It is predicted that fossil fuel combustion gas emissions including Carbon Dioxide, Sulphur Dioxide, Nitrogen Oxides, Carbon Monoxide and hydrocarbon particulate emissions will be slight and will not have an adverse significant impact on the existing ambient air quality in the vicinity of the proposed development site.

Energy Efficiency - All proposals for development shall seek to meet the highest standards of sustainable design and construction with regard to the optimum use of sustainable building design criteria such as passive solar principles and also green building materials. In order to reduce energy consumption, the following key design considerations have been considered in the design process and will be incorporated into the construction of the residential units, where feasible:

- Passive solar design including the orientation, location and sizing of windows
- The use of green building materials: low embodied energy & recycled materials
- Energy efficient window units and frames
- Building envelope air tightness
- Installation of Heat Recovery & Ventilation systems in all apartment units which operate by extracting warm air from kitchens and bathrooms, cleaning it and distributing it to other rooms in the unit.

Climate
The site area will include open space and landscaped areas. The overall development includes the construction of buildings and roadways will have the effect of marginally raising local air temperatures, especially in summer. Therefore, it is predicted that the proposed development will not have an adverse impact on micro-climate at the nearest residential properties or on the local receiving environment in the vicinity of the site boundaries.

The proposed development includes structures which will have a minor impact on the local micro-climate by means of wind sheer effects. There will however be no unacceptable impact within or beyond the overall site.

Greenhouse gases occur naturally in the atmosphere (e.g. carbon dioxide, water vapour, methane, nitrous oxide and ozone) and in the correct balance, are responsible for keeping the lower part of the atmosphere warmer than it would otherwise be. These gases permit incoming solar radiation to pass through the Earth's atmosphere, but prevent most of the outgoing infrared radiation from escaping from the surface and lower atmosphere into the upper levels. However, human activities are now contributing to an upward trend in the levels of these gases, along with other pollutants with the net result of an increase in temperature near the surface.

Motor vehicles are a major source of atmospheric emissions thought to contribute to climate change, however, vehicle exhaust emissions generated from site related vehicles will have a negligible impact on the macro-climate given modern technological developments in cleaner and more efficient vehicle engines.

The scheme has been designed to provide thermally efficient buildings which will reduce the consumption of fossil fuels within each individual dwelling. This will reduce the impact the operational phase of the development will have on the micro and macro climate. In particular, there will be no "traditional" passive air vents in the apartments which are both thermally and acoustically inefficient and if possible, Mechanical Ventilation and Heat Recovery (MVHR) systems shall be incorporated into the design of the apartments. The MVHR systems together with thermally and acoustically rated window sets will reduce the potential future impacts that the external climate will have in terms of wind and changing temperatures on the internal environment within the residential units. These design features will ensure the units are thermally efficient thus reducing the use of fossil fuels leading to a reduction of the impact on climate.

The thermal efficiency of the buildings will ensure that the development will be sustainable and will be protected against the impacts of future climate change which can include high winds, storm events and prolonged colder periods during the winter season.

The EPA's Integrated Pollution Prevention and Control (IPPC) Licensing Application Guidance Notes, 2012 define the threshold of boiler emissions for the categorisation of major ot minor emissions. As a genreal rule, gas boilers over 5 MW are regarded to be significant and categorised as a major emission. There will be no gas boilers in excess of 5MW on this site.

Operational Phase – Permanent
The permanent predicted impacts are as described above for operational impacts interim.

9.6 POTENTIAL CUMULATIVE IMPACTS

In accordance with *Schedule 6, Part 2(c) of the Planning and Development Regulations 2001*, this section has considered the cumulative impact of the proposed development in conjunction with future development in the vicinity of the subject site. This section relates to the cumulative impact on the subject site itself and on surrounding sites.

The European Commissions report of May 1999 'Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions' defines cumulative impact as follows:
"Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project".

The cumulative air quality impact of the existing residential development and existing local transport infrastructure together with the proposed Priorsland development is assessed with regard to having established the baseline air quality and then predicting the impact that the proposed development will have on the baseline air quality. Together the combined impact can be assessed to determine if there is sufficient "atmospheric budget" to facilitate the proposed development.

It is predicted that the cumulative impact of the construction and operational phases of both developments will not have an adverse long term impact on the receiving environment.

It is considered that in the absence of mitigation there is the potential for a short term slight negative cumulative impact associated with the construction phase of the Priorsland development on ambient air quality and climate primarily as a result of the use of diesel to fuel construction plant and equipment. However, through the implementation of Construction Phase air quality mitigation measures and the integration into the design of the operational development of sustainable aspects and energy reduction features will ensure the receiving environment including off site residential receptors and existing habitats will not be adversely impacted.

9.7 MITIGATION MEASURES

Construction phase
In order to ensure that adverse air quality impacts are minimised during the construction phase and that the potential for soiling of property and amenity, local public roads and the LUAS tram system is minimised, the following mitigation measures shall be implemented during the course of all construction activities:

Mitigation Measures (Construction)

- Avoid unnecessary vehicle movements and manoeuvring, and limit speeds on site so as to minimise the generation of airborne dust.
- Use of rubble chutes and receptor skips during construction activities.
- During dry periods, dust emissions from heavily trafficked locations (on and off site) will be controlled by spraying surfaces with water and wetting agents.

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads will be restricted to essential site traffic only.
- Re-suspension in the air of spillages material from trucks entering or leaving the site will be prevented by limiting the speed of vehicles within the site to 10kmh and by use of a mechanical road sweeper.
- The overloading of tipper trucks exiting the site shall not be permitted.
- Aggregates will be transported to and from the site in covered trucks.
- Where the likelihood of windblown fugitive dust emissions is high and during dry weather conditions, dusty site surfaces will be sprayed by a mobile tanker bowser.
- Wetting agents shall be utilised to provide a more effective surface wetting procedure.
- Exhaust emissions from vehicles operating within the construction site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions from vehicles are minimised by routine servicing of vehicles and plant, rather than just following breakdowns; the positioning of exhausts at a height to ensure adequate local dispersal of emissions, the avoidance of engines running unnecessarily and the use of low emission fuels.
- All plant not in operation shall be turned off and idling engines shall not be permitted for excessive periods.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- Material stockpiles containing fine or dusty elements including top soils shall be covered with tarpaulins.
- Where drilling or pavement cutting, grinding or similar types of stone finishing operations are taking place, measures to control dust emissions will be used to prevent unnecessary dust emissions by the erection of wind breaks or barriers. All concrete cutting equipment shall be fitted with a water dampening system.
- A programme of air quality monitoring shall be implemented at the site boundaries for the duration of construction phase activities to ensure that the air quality standards relating to dust deposition and PM_{10} are not exceeded. Where levels exceed specified air quality limit values, dust generating activities shall immediately cease and alternative working methods shall be implemented.
- A complaints log shall be maintained by the construction site manager and in the event of a complaint relating to dust nuisance, an investigation shall be initiated.
- Dust netting and site hoarding shall be installed along the northeastern site boundary to minimise fugitive windblown dust emissions falling on the LUAS tram line.

Operational Phase

The Operational Phase of the Proirsland development site will not generate air emissions that would have an adverse impact on local ambient air quality or local human health and as such there are no mitigation measures specified for the Operational Phase.

The operational phase mitigation by design measures to minimise the impact of the development on air quality and climate are as follows:

Mitigation Measures (Operational)

- Thermally efficient glazing systems on all units
- Mechanical Ventilation and Heat Recovery (MVHR) systems or equivalent installed in all apartments
- Thermal insulation of walls and roof voids of all units
- Natural Gas heating in all units
- Inclusion of electric car charging points to encourage electric vehicle ownership
- Proximity of LUAS to the development to provide public transport to residents
- Removal of invasive species from the site prior to development

9.8 PREDICTED IMPACTS

Construction Phase – Interim

Various elements associated with the construction phase of the proposed development have the potential to impact local ambient air quality, however the potential construction phase impacts shall be mitigated as detailed in Section 9.7 above to ensure there is a minimal impact on ambient air quality for the duration of all construction phase works.

Construction Phase – Permanent
Various elements associated with the construction phase of the proposed development have the potential to impact local ambient air quality, however the potential construction phase impacts shall be mitigated as detailed in Section 9.7 above to ensure there is a minimal impact on ambient air quality for the duration of all construction phase works.

Operational Phase – Interim
It is predicted that the operational phase of the development will not generate air emissions that would have an adverse impact on local ambient air quality or local human health.

Operational Phase – Permanent
It is predicted that the operational phase of the development will not generate air emissions that would have an adverse impact on local ambient air quality or local human health.

9.9 'DO NOTHING' SCENARIO

The subject site is currently comprised of agricultural land. The lands are primarily used by Carrickmines Equestrian Centre for grazing horses and tillage. Based on the projected increase in traffic up to the reference year of 2037, the increase in traffic related emissions, based on projected Traffic Impact Assessment figures without the subject development would be insignificant. This increase above the existing situation would be minor and would not result in a perceptible change in the existing local air quality environment.

9.10 WORST CAST SCENARIO

The main potential for adverse impact on local air quality will occur during the construction phase. The worst-case scenario therefore corresponds to the situation where the mitigation measures for construction activities fail or are not implemented. Should dust mitigation measures not be implemented during the construction phase, significant dust nuisance is likely in areas close to the construction site. Given the distance to sensitive receptors dust nuisance is not considered to be a significant issue providing mitigation measures are carried out.

9.11 MONITORING & REINSTATEMENT

Monitoring
This section describes the dust monitoring methodologies that shall be implemented at the site during the construction phases to ensure that dust generated by site activities does not cause nuisance or cause detrimental health effects to residential areas and sensitive receptors located in the vicinity of the site boundaries. In addition, the monitoring programme also provides for the assessment of dust along the M50 motorway and the Carrickmines Luas Park & Ride.

Dust Deposition Monitoring Methodology
Dust deposition levels will be monitored to assess the impact that site construction site activities may have on the local ambient air quality and to demonstrate that the environmental control measures in place at the site are effective in minimising the impact of construction site activities on the local receiving environment including the M50 Motorway and the Carrickmines Luas Park & Ride. The following procedure shall be implemented at the site on commencement of site activities:

The dust deposition rate will be measured by positioning Bergerhoff Dust Deposit Gauges at strategic locations near the boundaries of the site for a period of 30 +-2 days. Monitoring shall be conducted on a monthly basis during periods when the highest levels of dust are expected to be generated i.e., during site preparation works and soil stripping activities and on a quarterly basis thereafter. The proposed monitoring locations (D1 – D5) are presented below in Figure 9.3.

The selection of sampling point locations will be completed after consideration of the requirements of *Method VDI 2119* with respect to the location of the samplers relative to obstructions, height above ground and sample collection and analysis procedures. The optimum locations will be determined by a suitably qualified air quality expert to ensure that the dust gauge locations are positioned in order to best determine potential dust deposition in the vicinity of the site boundaries and existing on-site buildings.

After each (30 +-2 days) exposure period, the gauges will be removed from the sampling location, sealed and the dust deposits in each gauge will be determined gravimetrically by an accredited laboratory and expressed as a dust deposition rate in mg/m2-day in accordance with the relevant standards. Technical monitoring reports detailing all measurement results, methodologies and assessment of results shall be subsequently prepared and maintained by the Site Manager. Monitoring reports shall be made available to the Local Authority as requested.

A dust deposition limit value of 350 mg/m2-day (measured as per German Standard Method VDI 2119 – Measurement of Particulate Precipitations – Determination of Dust Precipitation with Collecting Pots Made of Glass (Bergerhoff Method) or Plastic. is commonly specified by Local Authorities and by the EPA to ensure that no nuisance effects will result from specified activities and it is to this Best Practice standard method that this programme of dust monitoring and control has been prepared. The *German Federal Government Technical Instructions on Air Quality Control - TA Luft* specifies an emission value for the protection against significant nuisances or significant disadvantages due to dustfall. This limit value is 350 mg/m2-day and it is to this limit value that all measured dust deposition levels shall be assessed. This limit value is commonly specified by Local Authorities at construction sites.

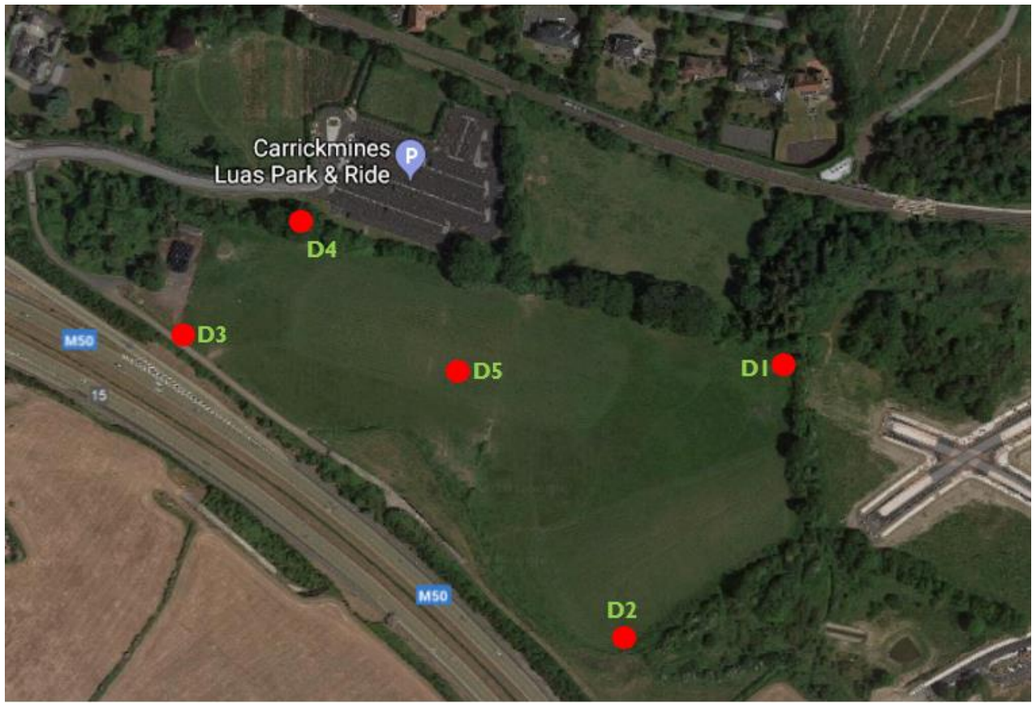

Figure 9.3: Construction Phase dust monitoring locations D1 – D5

Reinstatement
Reinstatement issues are not relevant to this Section of the EIAR.

9.12 DIFFICULTIES IN COMPILING INFORMATION

There were no difficulties encountered in compiling this section of the EIAR.

9.13 REFERENCES

- European Union (Planning & Development) (Environmental Impact Assessment) Regulations 2018 (SI No. 296 of 2018).
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- Environmental Protection Agency (EPA) (2002) Guidelines On Information To Be Contained in Environmental Impact Statements
- UK DEFRA (2016a) Part IV of the Environment Act 1995: Local Air Quality Management, LAQM. PG
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- EPA (2016) Air Quality Monitoring Report 2015 (& previous annual reports 1997-2014)
- EPA (2017) EPA Website: http://www.epa.ie/whatwedo/monitoring/air/
- UK DEFRA (2016) NO_x to NO_2 Conversion Spreadsheet (Version 5.1)
- Transport Infrastructure Ireland (2011) Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes
- Transport Infrastructure Ireland (2009) Guidelines for Assessment of Ecological Impacts of National Roads Schemes (Rev. 2, Transport Infrastructure Ireland, 2009)
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- EU (2017) Ireland's Final Greenhouse Gas Emissions in 2015
- BRE (2003) Controlling Particles, Vapours & Noise Pollution From Construction Sites
- The Scottish Office (1996) Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings
- UK Office of Deputy Prime Minister (2002) Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance
- USEPA (1997) Fugitive Dust Technical Information Document for the Best Available Control Measures
- USEPA (1986) Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition (periodically updated)

10.0 LANDSCAPE & VISUAL

10.1 INTRODUCTION

This chapter includes the Landscape and Visual Impact Assessment (LVIA) that was completed to assess the potential impact and effect of the proposed development on the landscape on the landscape setting as well as on visual receptors in the landscape such as residents, visitors, people pursuing recreational activities etc. The assessment indicates the types and levels of the anticipated effects of the development.

Photomontages have been prepared for the proposed scheme (refer to the proposed views for photomontages outlined below (A3 of the photomontages also included with the SHD application pack).

Definition of Landscape

The European Landscape Convention 2000 (ELC), also known as the Florence convention, defines landscape as 'an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors'. The ELC applies to natural, rural, urban and peri-urban areas and concerns landscapes that might be considered outstanding as well as every day or degraded. This is an inclusive definition that extends beyond the idea of landscape as only a matter of aesthetics and visual amenity.

The National Landscape Strategy for Ireland 2015-2025, which was developed as a result of the ELC, recognises that the Irish landscape has evolved over time and will continue to do so. This strategy notes that landscape is more than our stunning countryside and dramatic coastline; it also encompasses out towns, cities and villages, the ordinary and the everyday.

The Planning and Development Act 2000, as amended, provides that 'landscape' has the same meaning as in the ELC. The PDA, as amended, requires Development Plans and Regional Guidelines to include objectives relating to landscape, in accordance with relevant policies or objectives for the time being of the Government or any Minister of the Government relating to providing a framework for identification, assessment, protection, management and planning of landscapes and developed having regard to the European Landscape Convention done at Florence on 20 October 2000. In addition, an environmental impact assessment much assess the direct and indirect effects of a proposed development on the landscape.

10.2 METHODOLOGY

This assessment has been prepared based on the following guidelines and documents:

- *Guidelines on the Information to be contained in and Environmental Impact Statement*, by the Environmental Protection Agency, 2002
- *Revised Guidelines on the information to be contained in Environmental Impact Statements*- Draft, by the Environmental Protection Agency, 2015
- *Advice Notes on Current Practice in the preparation of Environmental Impact Statements,* by the Environmental Protection Agency, 2015.
- *Guidelines on Environmental Impact Assessment*, Draft, by the Environmental Protection Agency, 2017
- *Guidelines for Landscape and Visual Assessment*, 3rd Ed., Landscape Institute and Institute of Environmental Management and Assessment, 2013.
- *National Landscape Strategy for Ireland,* Department of Arts, Heritage and the Gaeltacht, 2015-25

The Landscape and Visual Assessment involved:

- Visiting the area.
- Undertaking a desk study of the subject site and its immediate environs in relation to its local and urban significance using the information gathered from site visits, studying aerial photography and Ordnance Survey mapping.
- Establishing and describing the receiving environment in terms of the existing landscape and its visual amenity.
- Assessing the nature, scale and quality of the proposed development through examination of the design team's drawings, illustrations and descriptions of the proposed scheme.

Once the receiving environment has been established, the proposed development is then applied to allow the identification of potential positive, negative and neutral impacts, prediction of their magnitude and the assessment of their significance on the environment. The definition of these impacts is defined are given in Table 10.1. The magnitude of these impacts is categorised as 'slight', 'moderate', 'substantial' or 'no change' and the criteria for each category is given in Table 10.2. Mitigation measures can then be identified, usually forming the main elements of the landscape masterplan, to reduce as far as possible any potential negative environmental impacts. The impacts of the proposal are considered during both the construction and operational phase of the proposed development.

Impact Description	Definition
Positive Impact	A change, which improves the quality of the existing landscape character.
Neutral Impact	A change, which does not affect the quality of the landscape character.
Negative Impact	A change, which reduces the quality of the existing landscape character.

Table 10.1 Impact Types

Substantial Impact	Total loss or major alteration of key elements / features / characteristics of the baseline landscape character and / or introduction of features considered to be totally uncharacteristic when set within the receiving landscape and its level of sensitivity.
Moderate Impact	Partial loss or alteration of key elements / features / characteristics of the baseline landscape character and / or introduction of features that may be prominent but not necessarily considered to be substantially uncharacteristic when set within the receiving landscape and its level of sensitivity.
Slight Impact	Minor loss or alteration to one or more key elements / features / characteristics of the baseline landscape character and / or introduction of features that may not be uncharacteristic when set within the receiving landscape and its level of sensitivity.
No Perceived Change	Very minor loss or alteration to one or more key elements / features / characteristics / of the baseline landscapes approximating the no change situation.

Table 10.2 Impact Categories

10.3 RECEIVING ENVIRONMENT

Site Context

The site is located in Dun Laoghaire-Rathdown County Council between several local centres, west of Carrickmines and Foxrock, south of Cabinteely and the Brennanstown Road area, northwest of the emerging Cherrywood Town Centre, north of the M50 and west of the N11.

The wider Cherrywood area is undergoing significant landscape and visual change with the delivery of the SDZ Planning Scheme through various permissions granted in the past 5 years. In particular the delivery of the infrastructural skeleton of the Phase 1 roads, 3 regional parks (Tully, Ticknick and Beckett), in tandem with the existing Green Luas line, beginning the transformation of this significant greenfield area between the M50 and N11 into the new urban community envisaged in the planning scheme.

Within the Priorsland site the majority of the lands remain greenfield, save for the Carrickmines Luas Park & Ride surface car park which serves the Carrickmines Luas stop. The Priorsland area is framed by strong infrastructural barriers, with the M50 to the southwest, the Green Luas line to the north, and Glenamuck Road North and roundabout to the west.

From within the subject site are a variety of views to the surrounding landscapes which includes the Dublin Mountains to the west and Killiney Hill to the north-east. In the immediate vicinity, the site has views to open fields located above the subject site on the southern side of the M50, whilst to the north the existing vegetation located within the Brennanstown Road properties also provides a scenic green backdrop to the site.

Character and Visibility

The site is distinguished by a number of dominant physical features. Apart from the stand of mature Turkey Oaks, which stretch along the Carrickmines stream, and some sections of hedgerow on the perimeter worthy of retention, the site is characterised by its open aspect and outward views. To the south and southwest is the Dublin Mountains with rolling countryside in the foreground, and to the north and northeast are areas of mature woodland.

The subject site and surrounding lands are currently in a transition period due to the land zoning of Cherrywood and the current opportunity for residential and population growth within metropolitan Dublin. The subject site is agricultural in nature. The fields are bounded by mature hedging and mature canopy trees located along the northern, eastern and western boundaries.

When accessing the subject site via the Glenamuck Road North roundabout, the visibility is obscured due to existing vegetation located along Glenamuck stream traversing the site in a west-east direction. Lands to the north contain low density residential development located within Brennanstown, consisting of larger dwellings and well-maintained gardens and generally including boundary hedging/planting providing significant screening.

The expansive and relatively level nature of the site renders it suitable for development. At the same time the site is exposed to prevailing winds from the Dublin and Wicklow Mountains to the west and south. The absence of dense vegetation or woodland across the majority of the site also exposes future development to traffic noise emanating from the M50.

Boundaries

There is an existing approximately 1.2m high stone wall with a timber fence and a 2m high (approximately) chain-link fence behind it on the north boundary between the Luas rail and the Priorsland site. This northern boundary also has a bramble thicket on the inside of the stone wall (refer to Arborist report). The existing eastern boundary of Priorsland is currently a heavily vegetated area (noted as hedge 2 in the Arborist report) with a timber fence approximately 1.2m height along the boundary. The southern existing boundary is a closed boundary backing onto the M50. In the centre of the southern boundary there is a bridge underpass under the M50. This is a privately accessible underpass and is consisting of a gate approximately 2m high. Another strong characteristic of the existing southern boundary is the noise coming from the M50. Along the southern portion of the western boundary there is a steel and chain-link fence between a private property and the Priorsland site. This fence is approximately 1.2m high. This boundary is approximately 1.2m high timber fence with a chain-link fence directly behind it. This boundary turns the corner around the Luas Park and ride car park and has a steel swinging gate to the car park. This boundary consists of dense vegetation on the inside of the fence (refer to Arborist report).

Trees and Hedgerows

To the east of the site, there is a substantial hedge that is broadly overgrown with the original Hawthorn element. The northern and southern site areas are divided by the Carrickmines Stream. There is only a small proportion of material to the south of this river, the majority of this was found to be in particularly poor condition and some in a dangerous state having suffered partial collapse.

The site's most significant material is within or adjoining the smaller northern field. In positions directly north of the Carrickmines Stream, there is a substantial and significant alignment of fully mature Turkey Oak. These are of variable health status with some specimens subject to decay and likely instability. Along the northern edge of the stream, there is substantial regenerative thicket development of poor quality. There is also some emergent young ash Elm and Sycamore of poor quality.

The western boundary of the northern field likely supported a Thorn based hedge in the past though little remains. Arising from this thicket there is a substantial emergent population of Elm and Ash. The northern boundary of this field with the LUAS line supports very little material of interest other than a Bramble thicket of a small number of emergent trees.

The eastern boundary of this field effectively involves a woodland edge. The tree survey carried out as part of the application has included a small number of trees located closest to the boundary of the site as most overhang it. In general terms, the quality of trees in this area tends to be rather poor with the smaller, younger ash being multi-stemmed heavily divided and of generally poor form. Further east is a dilapidated area of softwood plantation, dominated by Sitka Spruce. A small area near the north-east of the woodland is now being colonised by Birch, Common Alder and Ash.

Figure 10.1 Existing trees, tree lines and hedges on the subject site.

Relevant Planning Policy

The subject site lies within the Cherrywood Strategic Development Zone (SDZ) and represents the most significant strategic development node in Dun Laoghaire-Rathdown. The Council proposes to guide the development and implementation of the overall Cherrywood area through the mechanism of SDZ Planning Scheme, approved by An Bord Pleanála in April 2014.

Chapter 2.11 identifies the key objectives for 'Views and Prospects' and identifies that *'all development in the Planning Scheme should ensure the incorporation of key vantage points and panoramas to create a sense of place, coherence and appreciation for the overall setting and context of Cherrywood.'*

The Cherrywood SDZ contains several key objectives pertinent to this chapter which include:

> ***PD 27*** *It is an objective to protect and enhance views and panoramas to key local vantage points, local skylines and civic buildings in the surrounding area, and within the Planning Scheme itself. These views are identified in the SEA and consideration of significant views should inform all stages of the design process.*

PD 28 *Views to be protected and enhanced are separated into those from certain internal vantage points to areas outside of the Planning Scheme (external), and those within the Plan Area (internal). Views are not all panoramas, but include partial, intermittent and glimpsed views.*

External views to be protected:

- *Views and general prospects towards the Coast and marine horizons; principally from Tully Church environs and from existing developments within Tullyvale, Druid Valley and parts of Bride's Glen;*
- *Views and general prospects toward Killiney Hill; principally from Tully Church environs and from developments within Tullyvale and Druid Valley;*
- *Views and general prospects toward Carrickgollogan and the Lead Mines Chimney, principally from Tully Church environs, and from developments within Cherrywood Town Centre and its environs;*
- *Views towards Ticknick principally from the southern end of Lehaunstown Lane, Tully Church environs and from developments within Cherrywood Town Centre and its environs;*
- *Views and general prospects toward the Dublin and Wicklow Mountains; principally from Tully Church environs and from developments within Tully Village.*

PD 29 *Internal Views should also seek to ensure that principal visual axis of the public realm incorporate views towards significant landscape features within the Plan Area because these enhance its character and distinctiveness.*

Internal views to be protected:

- *Views from Lehaunstown Village and its environs towards Tully Church, and the Druid's Glen Buffer and Tree canopy;*
- *Views from adjoining development areas towards Tully Church and associated open spaces;*
- *Views from Tully Church to the Town Centre along Brigid's Way;*
- *Views towards Tully Village Open Space;*
- *Views towards Lehaunstown Park House from Tully Park.*

Figure 10.2 – Subject site (red) and the surrounding landscapes within view of the subject lands.

Local skyline views formed by river and stream corridors to be protected:

- *The northern and southern edges of Druid's Glen and the Glenamuck Stream (northern section of the Plan Area);*
- *The western enclosure/side of the Cabinteely Stream (north east section of the Plan Area);*
- *The enclosure of the Loughlinstown River within the Plan Area (eastern section of the Plan Area);*
- *The enclosure of Bride's Glen (south-eastern section of the Plan Area).*

10.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The development will comprise a mixed-use village centre and residential development of 443 no. units comprising 6 no. blocks of apartments (up to 5 storeys with basement/undercroft parking) providing 402 no. apartments units (146 no. 1-beds; 218 no. 2-beds and 38 no. 3-beds), and 41 no. houses (19 no. 3-beds and 22 no. 4-beds). All apartments provided with private balconies/terraces. Provision of indoor residential facilities to serve apartment residents.

The Village Centre and non-residential elements will comprise a supermarket, local retail/retail service units, non-retail commercial units, creche, gym, community space, and offices (High Intensity Employment) use.

Provision of car/bicycle/motorcycle parking; ESB sub-stations; bin storages areas, and all associated plant areas.

Provision of the first phase of Priorsland Park (on lands within the applicant's ownership) and other public and communal open spaces.

Construction of Castle Street through the subject lands and two road bridges across the Carrickmines Stream, one to serve the future school site/ park, the second to provide pedestrian and cyclist access to the Carrickmines Luas station and future Transport Interchange to the north. Provision of additional pedestrian bridge to the park. Provision of an acoustic barrier along the southern/western edge of the site.

All associated site development works, landscaping, boundary treatments and services provision.

A more detailed description is outlined in Chapter 3.

Landscape Strategy

The proposal for the Landscape at Priorsland strives to retain and enhance the existing character and quality of the site. In relation to the proposed use, the site must be re-examined through the lens of a small and sustainable microcosm landscape – a village centre with retail, schooling, recreation, housing, and amenity space. The existing Priorsland site has a number of particularly special existing features that must be maintained in this change of usage – including the protection of the particularly important row of Turkish Oak trees.

The main objectives of the landscape strategy are:

- Proposed realistic retention of existing trees and replacement planting
- Integration of the scheme within the wider context.
- Maintain the distinct spatial character of the existing site, while enhancing the identity.
- Provide a safe and accessible environment.
- Provide new opportunities for the protection and establishment of habitat.
- Creation of Priorsland Park.

When considering what is unique on the site, the most significant features are the stream, the vegetation, the proximity to Druid's Glen, and the line of mature Turkish Oak trees. It is these unique features that the proposal scheme must employ in the design of amenity space. Figure 10.3 shows how the existing characteristics of the site are not only carried through within the proposal but are central components to the park space and landscape design.

Figure 10.3 – Existing Environmental Characteristics

The local facilities of Priorsland include connection with green infrastructure, access to park space, linear park stream, green corridor. These connections were all made prominent components in the landscape design. To the north east of the site is the proposed Priorsland Park. This park sits within a network of green parkland in the Cherrywood SDZ. In the park there is informal kick-about, proposed work-out zones, additional tree planting and native planting areas. The existing bramble thickets along the northern edge of the park are proposed to be retained and will provide a buffer from the Luas line to the north. Additional tree planting is proposed to strengthen this space and further emphasise its use as an amenity. Priorsland Park sits directly beside the site for the future primary school (directly west). This proximity to the future school is instrumental to the park's usability. It will provide additional recreational space for students in addition to the local children of Priorsland.

The vegetation will also be exploited to further its use as amenity space within the scheme. The dense vegetation is currently acting as a buffer between the M50 and the Priorsland development. Not only will it continue to be used as a buffer, but the proposal also incorporates swales and SUDs into this vegetative zone. There are a number of swales proposed along the southern boundary of the site. The swales are proposed to be planted with appropriate plant species.

The treeline of Turkish Oaks along the existing Carrickmines stream is probably one of the most striking and significant features existing on the site. This feature is central to the configuration and layout of the site proposal – with sight from each road leading towards the treeline or running beside the treeline. The linear park is also designed in a way that interacts with the treeline – while maintaining a safe distance as not to disturb the trees. Through the consideration of amenity space in the Priorsland development, we see that the amenity space is not only multifunctional, but it supports ecological life, play, and multiple recreational uses – while protecting and enhancing the features already existing within the landscape.

Another key component of the Landscape design for Priorsland development is the desire to have amenity space local and within comfortable walking distance. At the end of each road axis there is amenity space in view. This principle creates a feeling that one is always surrounded by greenery, and that amenity is always within a short distance. This principle applies to all areas of the development: from the terrace houses, to apartment blocks, to part 5 housing, all green space access is inclusive.

The environment that the Priorsland development proposal intends to create is one with rich biodiversity. Coordination with a team of ecologists has been carried out to develop a strong plan for the continued growth and flourishing ecology within Priorsland (refer to Ecologist's report for steps taken to improve biodiversity and native vegetation). This biodiversity is linked to a greater network of green space within the Cherrywood SDZ – Tully park, Lehaunstown public open space, etc.

Figure 10.4 – Landscape Masterplan

Linear Park

This landscape consists of a sequence of different spaces – from densely planted space with simple paths, to more open lawn space, to patio space, to semi-private amenity space, to private terrace space, to delicate more decorative hedge planting zones. Castle street at the village centre will serve as the face of the proposed development. A number of both raised and ground level planting beds are proposed to create sheltered and comfortable seating areas for this plaza type space. The linear park to the south of Carrickmines stream contrasts with the more predominantly paved village centre zone, by being much softer and

heavily planted. These two zones will have a of high-quality hard and soft landscape, initiating a character which will be carried through the entire development (see *Drawing 201 and 202*). The linear park has an environment largely influenced by the line of Turkish Oaks on the north side of the river.

Priorsland Park

The Priorsland park play zone to the north-east of the site consists of an informal kick-about, a playlot, seating, a nature walk, as well as there are a number of exercise equipment zones surrounding the field. The park is under two ownerships and the design will be coordinated with the adjacent landowner to carry through the green connection between Priorsland and the rest of Cherrywood SDZ. The boundary in the north corner is proposed to be permeable to pedestrians to achieve connectivity through to the rest of the Cherrywood SDZ. The design proposes to remove part of the vegetation along the most northern portion of the eastern boundary to facilitate of a number of services and utilities. This need for utilities was seen as an opportunity to create the connection between Priorsland and Druid's Glen and the surrounding Cherrywood development and greenway. This connection is shown as indicative and the detail of this will be co-ordinated with the adjacent landowner.

Southern Open Spaces

The zone south of the stream is zone 3.8 and VC3 (as per Cherrywood SDZ). This portion of the development contains the village centre, retail, and higher density housing. The space is designed to be flexible in nature – with the ability to house open markets, events, seating, street performers, and other everyday life of Priorsland. In this zone the proposal features more hardscape and vegetation in the form of planting areas and tree pits. The landscape is on a podium – with underground parking below. Although the village centre zone has a distinct character, it is very connected to the linear park to the North, and it transitions seamlessly into the adjoining soft park space. Each perspective looking down a street leads to amenity space.

Planting & Materials

Drawing 201 Landscape Plan 1 and 202 Landscape Plan 2, prepared by Dermot Foley Landscape Architects, includes a detailed schedule of proposed planting and illustrates the location and extent of mown lawn, managed long grass, bulb, low groundcover, hedge and tree planting. Substantial tree planting is included in drawing 201 and 202 to replace existing trees removed and to improve the proportion of native species on site. A full schedule of proposed planting is included as part of this submission. Tree species are selected for longevity, suitability to local soil conditions and microclimate, biodiversity (native species) and, where required, suitability for close proximity to residential buildings. Low planting is utilised to create and reinforce sub-spaces within the larger landscape; for visual screening, defensible space, visual interest, ecological purposes and to guide or direct pedestrian's movement. The low planting is conceived as subtle layering of greens within the open spaces. The planting is layered as follows; lowest - bulb planting, groundcover planting, highest - clipped hedge planting. The planting palette for Priorsland was coordinated with the ecologist to achieve a planting mix that is both diverse, appropriate to the environment, and resilient. Specific species have been chosen for their ability to thrive in swale conditions where they are proposed in swales. Similarly, species have been chosen to suit the microclimate to which they are proposed – whether woodland, exposed locations, or shaded.

The selection of hard landscape materials is determined by function but also to provide a cohesive palette of materials throughout the site. Materials are chosen for durability, but where practical, are proposed to be constructed in a way which is sensitively integrated with lawn and soft landscape, in order to minimise the impact of hard landscape surfaces. Primary vehicular and pedestrian circulation are proposed as a durable, limited range of neutral materials with robust construction. The main vehicular routes are designed to 'play-down' the impact of the vehicular area in the landscape setting. The village centre is a primarily hardscape landscape plaza with intermittent planting beds and raised planters to create enjoyable seating spaces. Additionally, there are a number of elevated landscapes two podium courtyards and one terrace landscape. The materials and furniture in these locations are chosen to create a more intimate environment as they are located in private and semi-private open space.

10.5 POTENTIAL IMPACTS

Construction Phase

Any development on a large greenfield site would naturally result in significant visual impact and material change to the landscape character of the site. The construction phase of the development would be visually unappealing during the initial stages and as the development progresses the visual impacts would be lessened.

Major impacts during the construction phase will be:

- Changes to the landscape due to construction works, land excavations, temporary structures, machinery and scaffolding on the site.
- Removal of some vegetation and hedgerows.
- Dust and noise impacts to the surrounding
- Large machinery and work vehicles going to and from the site.
- Construction workers coming and going from the site

Mitigation measures to the construction phase will be dealt within the construction management plan.

Operational Phase

On completion the residential development will significantly alter the landscape from a vacant agricultural site to a large mixed residential estate. The character of the area will change from semi-rural to urban and which will integrate with the adjoining suburban areas existing and planned.

The scheme will be visible along the M50 and from certain vantage points in the wider landscape.

The residential units and landscaping will create new vertical emphasis throughout the currently vacant site. The provision of streets and open spaces will create a variety of views into and across the development. New levels of planting and landscaping will be proposed although some vegetation will also be lost.

The development of a high-quality residential development will accord with the specific requirements of the Cherrywood SDZ Planning Scheme in relation to building scale, layout, open space provision and landscaping.

10.6 POTENTIAL CUMULATIVE IMPACTS

The subject site is zoned for residential use and public open space lands and the proposed development will accord with same and with the quantitative and qualitative standards currently applied to residential development in the SDZ Planning Scheme and in national planning policy.

The design of the scheme will provide a distinctive and sustainable new residential development and Village Centre.

Due to the topography of the surrounding landscape the proposed development, at certain vantage points, will result in a cumulative impact visually with other adjoining developed and developing areas. These are considered in Section 10.8 below.

However, as is shown, the extent of impact on the wider landscape will not be widespread given that the views of the site in most locations are constrained by existing topography, vegetation and the existing built environment. Where visible the additional impact will not be excessive within the existing suburban context and given the sensitive design proposed.

The visual impact of the scheme in time will also decrease with the maturation of proposed landscaping and boundary planting.

10.7 MITIGATION MEASURES

Construction Phase

To reduce the potential negative impacts during the construction phase, good site management and housekeeping practices will be adhered to. The visual impact of the site compounds and scaffolding visible during the construction phase are of a temporary nature only and therefore require no remedial action.

The areas set aside for open spaces will be fenced off with no compounds or storage of materials taking place in these areas, in accordance with an agreed Construction Management Plan. To ensure the successful retention of trees and hedgerows, an Arborist is recommended to be retained by the contractor or developer to monitor and advise any works within the Root Protection Zones of retained trees.

Operational Phase

Mitigation measures have been incorporated into the design to minimise visual intrusion and adverse landscape impact whilst integrating the development into the surrounding landscape character.

Tree and other planting are proposed throughout the site and particularly within the main open spaces. An extensive landscape programme is proposed to create the optimum landscape solution for this new residential area.

The visual massing impact of the development will be reduced through provision of open spaces and streetscape planting throughout the site. Existing boundary hedgerow and planting will be maintained and enhanced where possible to provide natural screening of the site as currently provided.

Streetscape design will incorporate planting and landscaping to reduce the visual impact on parking and to integrate with the building elevations to create a sylvan setting appropriate to its suburban context.

The extensive landscaping proposal will help soften the visual impact of the development and with future maturing of planting will lead to a very attractive residential layout that integrates well with the adjoining uses and with the rural hinterland.

10.8 PREDICTED IMPACTS

14 photomontages have been provided that illustrate the existing and proposed physical and visual character of the subject lands. The full set of images are provided for in the attached appendices. In the attached images, the existing and proposed view are shown together to provide a clear illustration of visual and landscape differences with and without the proposed development from the same viewpoint. Please view the below tables in conjunction with the related images.


V10
V6
V3
V8
V7
V9
V5
V2
V1
V4


V13
V12
V11
V14

	Photomontage View 01 **View looking south from Carrickmines Luas Park and Ride No. 1**
Existing View	The existing view presents the Carrickmines Luas car park. Existing boundary vegetation from the subject site can be seen behind the car park. Even with the trees not in full leaf the subject site is only partially visible.
Proposed View	The proposed view indicates partial views of the Village Centre development with the upper floors of some apartments partly visible through the existing and new trees. Views of the site will be further screened during the spring and summer seasons when the trees are in full bloom.
Predicted Impact	Slight-Neutral

	Photomontage View 02 **View looking south from Carrickmines Luas Park and Ride No. 2**
Existing View	The Carrickmines Luas Park and Ride is the dominant feature from this viewpoint. Tree planting along the property boundary is also a dominant feature situated above the view line of vehicles, as are the fields located on the southern side of the M50.
Proposed View	The proposed view indicates partial views of the Village Centre development with the upper floors of some apartments and some of the houses partly visible through the existing and new trees. Views of the site will be further screened during the spring and summer seasons when the trees are in full bloom.
Predicted Impact	Slight-Neutral

	Photomontage View 03 **View looking south from Brennanstown Road**
Existing View	The existing view is from the Brennanstown Road area north of the Luas line. Large dwellings are situated on existing, generous plots. The streetscape is sylvan and includes a variety of street trees, all of which are mature and contain medium-large canopy cover.
Proposed View	The proposed development will not be visible from this location.
Predicted Impact	No Perceived Change

	Photomontage View 04 **View looking south-east from Golf Lane No. 1**
Existing View	The existing view from Golf Lane, due to the topography and lack of mature boundary planting provides views looking across the M50 towards the subject site. There are no sensitive views beyond the site.
Proposed View	The development will be a significant new visual element in the landscape but of a modest scale given its location along the strategic M50, and over time will be further screened when proposed vegetation matures. Given that the lands are designated for the provision of a new Village centre and residential development the visual impact is informed by the policy context.
Predicted Impact	Moderate - Positive

	Photomontage View 05 **View looking south-east from Glenamuck Road Roundabout**
Existing View	The view is from the roundabout at the vehicular entrance to the Carrickmines Luas Park & Ride. The site is not visible behind mature trees and hedgerows.
Proposed View	The proposed development due to its modest scale will not be visible behind the existing vegetation.
Predicted Impact	No Perceived Change

	Photomontage View 06 **View looking south-east from Carrickmines Luas station**
Existing View	The Green Luas line and Carrickmines stop located to the left, with an existing dwelling (Station House RPS. 1743) located abutting the Luas line. A protected structure (Priorsland RPS. 1746) can be seen to the right of the Station House. In the background, mature vegetation can be seen along with the fields located on the southern side of the M50. The application site is not visible behind existing mature planting.
Proposed View	The proposed development due to its modest scale will not be visible behind the existing vegetation.
Predicted Impact	No Perceived Change

	Photomontage View 07 **View looking south-east towards Glenamuck Road Roundabout**
Existing View	The site is not visible behind mature trees and hedgerows to the south-east of the roundabout.
Proposed View	The proposed development due to its modest scale will not be visible behind the existing vegetation.
Predicted Impact	No Perceived Change

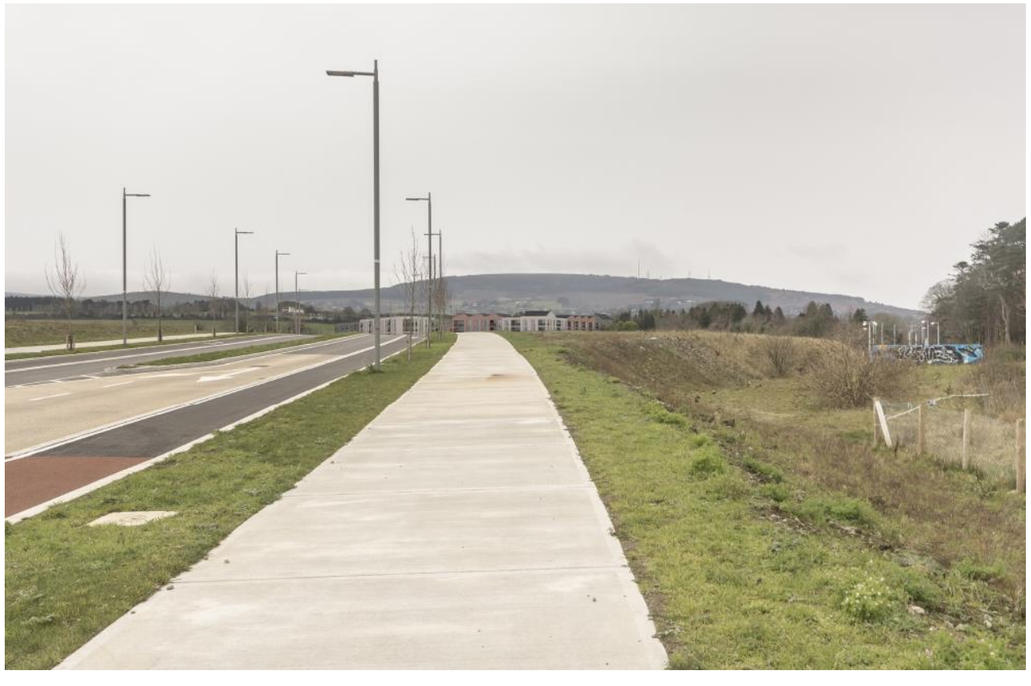
	Photomontage View 08 **View looking south-east towards Glenamuck Road Roundabout**
Existing View	The site is not visible behind mature trees and hedgerows to the south-east of the roundabout.
Proposed View	Given this view as taken from a higher vantage point than View 7 the apartment blocks are partially visible beyond the mature trees. The buildings are of a modest scale, and over time will be further screened when proposed vegetation matures. Given that the lands are designated for the provision of a new Village centre and residential development the visual impact is informed by the policy context.
Predicted Impact	Moderate - Positive

	Photomontage View 09 **View looking south-east over M50**
Existing View	The existing view is taken from the Glenamuck Road North bridge that crosses the M50 heading towards Carrickmines. The M50 is the dominant feature with mature planting screening suburban development in the Brennanstown area to the left. The undeveloped lands of Cherrywood are apparent in the background.
Proposed View	The development will be a significant new visual element in the landscape but of a modest scale given its location along the strategic M50, and over time will be further screened when proposed vegetation matures. Given that the lands are designated for the provision of a new Village centre and residential development the visual impact is informed by the policy context.
Predicted Impact	Substantial - Positive

	Photomontage View 10 **View looking south along Glenamuck Road North**
Existing View	The view from the junction of Glenamuck Road North and Pavilion Gate looks south towards the foothills of the Dublin mountains on the southern side of the M50 in the background. The foreground has suburban development set back behind large walls and boundary planting. The site is not visible from this view.
Proposed View	The proposed development due to its modest scale will not be visible behind the existing vegetation.
Predicted Impact	No Perceived Change

	Photomontage View 11 **View looking south from Golf Lane no. 2**
Existing View	The existing view from Golf Lane, due to the topography and lack of mature boundary planting provides views looking across the M50 towards the subject site. Beyond the subject site the low density residential area around Brennanstown Road is visible to the left whilst Killiney Hill is visible in far background.
Proposed View	The development will be a significant new visual element in the landscape but of a modest scale given its location along the strategic M50, and over time will be further screened when proposed vegetation matures. Given that the lands are designated for the provision of a new Village centre and residential development the visual impact is informed by the policy context.
Predicted Impact	Substantial - Positive

	Photomontage View 12 **View looking west from the Barrington's Road/Castle Street junction**
Existing View	The view looking west identifies the partially completed junction at Barrington's Road and Castle Street. Mature trees can be seen the background with the site to the rear of same. In the background are the Dublin Mountains.
Proposed View	The development will be a significant new visual element in the landscape but of a modest scale, and over time will be further screened when proposed vegetation matures. Given that the lands are designated for the provision of a new Village centre and residential development the visual impact is informed by the policy context.
Predicted Impact	Substantial - Positive



	Photomontage View 13 **View looking west from Barrington's Road**
Existing View	This view looking west shows Barrington Road within Cherrywood in the foreground. The Dublin Mountains dominate the background. The site is screened by existing planting.
Proposed View	The development will be a significant new visual element in the landscape but of a modest scale and over time will be further screened when proposed vegetation matures. Given that the lands are designated for the provision of a new Village centre and residential development the visual impact is informed by the policy context.
Predicted Impact	Moderate - Positive

	Photomontage View 14 **View looking north-east along the M50**
Existing View	The view is from the Ticknick Park pedestrian bridge over the M50, looking north-east along the M50 and towards the subject site. The M50 dominate the foreground. In the background the low density residential area around Brennanstown Road is visible. The site is not clearly visible from this view given mature planting along the M50.
Proposed View	The development will be a significant new visual element in the landscape but of a modest scale given its location along the strategic M50, and over time will be further screened when proposed vegetation matures. Given that the lands are designated for the provision of a new Village centre and residential development the visual impact is informed by the policy context.
Predicted Impact	Substantial - Positive

View	View Location	Predicted Impact (Operational Phase)
1	View looking south from Carrickmines Luas Park and Ride No. 1	Slight-Neutral
2	View looking south from Carrickmines Luas Park and Ride No. 2	Slight-Neutral
3	View looking south from Brennanstown Road	No Perceived Change
4	View looking south-east from Golf Lane No. 1	Moderate - Positive.
5	View looking south-east from Glenamuck Road Roundabout	No Perceived Change.
6	View looking south-east from Carrickmines Luas station	No Perceived Change
7	View looking south-east towards Glenamuck Road Roundabout	No Perceived Change
8	View looking south-east towards Glenamuck Road Roundabout	Moderate - Positive
9	View looking south-east over M50	Substantial - Positive
10	View looking south along Glenamuck Road North	No Perceived Change
11	View looking south from Golf Lane no. 2	Substantial - Positive
12	View looking west from the Barrington's Road/Castle Street junction	Substantial - Positive
13	View looking west from Barrington's Road	Moderate - Positive
14	View looking north-east along the M50	Substantial - Positive

Table 10.3 Summary of Visual Assessment

At local level the proposed residential development will constitute a significant intervention in the local setting replacing existing vacant field with a large residential and Village Centre development. However, in most cases the impact on local views is significantly mitigated by existing/planned development and vegetation. Immediate to the site, particularly from the Cherrywood lands, the visual change will be significant but ameliorated by the quality of the building design and landscaping.

Within the wider landscape, views of the proposed development site are generally constrained by a combination of variation in topography and existing mature vegetation. Where views of the proposed development are significant the design qualities associated with the proposed development in terms of positioning and heights of buildings and landscape treatments, will serve to reduce the impact.

In the long term the maturation of boundary planting will further screen the residential scheme at the small number of locations where the development will be visible in the wider landscape. Overall, the impact in considered acceptable in light of the quality of the design and the site's designation in the Cherrywood SDZ Planning Scheme.

10.9 'DO NOTHING' SCENARIO

The lands are agricultural and should the development not proceed the lands would remain as farmland in the short term. Given the location of the subject site and its proximity to the Dublin city centre, Carrickmines Luas stop and the M50 and the N11, the land is primed for residential and associated development to provide housing in response to the current shortage. The land is presently underutilised and given the zoning of the site and nearby lands, it is unlikely that the agricultural use of the land will remain in the long term.

10.10 WORST CAST SCENARIO

The worst case scenario from a visual impact would arise if construction of the proposed scheme had to cease, leaving an incomplete development or if the proposed landscaping was not fully/properly progressed.

10.11 MONITORING & REINSTATEMENT

The post development monitoring of the landscape and visual effects on the environment will take the form of management of the proposed landscaping and open spaces within the development and which will be detailed more specifically in the bills of quantities and specification for the landscape contractor at the implementation stage of the landscape proposal.

10.12 DIFFICULTIES IN COMPILING INFORMATION

There were no particular difficulties encountered during the compilation of this section of the EIAR Report.

11.0 TRAFFIC AND TRANSPORT

11.1 INTRODUCTION

Purpose of Section

The purpose of this Traffic and Transport EIAR Section is to assess the traffic impact of the proposed development of lands at Priorsland on the surrounding road network at Cherrywood Strategic Development Zone, Co Dublin.

11.2 RECEIVING ENVIRONMENT

Location and network summary

The proposed development site is a greenfield site located within the Cherrywood Strategic Development Zone, Co. Dublin as shown in Figure 11.1 The proposed development is bounded by the M50 to the south; the LUAS Green Line to the north and currently undeveloped green fields to the east and west.

11.3 CHARACTERISTICS OF DEVELOPMENT

The development will comprise a mixed-use village centre and residential development of 443 no. units comprising 6 no. blocks (A-F) of apartments (up to 5 storeys with basement/undercroft parking) providing 402 no. apartments units (146 no. 1-beds; 218 no. 2-beds and 38 no. 3-beds), and 41 no. houses (19 no. 3-beds and 22 no. 4-beds). All apartments provided with private balconies/terraces. Provision of indoor residential facilities to serve apartment residents.

The Village Centre and non-residential elements will comprise a supermarket, local retail/retail service units, non-retail commercial units, creche, gym, community space, and offices (High Intensity Employment) use.

Provision of car/bicycle/motorcycle parking; ESB sub-stations; bin storages areas, and all associated plant areas.

Provision of the first phase of Priorsland Park (on lands within the applicant's ownership) and other public and communal open spaces.

Construction of Castle Street through the subject lands and two road bridges across the Carrickmines Stream, one to serve the future school site/ park, the second to provide pedestrian and cyclist access to the Carrickmines Luas station and future Transport Interchange to the north. Provision of an additional pedestrian bridge to the park. Provision of an acoustic barrier along the southern/western edge of the site.

All associated site development works, landscaping, boundary treatments and services provision.

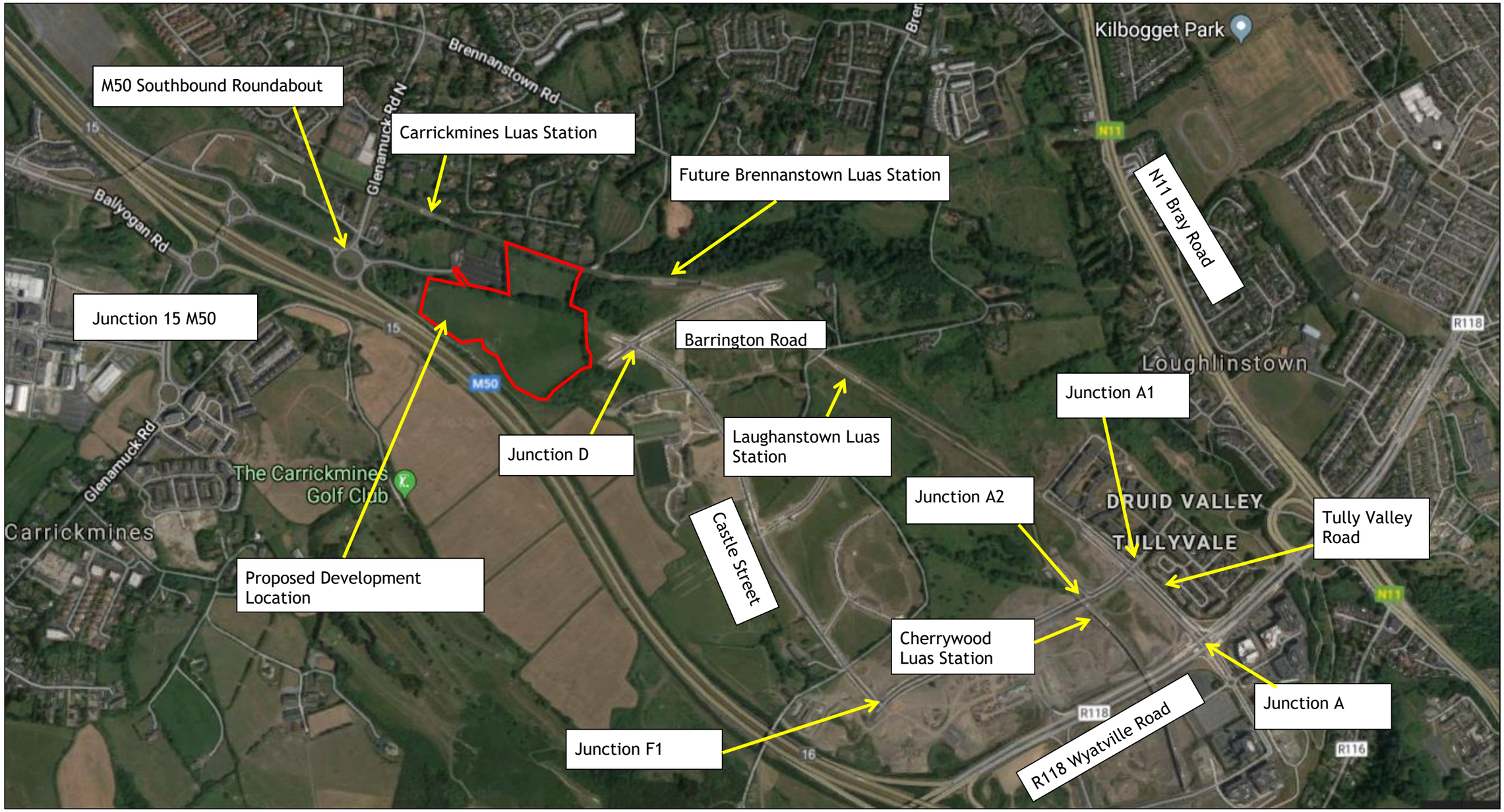


Figure 11.1 – Development Site Location Map and Surrounding Road Network © Google Map

11.4 SCOPING

The Developer and its Design Team have engaged with the Development Agency on numerous occasions seeking a resolution to accessing the Priorsland site to facilitate development. The Developer is committed to deliver the mixed-use development (primarily residential) within the Priorsland Area of the Cherrywood SDZ including the infrastructure in coordination with the Cherrywood SDZ Development Agency. This infrastructure includes the completion of Castle Street (and hence bus priority route) and connectivity to Carrickmines Luas Station, thus establishing the means to introduce an internal bus service for the Cherrywood SDZ.

The staged development of the Cherrywood Strategic Development Zone (SDZ) has led to permission issues with accessing the proposed development from the east, i.e. via Castle Street, as approved under the Cherrywood Planning. It is therefore proposed that the construction traffic (only) temporarily access the proposed development via the available access wayleave (and via the M50 Southbound Roundabout).

The permanent development scenario with access via Castle St will be implemented once all available roads are viable.

11.5 EXISTING TRAFFIC FLOWS AND TRAFFIC IMPACT OF PROPOSED DEVELOPMENT

Trip Generation of Proposed Development

PUNCH Consulting Engineers utilised trips rates taken from the proposed Roads and Infrastructure Phase 1 Cherrywood (Planning Application Ref: DZ15A/0758) noted in Arup's Traffic and Transportation Assessment for the RFI response which were applied pro-rata to the relevant type and GFA of development. The figures do not allow for the effect of bypass traffic inherent in the Village Centre usage adjacent to residential development. This is a conservative approach showing the worst-case scenario for the proposed development. Table 11.2 below details the estimated volume of trips at the peak hours are assessed as:

	Number of External Trips			
	08.00 - 09.00		17.00 - 18.00	
Land use	AM Arrivals	AM Departures	PM Arrivals	PM Departures
Total Residential	49	244	189	73
Total Non-Residential	110	69	189	207
Total	**159**	**313**	**378**	**280**

Table 11.2 Total Estimated Number of Person Trips Generated by Proposed Development

11.6 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

Construction Phase – Interim:

Construction traffic travelling to the proposed development site at Priorsland will, on a temporary basis, use the western route via the available access wayleave. The increase in traffic volumes as a result of construction vehicles visiting the site in the interim scenario is considered negligible and will be spread out over the duration of the construction phases of the development. It is recommended that all deliveries are provided with instructions/directions on accessing the site.

Construction Phase – Permanent:
Construction traffic travelling to the proposed development site at Priorsland will, in the permanent scenario, use Castle St once in operation, if it becomes available during construction. The construction works associated with progressing with the permanent scenario are limited and small in scale compared to the preceding interim construction phase. As a significant area of the whole SDZ is as-yet undeveloped, it is likely therefore that there will be an amount of other construction traffic working on other nearby sites at the same time.

Operational Phase – Permanent:
Access to the proposed development is to be facilitated via the existing junction of Barrington Road and Castle Street. Buses, cyclists and pedestrians exiting from Priorsland will be able to proceed along Castle Street and then along the link to Wyattville Road. For incoming traffic, the movement is reversed. Other exiting vehicular traffic will turn left the junction of Castle Street and Barrington Road and then join Grand Parade or continue north along Druids Glen Road to join the existing N11. The permanent impact on the local road network within the Cherrywood SDZ area has not been assessed, as the projected traffic flows were accounted for in the overall design of the development.

'Do – Nothing' Scenario
If the proposed development does not proceed there would be no additional demand or loading on the existing road network other than the naturally growing baseline traffic figures.

Residual Impact

The volumes of traffic generated from the currently proposed development will have a negligible effect on the highway network traffic volumes and can be considered within the norms for urban developments.

Cumulative Assessment

The proposed development is located at the western end of the Cherrywood SDZ. In the interim scenario, where the construction vehicle (only) access to the proposed development is proposed to the west, the additional traffic will have negligible impact on the existing road network. In the permanent scenario, the cumulative effects are understood to have been addressed in the overall Cherrywood SDZ planning assessment. The cumulative effects of the adjacent sites have been discussed further in the TTA in relation to traffic impact.

In the short term, there will be a slight increase in traffic on the surrounding highway network. However, with the combination of the LUAS system and car reduction measures such as cycle lanes and bus lanes then as they become widely used, the volumes of traffic for the surrounding highway network, generated from the proposed development, will have a minimal effect on the overall traffic volumes.

11.7 Mitigation Measures

Construction Phase– Interim/Permanent:

As with any construction project, the contractor will be obliged to prepare a comprehensive traffic management plan for the construction phase. The purpose of such a plan is to outline the measures to manage the expected construction traffic activity during the construction period. In the interim, however, this section will provide a preliminary overview of the likely volume and routing of construction vehicles, based on a most likely scenario of construction.

The site as proposed would be expected to require approximately 3 years to complete from commencement of works. Parking for site operatives will be a requirement throughout the contract. It would be expected that a site of this size would generate a requirement for in the region of up to 300 site operatives during the peak period of construction and would lead to a parking requirement for up to about 100 vehicles. This could be accommodated within the curtilage of the site.

Construction traffic approaching the site will travel via the existing Right of Way to the west of the site in the interim and the internal SDZ road system if the Castle Street extension is delivered and access made available via Cherrywood lands to the east in the short term. Again, the Traffic Management Plan for the construction stage would identify haulage routes and restrictions as appropriate in discussion with the Local Authority.

There will also be a requirement for comprehensive measures as part of the construction management, such as:

- Temporary warning signs;

- Banksmen controlling access and egress from the site;
- All marshalling areas and site offices will be contained within the site boundary and will therefore have little impact on external roads;
- Wheel washers/judder bars to clean off vehicles exiting the site during spoil removal;
- All loads to be properly stowed and secured with a tarpaulin, where appropriate;
- Routine sweeping/cleaning of the road and footpaths in front of the site;
- No uncontrolled runoff to the public road from dewatering/pumping carried out during construction activity.
- Hoarding will be provided along the site frontage to protect pedestrians using the footpaths.

Any increase in volumes on the surrounding highway network as a result of the proposed development's construction traffic will likely have a short-term insignificant impact.

Operational Phase – Permanent:

The design of the site layout, roads and accesses in accordance with the relevant guidelines and codes of practice is likely to mitigate any potential impacts during the operational phase of the development.

11.8 PREDICTED IMPACT OF THE PROPOSED DEVELOPMENT

Construction Phase – Interim:
There will be a short-term insignificant negative impact to local traffic during the construction phase.

Construction Phase – Permanent:
The increase in traffic volumes as a result of construction vehicles visiting the site in the permanent scenario is considered negligible.

Operational Phase - Permanent
There will be a long-term slight impact to local traffic. But this arrangement will reflect and be consistent with the final SDZ traffic configuration.

'Do Nothing' Scenario
If the proposed development does not proceed there would be no additional demand or loading on the existing road network other than the naturally growing baseline traffic figures.

11.9 MONITORING

Construction Phase– Interim/Permanent:
The contractor will be obliged to appoint a traffic liaison officer/traffic manager who will be involved in preparing the CTMP and to monitor the performance of the CTMP. The traffic liaison officer will be available to receive complaints, comments and queries about the traffic generated by the construction site. and traffic issues associated with the site. Regular meetings will be held on-site to which with all relevant stakeholders will be invited. The traffic liaison officer/traffic manager will liaise with:

- An Garda Siochana
- Irish Rail
- Other relevant statutory bodies
- Members of the community.
- Adjacent contractors

The traffic liaison officer/traffic manager will be sufficiently senior in position and will responsible for dealing with any complaints and remedying any non-compliance and developing solutions to prevent re-occurrence.

Operational Phase – Permanent:

The overall facilities on site such as roads and car parks will be maintained and managed by a management company. The management company will ensure the security and maintenance of the internal roads and car parks. This would entail the use of CCTV and necessary barriers throughout the car parks.

11.10 REINSTATEMENT

After construction, all roads are to be backfilled and reinstated in accordance with the design and relevant local authority requirements.

11.11 INTERACTIONS AND POTENTIAL CUMULATIVE IMPACTS

There is potential for traffic and transportation to interact with other environmental elements. These interactions are listed below:

Interactions

Soils and Geology

Construction traffic will have an impact on the soils and geology as well as on the traffic on the local road network. The requirement for circa 36,470m^3 will require circa 4,000 deliveries of imported fill material to site. There is no anticipated cumulative effect as the construction stage is finite and the permanent design for the site will protect the existing soil and geological environment.

Material Assets – Water Services, Drainage and Flood Risk

The Carrickmines River and Ticknick Stream watercourses will be protected during the operational phase from traffic related activity through the implementation of sustainable drainage systems (SuDS) on site conforming to the various Cherrywood Planning Scheme (CPS) requirements as outlined in the Specific Objectives set out in Chapter 4 Section 4.1.2 of the CPS. These SuDS measures will intercept and attenuate surface water on site. The surface water will be passed through petrol interceptors and other SuDS measures that will clean the surface water prior to discharge to natural watercourses.

Potential Cumulative Impacts

There are no anticipated cumulative effects.

12.0 WASTE MANAGEMENT

12.1 INTRODUCTION

This section addresses the subject of waste management for the proposed new development at Priorsland, Cherrywood, Carrickmines, Co. Dublin. Waste management is addressed for both the construction and operational phases of the project. This site is located on the eastern side of the M50 and will consist of a range of residential units, a creche, community centre, retail/non-retail unit and all associated works.

A site-specific Construction and Demolition Waste Management Plan (CDWMP) has been prepared for the construction phase of the development in advance of the commencement of the construction works. A separate Operational Waste Management Plan (OWMP) has also been prepared for the operational phase of the development.

The CDWMP has been prepared in accordance with the *'Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects'* document produced by the National Construction and Demolition Waste Council (NCDWC) in conjunction with the Department of the Environment, Heritage and Local Government in July 2006.

These documents will ensure the sustainable management of wastes arising at the development in accordance with legislative requirements and best practice standards.

12.2 METHODOLOGY

The assessment of the impacts of the proposed development arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports.

The primary legislative instruments that govern waste management in Ireland and applicable to the project are:

- Waste Management Act 1996 (No. 10 of 1996) as amended. Secondary legislation includes:
  - European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended
  - Waste Management (Collection Permit) Regulations (S.I No. 820 of 2007) as amended
  - Waste Management (Facility Permit and Registration) Regulations 2007, (S.I No. 821 of 2007) as amended
  - Waste Management (Licensing) Regulations 2004 (S.I. No. 395 of 2004) as amended
  - Waste Management (Packaging) Regulations 2014 (S.I. 282 of 2014) as amended
  - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997) as amended
  - Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015) as amended by S.I. No. 182 of 2019,reg 3
  - European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014) as amended
  - European Union (Batteries and Accumulators) Regulations 2014(S.I. No. 283 of 2014) as amended
  - Waste Management (Food Waste) Regulations 2009 (S.I. 508 of 2009), as amended
  - European Union (Household Food Waste and Bio-waste) Regulation 2015 (S.I. No. 430 of2015)
  - Waste Management (Hazardous Waste) Regulations, 1998 (S.I. No. 163 of 1998) as amended
  - Waste Management (Shipments of Waste) Regulations, 2007 (S.I. No. 419 of 2007) as amended
  - European Communities (shipments of Hazardous Waste exclusively within Ireland) Regulations 2011 (S.I. No.342/2011

  - European Communities (Transfrontier Shipment of Waste) Regulations 1994 (SI 121 of 1994)
  - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015)
- Environmental Protection Act 1992 (No. 7 of 1992) as amended.
- Litter Pollution Act 1997 (No. 12 of 1997) as amended.
- Planning and Development Act 2000 (No. 30 of 2000) as amended.

This Chapter is based on a consideration of the proposed development and addresses the following aspects:

- Legislative context;
- Demolition phase (Not applicable to this green field site);
- Construction phase (including site preparation, excavation and levelling); and,
- Operational phase.

A desk study was carried out which included the following:

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland;
- Description of the typical waste materials that will be generated during the construction and operational phases; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

Estimates of waste generation during the demolition, construction and operational phases of the proposed development have been calculated. The waste types and estimated quantities are based on published data by the EPA in the National Waste Statistics Summary Report for 2018 (published in September 2020 by the EPA), data recorded from similar previous developments, Irish and US EPA waste generation research, other available research sources and waste collection data from the current facilities on site.

Mitigation measures are proposed to minimise the effect of the proposed development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal.

Legislation and Guidance

Waste management in Ireland is subject to EU, national and regional waste legislation which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act 1996 (as amended).

In addition to Legislation, the Irish government issues policy documents which outline measures aimed to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The policy document A Waste Action Plan for a Circular Economy Ireland's National Waste Policy 2020-2025 was published on the 4th of September 2020. The 'Waste Action Plan for a Circular Economy' goes beyond the management of waste and addresses how we look at resources more broadly, capturing and maximising the value of materials that may in the past have been discarded. A key objective of this Action Plan is therefore to shift the focus away back up the product life cycle, to remove or design out harmful waste, to extend the life of the products and goods used and prevent waste arising in the first place – consistent with the concept of a zero-waste future.

The strategy for the management of waste from the construction and demolition phase is in line with the requirements of the Draft Best Practice Guidelines for the Preparation of resource management plans for construction & demolition projects published in April 2021. These draft guidelines will supersede the Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects published in 2006. The guidance document Construction and Demolition Waste Management: A handbook for Contractors and Site Managers was also consulted in the preparation of this assessment. There are currently no Irish guidelines on the assessment of operational waste generation and guidance is taken from industry guidelines, plans and reports, British Standards and other relevant studies and reports including BS 5906:2005 Waste Management in Buildings – Code of Practice, the Eastern-Midland Region Waste Management Plan 2015 – 2021, the EPA National Waste Database Reports 1998 – 2012 and the EPA National Waste Statistics Web Resource.

12.3 RECEIVING ENVIRONMENT

The subject site is located at Priorsland, Cherrywood, Carrickmines, Co. Dublin. In terms of waste management, the receiving environment is under the jurisdiction of Dún Laoghaire-Rathdown County Council (DLRCOCO) as the local authority responsible for setting and administering waste management activities in the area. This is governed by the requirements set out in the *Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021.*

The waste management plan sets the following targets for waste management in the region:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan;
- Achieve a recycling rate of 50% of managed municipal waste by 2020; and
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

The Regional Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of *"70% preparing for reuse, recycling and other recovery of construction and demolition waste"* (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

The National Waste Statistics update published by the EPA in December 2017 identifies that Ireland's current progress against this C&D waste target is at 68% and our progress against 'Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass (includes metal and plastic estimates from household WEEE)' is at 45%. Both of these targets are required to be met by 12 December 2020 in accordance with the requirements of the Waste Framework Directive. The Dún Laoghaire-Rathdown County Development Plan 2016 – 2022 also sets policies and objectives for the DLRCOCO county development plan 2016-2022 area which reflect those set out in the regional waste management plan.

DLRCOCO no longer operates any municipal waste landfill in the area. There are numerous wastes permitted and licensed facilities located in the Eastern-Midlands Waste Region for management of waste from the construction industry as well as municipal sources. These include soil recovery facilities, inert C&D waste facilities, hazardous waste treatment facilities, municipal waste landfills, material recovery facilities, waste transfer stations and two waste-to-energy facilities.

12.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The development will comprise a mixed-use village centre and residential development of 443 no. units comprising 6 no. blocks of apartments (up to 5 storeys with basement/undercroft parking) providing 402 no. apartments units (146 no. 1-beds; 218 no. 2-beds and 38 no. 3-beds), and 41 no. houses (19 no. 3-beds and 22 no. 4-beds). All apartments provided with private balconies/terraces. Provision of indoor residential facilities to serve apartment residents.

The Village Centre and non-residential elements will comprise a supermarket, local retail/retail service units, non-retail commercial units, creche, gym, community space, and offices (High Intensity Employment) use.

Provision of car/bicycle/motorcycle parking; ESB sub-stations; bin storages areas, and all associated plant areas.

Provision of the first phase of Priorsland Park (on lands within the applicant's ownership) and other public and communal open spaces.

Construction of Castle Street through the subject lands and two road bridges across the Carrickmines Stream, one to serve the future school site/ park, the second to provide pedestrian and cyclist access to the Carrickmines Luas station and future Transport Interchange to the north. Provision of additional pedestrian bridge to the park. Provision of an acoustic barrier along the southern/western edge of the site.

All associated site development works, landscaping, boundary treatments and services provision.

It is proposed that construction traffic will access/exit the proposed development via an existing access route utilising the available wayleave immediately west of the application site (itself accessed via the M50 Southbound Roundabout).

A more detailed description is outlined in Chapter 3.

The project will involve the development of the proposed Priorsland site over a construction period of c.5 years. When considering a development of this nature, the potential waste management impact on the surroundings must be considered for each of two distinct stages:

- construction phase;
- operational phase.

As stated, the construction phase will involve extensive excavation over the development site and the erection of a new village centre and housing over a phased construction period. These issues are discussed in detailed in the following sections. Waste activities relating to the construction and operation of the development in terms of waste management are discussed below.

Demolition Phase
The proposed development site is a green field site; therefore, no demolition works at the site will be required.

Construction Phase
During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The construction contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

In addition, excavations will be required to facilitate construction. The project engineers, Punch Consulting Engineers, have estimated that the total volume of material to be excavated will be c. 15,000m^3. It is expected a fill quantity of 47,000m3 will be required. However, in the unlikely event that there is surplus material that requires removal from site and it is deemed to be a waste, removal and reuse/recycling/recovery/disposal of the material will be carried out in accordance with the *Waste Management Act 1996* (as amended), the *Waste Management (Collection Permit) Regulations 2007* (as amended) and the *Waste Management (Facility Permit & Registration) Regulations 2007* (as amended). The volume of waste requiring recovery/disposal will dictate whether a Certificate of Registration (COR), permit or license is required by the receiving facility. The spoil generated from the basement construction must be disposed at an appropriate licensed facility.

In order to establish the appropriate reuse, recovery and/or disposal route for the material to be removed off-site, it will first need to be classified. Waste material will initially be classified as hazardous or non-hazardous in accordance with the EPA publication *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous*. Environmental soil analysis will be carried out prior to construction on a number of the soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste including potential pollutant concentrations and leachability.

In the unlikely event that surplus soils/stones are generated it may be suitable for acceptance at either inert or non-hazardous soil recovery facilities/landfills in Ireland, In the event of hazardous material being encountered, it will be transported for treatment/recovery or exported abroad for disposal in suitable facilities.

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

also be generated infrequently from site offices. The CDWMP provides an estimate of the main waste types likely to be generated during the construction phase of the proposed development and these are summarised in Table 12.1.

Construction Waste Material	Quantity	Actions
Metal	558.6 t	20% to be reused on site and80% to be recycled
Glass	11.76 t	50% of any waste concrete to be recycled and50% to be properly disposed of
Paper & Cardboard	0.88 t	100% of any waste masonry to be recycled
Plastic	0.88 t	100% of any waste timber to be recycled
Wood	168 t	100% of any waste packaging to be recycled
Mixed Waste	8.82 t	Not envisaged at this stage of the project*
Mineral (concrete, bricks, gypsum)	1293.6 t	Any other waste materials will be recycled wherepossible or disposed of appropriately
Soil/Stones	221.7 t	
Residues	676.2 t	
TOTAL Arisings	**2,940 t**	

Table 12.1: On and Off-Site Reuse, Recycle/Recovery and Disposal Rates for Construction Waste

It should be noted that until final materials and detailed construction methodologies have been confirmed it is difficult to predict with a high level of accuracy the construction waste that will be generated. The exact materials and quantities may be subject to some degree of change and variation during the construction process. However, the above estimates are considered to be the worst-case scenario. The site-specific CDWMP will be updated and submitted prior to commencement of the construction phase which may refine the above waste estimates.

Operational Phase

An Operational Waste Management Plan (OWMP) has been prepared for the development. The plan will seek to ensure the development contributes to the targets outlined in the Eastern Midlands Regional (EMR) Waste Management Plan 2015 – 2021. Mitigation measures proposed to manage impacts arising from wastes generated during the operation of the proposed development are summarised below.

All waste materials will be segregated into appropriate categories and will be stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas of the site in accordance with the *Dún Laoghaire-Rathdown County Development Plan 2016 – 2022.*

The estimated quantum/volume of waste that will be generated from the residential units has been determined based on the predicted occupancy of the units and is presented in table 12.2 below. Non-residential waste predictions (L/per have also been estimated and are summarised in table 12.3 (L/per week).

Waste Volume (l/week)							
Waste type	**Block A**	**Block B**	**Block C**	**Block D**	**Block E**	**Block F**	**Totals**
Organic Waste	360	355	355	225	425	290	**2010**
Mixed Dry Recyclables	5070	4845	5265	3895	6980	4335	**30390**
Glass	360	355	355	225	425	290	**2010**
Mixed Municipal Waste	5070	4845	5265	3895	6980	4335	**30390**
Total	**10860**	**10400**	**11240**	**8240**	**14810**	**9250**	**64800**

Table 12.2: Residential Waste Prediction (m^3/per week)

Non-Residential Floor Areas	Location	Area sq.m	Area (sq.) GIA	Area (sq.) (NIA)	DMR Recycling	Food Waste	MNR Residual	Glass	Total (L)
Retail	**Plot A & B**	715	657.8	550.55	2752.75	1376.38	2752.75	1376.38	5505.50
Non-Retail	**Plot A & B**	213	196.0	164.01	410.03	410.03	410.03	410.03	820.05
Community Facilities	**Plot E**	513	472.0	395.01	987.53	987.53	987.53	987.53	1975.05
Creche	**Plot A**	252	231.8	194.04	970.20	485.10	485.10	485.10	1455.30
Residential amenity	**Plot C & E**	155	142.6	119.35	298.38	298.38	596.75	298.38	895.13
Gym	**Plot E**	551	506.9	424.27	2121.35	2121.35	2121.35	2121.35	

Table 12.3: Commercial Waste Prediction (m^2/per week)

All waste leaving the site will be recycled or recovered, with the exception of those waste streams where appropriate recycling/recovery facilities are currently not available. All waste leaving the site will be transported by suitable permitted contractors and taken to suitably permitted or licenced facilities.

All waste leaving the site will be recorded and copies of relevant documentation maintained. It is proposed that Block A residents will avail of one of two commercially available mini compactors for the dry mixed recyclable and mixed non-recyclable waste streams.

Hazardous Waste

Hazardous waste may be generated from WEEE, batteries, fluorescent tubes, and cleaning products. Any waste classified as hazardous will be required to be taken to a specialised waste company e.g., Rilta.

12.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

This section details the potential waste impacts associated with the proposed development.

Construction Phase

The proposed development will generate a range of non-hazardous and hazardous waste materials during demolition and construction. General housekeeping and packaging will also generate waste materials as well as typical municipal wastes generated by construction employees including food waste.

Waste materials will be required to be temporarily stored on site pending collection by a waste contractor. Dedicated areas for waste skips and bins will be identified across the site. These areas will be easily accessible to waste collection vehicles.

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development and on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the development and the surrounding areas.

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. All waste materials will be dealt with in accordance with regional and national legislation, as outlined previously, and time and resources will be dedicated to ensuring efficient waste management practices.

Wastes arising will be taken to suitably registered/permitted/licenced waste facilities for processing and segregation, reuse, recycling, recovery and/or disposal as appropriate. There are numerous licensed waste facilities in the Eastern Midlands region which can accept hazardous and non-hazardous waste materials. Acceptance of waste from the proposed development would be in line with daily activities at these facilities. Where possible, waste will be segregated into reusable, recyclable and recoverable materials.

Recovery and recycling of C&D waste has a positive impact on sustainable resource consumption, for example where waste timber is mulched into a landscaping product or waste asphalt is recycled for use in new pavements. The use of recycled materials, where suitable, reduces the consumption of natural resources.

There is a quantity of top soil and sub soil which will need to be excavated to facilitate the proposed development. The project engineers Punch Consulting have advised that it is likely that all of this material will be suitable for reuse onsite. However, if there is surplus excavated material it will need to be removed off-site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

For the interim period (up to 3years+) access to the site will be via the existing access road to the west of the site until such time as the remainder of Castle Street on third party lands to the east of the application site is completed and becomes available.

The opportunities for waste materials to be reused off-site will provide positive impacts in the resourcing of materials for other developments and reduce the requirement for raw material extraction.

The potential effect of construction waste generated from the proposed development is considered to be ***short-term,*** and ***not significant.***

Operational Phase

The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy. This would lead to volumes of waste being sent unnecessarily to landfill.

The nature of the development means the generation of waste materials during the operational phase is unavoidable. Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion in recycled products (e.g., paper mills and glass recycling).

The waste materials generated on a daily basis will be stored in dedicated waste storage areas.

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development and on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the development and the surrounding areas.

Waste collection vehicles will be required to service the development on a regular basis to remove waste. Operational access to the site will be via the completed Castle Street connecting with the remainder of the Cherrywood Phase 1 road system to the east.

The use of non-permitted waste contractors or unauthorised facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously. Time and resources should be dedicated to ensuring efficient waste management practices. An operational waste management plan has been included as an appendix.

The potential impact of operational waste generation from the development is considered to be ***long-term*** and ***not significant***.

12.6 POTENTIAL CUMULATIVE IMPACTS

Should the construction of this project proceed in parallel or overlap with the construction of other proposed schemes, this could give rise to short term, slight resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland due to an increased demand on waste recovery and/or disposal sites during the construction phase.

Having regard to the imperceptible resource and waste management effect of the proposed scheme during operation, no negative likely significant cumulative resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland are identified during the operational phase of the proposed scheme.

The existing waste management infrastructure and procedures for management of waste are sufficient and as such there will be no significant cumulative impact in terms of waste from the proposed development. The cumulative impact of the additional wastes generated by the proposed development has been considered in combination with those listed above.

12.7 MITIGATION MEASURES

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

Construction phase

A project specific CDWMP has been prepared in line with the requirements of the guidance document issued by the DoEHLG. Adherence to the high-level strategy presented in this CDWMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the construction phase of the proposed development.

Punch Consulting Engineers have estimated that c. 15,000m^3 of topsoil and sub soil will be generated from the excavations required to facilitate the basement. It is anticipated that all of this material will be reused onsite, and it will not require removal for offsite. If excavated material is to be taken offsite the contractor(s) will endeavour to ensure that material is reused or recovered off-site or disposed of at authorized facility.

In addition, the following mitigation measures will be implemented:

12.7.1 Building materials will be chosen with an aim to 'design out waste';

12.7.2 On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery – that the following waste types, at a minimum, will be segregated:

- Concrete rubble (including ceramics, tiles and bricks);
- Plasterboard;
- Metals;
- Glass; and
- Timber.

12.7.3 Left over materials (e.g., timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials shall be re-used on-site, where possible;

12.7.4 All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;

12.7.5 Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);

12.7.6 A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works;

12.7.7 All construction staff will be provided with training regarding the waste management procedures;

12.7.8 All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal;

12.7.9 All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities; and

12.7.10 All waste leaving the site will be recorded and copies of relevant documentation maintained.

These mitigation measures will ensure that the waste arising from the construction phase of the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997* and the *EMR Waste Management Plan (2015 - 2021)*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will encourage sustainable consumption of resources.

Operational Phase

All waste materials will be segregated into appropriate categories and will be stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas of the site in accordance with the *Dún Laoghaire-Rathdown County Development Plan 2016 – 2022*.

In addition, the following mitigation measures will be implemented:

12.7.11 On-site segregation of all waste materials into appropriate categories including (but not limited to):

- Organic/catering waste (including garden waste from landscaping activities).
- Dry Mixed Recyclables;
- Mixed Non-Recyclable Waste;
- Glass;
- Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment;
- Batteries (non-hazardous and hazardous)
- Fluorescent bulb tubes and other mercury containing waste (if arising).
- Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.); and

12.7.12 All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials;

12.7.13 All waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available;

12.7.14 All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities; and

These mitigation measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, and all associated Regulations. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

12.8 PREDICTED IMPACTS

The implementation of the mitigation measures outlined in Section 12.6 will ensure that a high rate of reuse, recovery and recycling is achieved at the development during the construction phases as well as during the operational phase. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved.

Construction Phase

A carefully planned approach to waste management as set out in Section 12.7 and adherence to the CDWMP during the construction phase will ensure that the impact on the environment will be *short-term, neutral* and *imperceptible.*

Operational Phase

During the operational phase, a structured approach to waste management as set out in Section 12.7 will promote resource efficiency and waste minimisation. Provided the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted impact of the operational phase on the environment will be *long-term, neutral* and *imperceptible*.

12.9 'DO NOTHING' SCENARIO

If the proposed development did not go ahead there would be no waste generated at this site and operational waste generated from this site would stay at its current level.

12.10 WORST CASE SCENARIO

The 'worst-case' scenario, is that, should a CDWMP not be implemented, the target recycling rates outlined in the Waste Management Plan for the Dún Laoghaire-Rathdown Region and all relevant waste guidance targets will not be achieved. In addition, if waste is not managed and stored correctly on site, this may lead to litter or pollution issues on the site or adjacent sites. However, this is thought to be unlikely having taken into consideration the mitigation measures outlined above.

12.11 MONITORING & REINSTATEMENT

Construction Phase

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the construction phases where there is a potential for waste management to become secondary to progress and meeting construction schedule targets. As specified in the CDWMP, the need for a waste manager will be appointed who will have responsibility to

monitor the actual waste volumes being generated and to ensure that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the waste manager should identify the reasons for targets not being achieved and work to resolve any issues. Recording of waste generation during the project will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future projects.

Operational Phase

During the operational phase, waste generation volumes should be monitored by the management company or equivalent, against the predicted waste volumes outlined in the OWRMP. There may be opportunities to reduce the number of bins required in the communal Waste Storage Areas (WSAs) where estimates have been too conservative. Reductions in bin requirements will improve efficiency and reduce waste contractor costs. Waste legislation should also be consulted on a regular basis in case of any changes which may impact on waste management procedures.

12.12 DIFFICULTIES IN COMPILING INFORMATION

There were no difficulties encountered during the production of this chapter of the EIAR.

12.13 REFERENCES

- Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, August 2017).;
- Draft Advice Notes for preparing Environmental Impact Statements (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).;
- European Commission Guidance 2017
- EPA National Waste (Database) Reports;
- The Dublin City Council Development Plan 2016 – 2022.
- Waste Management Act 1996 (No. 10 of 1996), as amended.
- Eastern-Midlands Waste Region Waste Management Plan, 2015-2021, Eastern-Midlands Region, 2015.
- Waste Framework Directive (Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste).
- Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) as amended
- Waste Management (Facility Permit and Registration) Regulations 2007, as amended
- Waste Management: Changing Our Ways, The Department of the Environment and Local Government, 1998.
- Preventing and Recycling Waste: Delivering Change, The Department of the Environment and Local Government, 2002.
- Taking Stock & Moving Forward, The Department of the Environment and Local Government, 2004.
- National Strategy on Biodegradable Waste Management, Department Environment, Heritage and Local Government, 2006.
- A Waste Action Plan for a Circular Economy Ireland's National Waste Policy 2020-2025, Department of Communications, Climate Action and Environment 2020
- Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous, Environmental Protection Agency, 2015.
- Waste Management in Buildings – Code of Practice, British Standard, BS 5906:2005, 2005.
- Mobile Waste and Recycling Containers Part 1: Containers with 2 wheels with a capacity up to
- 400 l for comb lifting devices — Dimensions and design, British Standard, BS EN 840-1:2012, 2012.

- Mobile waste containers. Containers with four wheels with a capacity from 750 l to 1700 l with flat lid(s), for wide trunnion or BG-and/or wide comb lifting devices. Dimensions and design, British Standard, BS EN 840-4:1997, 1997.
- Municipal Waste Statistics for Ireland, EPA Waste Data Release, 31 October 2018
- Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects 2006
- Best Practice Guidelines for The Preparation of Resource Management Plans for Construction & Demolition Projects - Draft For Public Consultation April 2021

13 CULTURAL HERITAGE

13.1 INTRODUCTION

This chapter describes the likely significant effects of the proposed development on archaeology, architectural and cultural heritage. Detailed interrogation of the paper sources, field inspections, and ground investigations were undertaken in an attempt to identify any known cultural heritage sites and previously unrecorded features, structures and portable finds within the proposed development area.

This Chapter has been prepared by Faith Bailey and Maeve Tobin of IAC Ltd. Faith holds a single honours degree in Archaeology and a Masters in Cultural Landscape Management (University of Wales, Lampeter), has over 18 years' experience working the cultural heritage consultancy, is a licence eligible archaeologist and is a Member of the Institute of Archaeologists of Ireland and a Member of the Chartered Institute for Archaeologists. Maeve graduated from UCC with a B.A in Archaeology & Geography (2003) and an M.A. in Osteoarchaeology (2004), following which she worked as a field archaeologist. Both Faith and Maeve have considerable experience in the preparation, co-ordination and submission of EIA and desk-top assessments for a variety of largescale residential, commercial, windfarm and infrastructural projects across the country.

13.2 METHODOLOGY

This assessment determines, as far as reasonably possible from existing records, the nature of the cultural heritage resource within the footprint and a defined vicinity of the proposed development using appropriate methods of study.

As outlined by the Chartered Institute for Archaeologists, desk-based assessment is a programme of study of the historic environment within a specified area or site on land, the inter-tidal zone or underwater that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage assets.

Desk based assessment leads to the following:

- Determining the presence of known archaeological and built heritage sites that may be affected by the proposed development;
- Assessment of the likelihood of finding previously unrecorded archaeological remains during the construction programme;
- Determining the impact (direct/ indirect) upon the known cultural heritage sites in the surrounding area (receiving environment);
- Identifying mitigation measures based upon the results of the above research; and
- Describing the residual impact on the archaeological, architectural and cultural heritage resource.

Research for this assessment has been undertaken in five phases. The first phase comprised a paper survey of publicly available archaeological, architectural, historical and cartographic sources. The second phase involved field inspections of the proposed development area in September 2018. The third phase involved a geophysical survey of the available lands in September 2018 (Nicholls 2018, licence 18R0197, Appendix 13.1). The fourth phase comprised archaeological test trenching undertaken in October 2018 (Kavanagh and Tobin 2018, licence 18E0650 18R0249, Appendix 13.2). The fifth, and final, phase consisted of an assessment of the Carrickmines Stream, which was carried out in January 2019 by Rob Goodbody and Maeve Tobin (Goodbody 2019, Appendix 13.3).

GUIDANCE AND LEGISLATION

This assessment has been undertaken having regard to general EIA guidance as described in Chapter 1 and the following legislation and guidelines were also consulted as part of the assessment.

- National Monuments Act 1930 to 2014;
- The Planning and Development Acts 2000 to 2018;
- Planning & Development Regulations 2001–2018;
- Heritage Act, 1995, as amended;
- Heritage Act 2018;
- Frameworks and Principles for the Protection of the Archaeological Heritage, 1999, (formerly) Department of Arts, Heritage, Gaeltacht and Islands; and
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999 and the Local Government (Planning and Development) Acts 2000–2018.

STUDY AREA

The archaeological, architectural and cultural heritage receiving environment is defined as an area measuring 500m from the red line boundary for the proposed development. Measurements have been taken from the proposed development boundary (red line boundary) to the upstanding remains of a site or structure. Where there are no upstanding remains, the measurement is taken to the centre of the site as indicated within Figure 13.1.

SITE VISITS

Field inspection is necessary to determine the extent and nature of archaeological and architectural remains and can also lead to the identification of previously unrecorded or suspected sites and portable finds through topographical observation and local information. The archaeological and architectural field inspection was carried out during August 2018 and January 2019 and entailed:

- Noting and recording the presence of known and previously unknown features of archaeological, architectural or cultural heritage significance;
- Verifying the extent and condition of recorded sites and structures (RMPs/ RPS/ NIAH); and
- Visually investigating any suspect landscape anomalies to determine the possibility of their being anthropogenic in origin and of archaeological, architectural or cultural heritage significance.

CONSULTATION

Following the initial research, a number of statutory and voluntary bodies were consulted to gain further insight into the cultural background of the receiving environment and study area, as follows:

- Correspondence with the National Monument Service (NMS) of the Department of Housing, Local Government and Heritage (DoHLGH) in September and October 2018 regarding investigations at Priorsland.
- Meeting with representatives of the National Museum of Ireland on site to review findings of test investigations in November 2018.

The following were also informally consulted to gain baseline data for the study area in January 2019:

- Units in the Department of Housing, Local Government and Heritage (DoHLGH) including the Heritage Service, National Monuments and Historic Properties Section which include a number of datasets: Record of Monuments and Places; Sites and Monuments Record; Monuments in State Care Database; Preservation Orders; Register of Historic Monuments; Architectural Advisory Unit and Underwater Archaeology Unit;
- National Museum of Ireland, Irish Antiquities Division: topographical files of Ireland;
- National Inventory of Architectural Heritage: County Dublin; and
- Dun Laoghaire Rathdown County Council: Planning Section.

CATEGORISATION OF THE BASELINE ENVIRONMENT - PAPER SURVEY

A paper survey is a document search undertaken as part of the desktop study of the baseline data. The following sources were examined and a list of areas of archaeological, architectural and cultural heritage potential was compiled:

- Record of Monuments and Places for County Dublin;
- Sites and Monuments Record for County Dublin;
- National Monuments in State Care Database;
- Preservation Orders List;
- Topographical files of the National Museum of Ireland;
- Cartographic and written sources relating to the study area;
- Dun Laoghaire Rathdown County Development Plan 2016–2022;
- Draft Dun Laoghaire Rathdown County Development Plan 2022–2028;
- Strategic Environmental Assessment (SEA) Environmental Report for the Cherrywood Planning Scheme (2012);
- Cherrywood Planning Scheme (2014);

- National Inventory of Architectural Heritage County Dublin (Architectural & Garden Survey);
- Place name analysis;
- Aerial photographs; and
- Excavations Bulletin (1970–2021).

Further information is provided below on the key data sources.

Record of Monuments and Places (RMP): Section 12(1) of the National Monuments (Amendment) Act 1994 provides that the Minister for Arts, Heritage, Gaeltacht and the Islands (now the Minister for Housing, Local Government and Heritage) shall establish and maintain a record of monuments and places where they believe there are monuments. The record comprises of a list of monuments and relevant places and mapping showing each monument and relevant place in respect of each county in the State. Sites recorded on the RMP all receive statutory protection under the National Monuments Act.

Sites and Monuments Record (SMR): The SMR holds documentary evidence and records of field inspections of all known archaeological sites and monuments. Some information is also held about archaeological sites and monuments whose precise location is not known e.g. only a site type and townland are recorded. These are known to the National Monuments Section as 'un-located sites' and cannot be afforded legal protection. As a result these are omitted from the RMP. SMR sites are also listed on a website maintained by the Department of Housing, Local Government and Heritage (DoHLGH).

National Monuments in the State Care database: This is a list of all the National Monuments in the State guardianship or ownership. Each is assigned a National Monument number whether in guardianship or ownership and has a brief description of each monument.

A National Monument receives statutory protection and is described as 'a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto' (National Monuments Act, 1930, Section 2).

The Minister for the Department of Environment, Heritage and Local Government (now the Minister for Housing, Local Government and Heritage) may acquire National Monuments by agreement or by compulsory order. The State or Local Authority may assume guardianship of any National Monument (other than dwellings). The owners of National Monuments (other than dwellings) may also appoint the Minister or the Local Authority as guardian of that monument if the State or Local Authority agrees. Once the site is in ownership or guardianship of the State, it may not be interfered with without the written consent of the Minister.

Preservation orders list: Preservation Orders and/or Temporary Preservation Orders, can be assigned to a site or sites that are deemed to be in danger of injury or destruction. Orders are allocated under the National Monuments Act, 1930. Preservation Orders make any interference with the site illegal. Temporary Preservation Orders can be attached under the National Monuments Act, 1954. These perform the same function as a Preservation Order but have a time limit of six months, after which the situation must be reviewed. Work may only be undertaken on or in the vicinity of sites under Preservation Orders with the written consent, and at the discretion, of the Minister (DoHLGH).

Register of Historic Monuments: This register was established under Section 5 of the National Monuments (Amendment) Act 1987 and requires the Minister to establish and maintain such a record. Historic monuments and archaeological areas included in the register are afforded statutory protection pursuant to the regime under the National Monuments Acts 1930 to 2014. The register also includes sites under Preservation Orders and Temporary Preservation Orders. All registered monuments are included in the RMP.

Topographical Files of the National Museum of Ireland: This is the national archive of all known finds recorded by the National Museum of Ireland. This archive relates primarily to artefacts but also includes references to monuments and unique records of previous excavations. The find spots of artefacts are important sources of information on the discovery of sites of archaeological significance.

Cartographic Sources: These are important in tracing land use development within the receiving environment of the proposed development as well as providing important topographical information on areas of archaeological potential and the construction of buildings. Cartographic analysis of all relevant maps has been made to identify any topographical anomalies or structures that no longer remain within the landscape.

The cartographic sources consulted include:

- Down Survey Map, 1654–56, Barony of Rathdown;
- John Rocque's Exact survey of Dublin County, 1760;
- John Taylor's Map of the Environs of Dublin, 1816; and
- Ordnance Survey 6-inch and 25-inch maps of Dublin (1836, 1843, 1871, and 1909).

Documentary Sources: Documentary sources (as identified above) were consulted to compile background information on the archaeological, architectural and cultural heritage receiving environment of the proposed development.

Development Plan and Planning Scheme: Development Plans contain a catalogue of all the Protected Structures, archaeological sites and Architectural Conservation Areas within every county. The development plan of relevance that was examined as part of this assessment include the Dun Laoghaire Rathdown County Development Plan 2016–2022, the draft county plan (2022-2028) and The Cherrywood Planning Scheme, 2014.

The National Inventory of Architectural Heritage (NIAH): The NIAH is a government-based organisation tasked with making a nationwide record of locally, regionally, nationally and internationally significant structures, which in turn provides county councils with a guide as to what structures to list within the Record of Protected Structures. The NIAH have also carried out a nationwide desk-based survey of historic gardens, including demesnes that surround large houses.

Aerial Photographic Coverage: This is an important source of information regarding the precise location of sites and their extent. It also provides information on the terrain and its likely potential for archaeology. Ordnance Survey aerial photographs (1995-2013), Google Earth coverage (2003–2021) and Bing Maps were examined for this assessment.

Excavations bulletin: This is a summary publication that has been produced every year since 1970. This summarises every archaeological excavation that has taken place in Ireland during that year up until 2010 and since 1987 has been edited by Isabel Bennett. This information is also available online from 1970–2021. Information from this resource is vital when examining the archaeological content of any area, which may not have been recorded under the SMR and RMP files.

GEOPHYSICAL SURVEY

Geophysical surveys are used to create 'maps' of subsurface archaeological features. Features are the non-portable part of the archaeological record, whether standing structures or traces of human activities left in the soil. Geophysical instruments can detect buried features when their electrical or magnetic properties contrast measurably with their surroundings. In some cases, individual artefacts, especially metal, may be detected as well. Readings, which are taken in a systematic pattern, become a dataset that can be rendered as image maps. Survey results can be used to guide excavation and to give archaeologists insight into the pattern of non-excavated parts of the site. Unlike other archaeological methods, the geophysical survey is not invasive or destructive. A geophysical survey was undertaken to inform this assessment in September 2018 within the proposed development area (Nicholls 2018, Licence 18R0197). A summary of the geophysical report is presented in Section 13.3 and the full text included in Appendix 13.1.

ARCHAEOLOGICAL TEST TRENCHING

Archaeological Test Trenching can be defined as 'a limited programme... of intrusive fieldwork which determines the presence or absence of archaeological features, structures, deposits, artefacts or ecofacts within a specified area or site on land or underwater. If such archaeological remains are present test trenching defines their character and extent and relative quality' (CIfA 2014a, 4). A program of archaeological testing based on the results of the geophysical survey was carried out in the proposed development area in October and November 2018. This was undertaken by Liza Kavanagh of IAC under licence 18E0650. A summary of the testing report is presented in Section 13.3 and the full text included in Appendix 13.2.

IMPACT ASSESSMENT METHODOLOGY

In order to assess, distil and present the findings of this study, the following definitions apply:

- 'Cultural Heritage' where used generically, is an over-arching term applied to describe any combination of archaeological, architectural and cultural heritage features, where;
- the term 'archaeological heritage' is applied to objects, monuments, buildings or landscapes of an (assumed) age typically older than AD 1700 (and recorded as archaeological sites within the Record of Monuments and Places);
- the term 'architectural heritage' is applied to structures, buildings, their contents and settings of an (assumed) age typically younger than AD 1700;
- the term 'cultural heritage', where used specifically, is applied to other (often less tangible) aspects of the landscape such as historical events, folklore memories and cultural associations. This designation can also accompany an archaeological or architectural designation or describe features that have a more recent origin, but retain cultural heritage significance; and
- For the purposes of this report the terms 'architectural heritage' and 'built heritage' have the same intended meaning and are used interchangeably.

The Impact Definitions identified in Section 3.7 of the draft 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (2017) are used.

13.3 RECEIVING ENVIRONMENT

ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

The proposed development area is situated in the townlands of Brenanstown and Carrickmines Great, in the Parish of Tully, Dublin 18. It is bordered by a trackway and the M50 to the southwest, by the Luas line and car park to the northwest and north, and by the Cherrywood Phase 1 Roads corridor (Reg. Ref. DZ15A/0758) to the east. The site comprises two relatively flat fields of pasture used by an equestrian centre, separated by the straightened channel of the Carrickmines Stream (Plates 13.1–4). The Ticknick Stream borders the site along the eastern perimeter. The ground is often wet, testifying to the altered course of the former stream. The fields are bordered by mature trees and hedgerows, relating to the former parkland associated with Priorsland House, situated immediately north of the proposed development area.

The zone of notification for recorded monument mill and enclosure site (DU026-080001-2) is located within the eastern part of the application site (Figure 13.1). In the wider vicinity, 13 recorded sites or features are known within a 500m radius. The most significant and nearest of these include Carrickmines Castle and associated remains (DU026-005001–5) 210m west-northwest and Brenanstown Portal Tomb (DU026-007, Nat. Mon. 291) situated c. 420m to the northeast; both of which are listed as National Monuments and are also recorded in the Development Plan as Protected Structures. The name Carrickmines may derive from '*Carraig-Maighin'* meaning 'little plain of rocks' (Clinton and Shiels 2013). Investigations at Carrickmines, in advance of the M50, led to what has been described as one of the most important excavations of a medieval settlement landscape in Ireland.

Prehistoric Period

During the prehistoric period this area would have been ideal for settlement, situated within the coastal plains, adjacent to a watercourse, with good visual corridors west and south to the hills. Archaeological evidence testifies to the continued presence of a settled population in the area from the Neolithic period onwards, although Mesolithic tools have also been identified in Laughanstown and Glebe.

The culture of building large megalithic monuments was prevalent in this region with several monuments recorded in Rathdown. A portal tomb (DU026-007) is present in Brenanstown on the north side of the Carrickmines Stream 420m to the northeast, and a Wedge Tomb DU026-024 is recorded 1.2km south in Laughanstown. The remains of Neolithic habitation features were identified during excavations at Carrickmines Great within the M50 footprint to the west of the application area which included a large pit containing early Neolithic waste overlying nine water-rolled pebble beads (Ó Drisceoil 2013). Stray finds of polished stone axes and Neolithic flints are recorded from the wider area.

While the megalithic tomb tradition extended into the Bronze Age (c. 2500–800BC) with Wedge Tombs recorded as being in use at the start of this period, there was a gradual shift toward more individual burials such as pits, ring ditches and barrows. The nearest Wedge Tomb is situated at Laughanstown (DU026-024, Nat. Mon. 2016) c. 1.3km south and excavation has indicated a substantial flat cemetery was present in the surrounding fields (Seaver 2013). Extensive evidence for Bronze Age burial and settlement activity has been recorded in the vicinity of the proposed development area within Carrickmines Great, Laughanstown, Cherrywood, Glebe, Jamestown, and Kilgobbin (Seaver 2013; McQuade 2013; ÓDrisceoil 2013 and Hagen 2013). Megalithic rock art, cup-marked granite boulders (DU026-145 and DU026-144) were also identified during groundworks associated with the M50 in Carrickmines Great and Laughanstown respectively. Although several burial sites have been recorded in the area the most interesting in terms of contents was recorded at Laughanstown c. 1.3km southeast, in the form of an isolated early Bronze Age cremation burial accompanied by an urn, a copper alloy pin and some burnt flint (McQuade 2013). A ring barrow (DU026-133), cremation burial and the remains of a roundhouse were also excavated further to the southeast at Cherrywood (O'Neill 1999). Notably recent test trenching undertaken in 2018 to inform this chapter revealed a ringditch enclosing at least six cremation pit burials, of which four contained urns (Plates 13.10–12). Further description of this site is included below and in Appendix 13.2.

The nearest evidence for settlement comprises the early and late Bronze Age hut structures excavated c. 20m to the west at Carrickmines Great (Ó Drisceoil 2013). A large quantity of flints were recovered associated with this site. A bronze palstave axehead is recorded as a stray find from Glenamuck South (NMI Ref.: 1974:89). The most common indicator of settlement in the Bronze Age is the burnt mound or *fulacht fia*, and several have been recently excavated c. 20–50m east in Brenanstown within the footprint of the Castle Street and Barrington's Road dating to the early and middle Bronze Age (Whitty, McIlreavy and Kavanagh 2018). Further examples have been recorded at Carrickmines Great (DU026-135) 100m southwest and within the wider area at Laughanstown and Ticknick (ibid.). The remains of heavily truncated burnt mounds have been identified within the application area during recent testing (Plate 13.13)

There is a growing corpus of evidence for Iron Age activity in the wider vicinity of the application site. Settlement features have been recorded during excavations at Carrickmines Great, Jamestown, Laughanstown, and Kilgobbin. Iron Age hut sites were excavated at Kilgobbin (Hagen 2013) and at Carrickmines Great (Ó Drisceoil 2013; Ó Drisceoil and Devine 2012). The early Iron Age habitation site at Carrickmines Great, to the immediate south of the application area, appeared to be a small undefended farmstead represented by a post-built circular house associated with iron-smelting furnace, charcoal-production features and cultivation of cereals (ibid.). At this time the surrounding landscape has been characterised as woodland with oak, alder, hazel, ash and apple trees in the vicinity. A late Iron Age cremation burial pit was also recorded in the northern limit of the Carrickmines Great excavation area c. 50m north of the 'farmstead' discussed above (ibid.). Further evidence for Irons Age burial was identified as a cremation deposit within a ring ditch excavated at Jamestown c. 2km to the west (Kyle 2012). A copper-alloy ring retrieved from this ring ditch has been interpreted as a finger ring, a chain link, or part of a composite bracelet or necklace (ibid.).

Early Medieval Period

The territory around Carrickmines was ruled by the Lordship of the *Uí Briúin Cualann*. Rathdown was well-populated during this period with a large number of ecclesiastical centres established in the area (Rathmichael, Tully, Shankill and Kilternan) and close proximity to the coastal resource. It is therefore surprising that there is not greater evidence for settlement in the form of ringforts within the area. It is possible that there was no need for a large number of defended settlements within the area as Rathdown was out of reach of the constant attention of the Kings of Meath to the north of Dublin city and the Kings of Leinster to the west of the Wicklow Mountains. It is also possible that many of the sites were removed during the medieval period, when the arrival of the Anglo-Normans and their new techniques of warfare rendered the ringfort obsolete.

Excavations have revealed a significant early medieval Hiberno-Norse settlement and burial site at Cherrywood (O'Neill 2006, O'Neill and Coughlan 2010) and a secular settlement site (ringfort DU026-149) at Glebe 1.7km to the south and southeast respectively (Corlett 2013). Tully Church, graveyard, crosses and ecclesiastical enclosure (DU026-023001–19, Nat. Mon. 225) located 950m southeast are situated on a natural prominence overlooking the coastal plains. Tully, which is thought to have been founded in the eight century (Corlett 2013) gained much power and influence and it has been suggested (Murphy and Potterton 2010, 67) that the site was a strategic holding of the church. The distribution of Rathdown slabs, including those at Tully Church, within this wider region appear to indicate additional evidence for the spread of Scandinavian settlement activity. A substantial cemetery founded in the early medieval period was also identified c. 2km to the east at Cabinteely (DU026-119).

Medieval Period

There are a large number of fortified buildings within the Rathdown area and this was in part due to the presence of the Pale. The Pale was defined as a hinterland around the centre of Anglo-Norman rule based in Dublin. The complex of medieval settlement features at Carrickmines (DU026-005001-4) is situated c. 230m to the northwest. Carrickmines lay at the junction of two medieval roads, leading north to Dublin and east to Laughanstown/ the coast (Clinton and Shiels 2013, 137). Excavations in advance of the M50 revealed three conjoined enclosures representing occupation from the late 12th century into the modern period (ibid.). It is likely, based on historical and archaeological records, that a small manor (including a stone-lined cereal-drying kiln) containing arable and pastoral land was present at Carrickmines from the mid-late 12th century (Bolton 2016, 112). In the following decades a horizontal watermill, workshop containing three furnaces or kilns, and an additional structure were built. In the early 13th century the excavators have identified a moated enclosure surrounding the manor, representing the first evidence for fortification at Carrickmines. A significant number of artefacts (c. 90,000) were recovered during excavation at Carrickmines, including a vast number of locally produced ceramics and metalwork (Clinton and Shiels 2013, 138)

Carrickmines manor was situated on the frontier of Anglo-Norman and Gaelic-Irish land holdings and during the 14th and 15th centuries their interaction was characterised by interspersed violence. The site acted as a military base to defend the region from raiding by the O'Byrnes and the O'Tooles. The status of Carrickmines in the mid-14th century has been described as a 'Ward' with military functions but not necessarily a defensive structure (Bolton 2016, 114). The most defensive feature identified during excavation, the trivallate 'southeast enclosure' appears to have been constructed at this time, representing an attempt to strengthen the manor. The zone of archaeological potential for the castle (DU026-005) is located c. 210m west-northwest of the application site and excavation revealed the innermost ditch was revetted with granite walling. A two-phased tower was identified at the northeast terminus of the inner ditch. During the 15th century the 'Subsidised Castles Act' provided grants of ten pounds to encourage the construction of castles to defend the Pale against the native Irish. In 1400 Carrickmines passed to the Walsh family although Bolton (ibid. 116) notes that they were not great castle builders, and the presence of a 'castle' here remains speculative. In 1494 an act of Parliament required landowners to construct a line of defences along the border of the Pale, but it is likely that not all did so. Evidence for a boundary of the Pale ditch has been identified 520m southwest (DU026-122) and c. 1.4km northwest (DU026-115) of the application site. The Pale fortifications would have led from Kilgobbin Castle to Carrickmines, although the exact alignment of the ditch, with respect to the current site is not known.

The zone of notification for the site of an 'ancient mill' and enclosure (DU026-080001) is located within the eastern half of site (Figure 13.1) based on local knowledge collected during field work for the Ordnance Survey in 1836. A building, quern stone and possible enclosures were recorded in a sketch map in the approximate location of the proposed development area although the scale of the map could indicate a much larger area (Figure 13.2). The site was recorded on the published 1843 6-inch OS map as the 'site of an ancient mill' (Figure 13.2); now recorded as DU026-080. In the mid-19th century the Carrickmines Stream had been straightened into an excavated channel and the fields subject to reclamation and reorganisation. No reference to a former mill is shown on the 1909 25-inch OS map (Figure 13.2). Earlier mapping in the mid-17th century (Figure 13.2) suggests the site of a water mill further to the northeast near to Brenanstown House. The exact location of the mill is vague; however, Paddy Healy noted the presence of a mill stone on the banks of the stream further northeast (Appendix 13.3). Field inspection by the authors and Rob Goodbody, a built heritage specialist, did not identify any evidence for former mill buildings and a review of the Ordnance Survey archives confirms that the stone-faced stream is a recent construct (Appendix 13.3).

Post-Medieval Period

The Walsh's of Carrickmines continued to rise in power and affluence although this came to an abrupt conclusion in the mid-17th century with the eruption of the Irish Confederate War in 1641. During the 17th century rebellious activity took its effect on the landscape, especially in the neighbouring townlands of Carrickmines and Loughlinstown. The enclosure at Carrickmines acted as a base for the confederate forces in 1641 however the most significant historic event recorded at Carrickmines was its siege in March 1642. Excavations revealed two multiple graves (or mass graves) containing the remains of 15 individuals, including men, women and children (Clinton, Fibiger and Shiels 2013). The bodies appeared to be hastily buried in a non-Christian manner and several of the skeletons displayed evidence for unhealed blade trauma representative of interpersonal violence at their time of death. There is potential for remains of massacre burials to continue east within the portion of land preserved around the farmhouse (ibid. 149). Evidence for the siege was also represented by c. 30 musket balls and an impacted cannonball, their location suggesting incoming fire from the Dublin side of the Glenamuck Stream (ibid.).

By the 18th century, even with the turmoil of the English civil war and arrival of Cromwell in Ireland, the population of southeast Dublin and northeast Wicklow prospered. The house at Carrickmines was occupied by the Mooney Family at the turn of the 18th century (Clinton and Shiels 2013) and they continued on here until the 21st century. A significant 18th century military camp (DU026-127) was established in Laughanstown and Cherrywood townlands as a result of the Napoleonic threat c. 600m to the east. John Ferrars (1796), who drew the camp in 1796, described the 'tents of canvas, wooden taverns, wooden huts and buildings of brick'. Numerous programmes of investigation have indicated that the camp was heavily truncated and disturbed following closure, by centuries of agricultural activity and the construction of the railway. Middens of domestic waste and scattered finds of militaria in the topsoil are the main indicators of the camp occupation. Monitoring of topsoil stripping in 2003 exposed the remains of a military kitchen 1.2km southeast of the application site (McQuade 2003a; McQuade 2003b). The remains of a second military kitchen were discovered 400m to the north of this during recent testing (McIlreavy and Tobin 2016). Military buttons, musket shot, clay pipe, glass bottles, tokens and a range of 18th century artefacts have been retrieved from the topsoil and plough zone as distant as the footprint of the M50 suggesting that the surrounding fields were used for manoeuvres.

By the turn of the 19th century the proposed development area lies c. 142m southeast of Carrickmines House, which is later renamed as 'Friarsland' and subsequently 'Priorsland'. The National Inventory of Architectural Heritage describes the house as being an integral component of the 19th century domestic built heritage of the region (RPS 1746, NIAH Ref.: 6026023). The existing protected structure, a detached three-bay two-storey house, is located on the site of an earlier structure, components of which may have been incorporated into the current structure.

The branch of the Dublin & South Eastern Railway was constructed running south from Harcourt Street Station to Bray in the mid-19th century. The route of the former railway line runs along the northern boundary of application site within the approximate footprint of the current Luas line. The former railway station (RPS 1743, NIAH Ref. 60260232) is located c. 198m northwest of the application site. A water tower also associated with the former railway complex is also listed in the NIAH c. 177m northwest of the application site (NIAH Ref.: 60260233).

COUNTY DEVELOPMENT PLAN

The Dun Laoghaire Rathdown County Development Plan (2016–2022), draft plan (2022-2028) and the Cherrywood SDZ Planning Scheme (2014) detail the archaeological constraints (Recorded Monuments and Protected Structures) and the objectives with regard to their protection and conservation (Appendix 13.4/5). In addition to the Record of Monuments and Places (RMP) and the Record of Protected Structures (RPS) an Industrial Heritage Survey of the county has also been undertaken. A study area of 500m radius of the application site was used for this assessment.

The zone of notification for two sites, enclosure and mill (DU026-080001–2), is present in the eastern part of the application site (Figure 13.1, Table 13.1). Within the receiving environment there are six other recorded sites or features known; the most significant and nearest of which are Carrickmines Castle and associated remains (DU026-005001–5) 210m west-northwest and Brenanstown Portal Tomb (DU026-007, Nat. Mon. 291) c. 420m to the northeast. Both of these sites are listed as National Monuments. The Portal Tomb is also recorded in the Development Plan as a Protected Structure.

There are no Protected Structures located within the proposed development area; however, there are eight in the receiving environment (Table 13.1). In addition to the monuments noted above these include the buildings known as Priorsland House and outbuildings (RPS 1746), the former Carrickmines Railway Station (RPS 1743) and Barrington's Tower (RPS 1729).

REFERENCE NO.	STATUTORY PROTECTION	LOCATION	CLASSIFICATION	DISTANCE FROM SITE
DU026-080001-2	RMP	Brenanstown and Carrickmines Great	Enclosure (-001), Mill (-002)	Within application site
1746, 60260234	RPS	Glenamuck Road, Carrickmines	Priorsland House, Out-Offices and Gates (1844–1884)	142m northwest
60260228	-	Castle View, Carrickmines	Water pump (1911–1937)	220m northwest
1967, 60260233	RPS	Glenamuck Road, Carrickmines	Water tower (1850–1909)	177m northwest
1743, 60260232	RPS	Glenamuck Road, Carrickmines	Station House - Former Carrickmines Railway Station (1850–1855)	198m northwest
DU026-135	SMR	Carrickmines Great	*Fulacht Fia*	100m southwest
2066, 60260219	RPS	Brenanstown	Mausoleum, family burial ground (1845–1850)	200m northeast
DU026-005001-4, DU026-146	Nat. Mon., RMP	Carrickmines Great	Castle (-001), bawn (-002), fortifications (-003), mill (-004), ringwork (-005), Rock Art (DU026-146)	210m west-northwest
DU026-006	RMP	Laughanstown	Enclosure	250m east
1729, 60260220	RPS	Brenanstown Road, Brenanstown	Barrington's Tower, House	260m northeast
60260231	-	Glenamuck Road, Carrickmines	Tullybeg House (1912–1937)	390m north
60260221	-	Brenanstown Road, Brenanstown	Water pump (1911–1937)	370m northeast
2050, 60260225	RPS	Brenanstown Road, Brenanstown	Coolgreen House (1895–1905)	407m north

REFERENCE NO.	STATUTORY PROTECTION	LOCATION	CLASSIFICATION	DISTANCE FROM SITE
2020, 60260230	RPS	Glenamuck Road, Carrickmines	Hillside House (1902–1909)	477m north
DU026-007	Nat. Mon., RMP, RPS	Brenanstown	Portal Tomb	420m northeast
60260227	-	Glenamuck Road, Carrickmines	Ingleside House (1902–1909)	500m north
DU026-150	SMR	Carrickmines Great	*Fulacht Fia*	500m south

Table 13.1 Recorded sites of archaeological and architectural significance within the receiving environment

NATIONAL INVENTORY OF ARCHITECTURAL HERITAGE

A review of the National Inventory of Architectural Heritage survey results indicates that no features are recorded within the proposed development; however, 11 structures of built heritage value have been selected for inclusion in the inventory within the receiving environment. One of these, Priorsland House (NIAH Ref. 60260234), is located c. 142m northwest of the application site. These buildings and features represent a sample of the general architectural heritage of the Carrickmines and Brenanstown area. Priorsland House is already listed as a Protected Structure, as is Station House (NIAH Ref. 60260232). Smaller elements comprising a representative sample of historic street furniture are also included in the NIAH such as the water pump (NIAH Ref. 60260228) situated c. 44m to the northwest.

CARTOGRAPHIC ANALYSIS

A review of the available historic maps has been carried out and a selection of the most relevant are presented in Figure 13.2. The Down Survey Barony Map of Rathdown (c. 1655), though not accurately scaled, shows a large castle and houses at 'Carrickmaine' to the northwest of the proposed development area. The Carrickmines Stream flows eastwards from here to pass through the application site. No features are in indicated within the study area and there is no indication of a mill in the immediate vicinity however a water mill is indicated further east along the stream, near to 'Brennans tonne' House. Rocque's map of 1760 shows the application site comprising part of enclosed fields to the southwest of Carrickmines with the Carrickmines Stream flowing through. There are no structures or features of archaeological potential illustrated within the application area, nor is there any indication of mill DU026-080. Taylor's Map of 1816 presents a more accurate illustration of the topographical features and infrastructure of the surrounding landscape. The application site is shown to the immediate east of the newly constructed Glenamuck Road, which leads from Golden Ball in the southwest to Carrickmines in the northeast. The route of a watercourse, tributary to the Glenamuck Stream, is shown passing through the site.

The first accurate historic mapping of the area was undertaken by the Ordnance Survey in the 1830s with the publication of a 'fair plan' in 1836, superseded by the First Edition 6-inch OS map in 1843. The maps were informed by notes and sketches completed at the time of the survey, of which one sketch indicates the presence of a building and quern stone in the approximate location of the proposed development area. These features are not shown directly on the banks of the stream as suggested on the 1843 6-inch OS map as 'site of ancient mill'; later designated as RMP DU026-080. The mill building is not indicated on the earlier 1836 fair plan and a review of the sources by Goodbody (Appendix 13.3) confirms that the 1843 map is the only documentary evidence for the site of the mill at that location. Earlier evidence for mills on this river places them further downstream and this makes sense, as the relatively flat land that caused the extensive meandering of the river would not make a good location for a mill, where the millrace needs to run almost level for a distance in order to achieve a fall back into the river (*ibid*.).

At the time of survey in the 1830s the original meandering course of the Carrickmines Stream is shown, but also the maps show the straightened channel of the stream which was under construction (See Appendix 13.3 for further discussion). The site is comprised of irregular-shaped fields to the southwest of Carrickmines House (later Priorsland). The Carrickmines Stream forms the townland boundary between Brenanstown to the north and Carrickmines Great to the south. Ticknick Stream flows along the eastern boundary of site, forming the townland boundary between Carrickmines Great and Brenanstown/Laughanstown. The glen of the Carrickmines Stream, is shown to the northeast as a wooded area, with a '*cromlech*' (portal tomb DU026-007) situated on the overlooking ridge to the north. The first edition OS map of 1843 also shows a structure in the location of Priorsland House (RPS 1746, NIAH Ref. 60260234), likely the predecessor of the existing protected structure. A principal structure with associated outbuildings to the north is depicted. By the time of the 1871 OS map, these structures are labelled Friarsland.

In the late 19th century, the Dublin and South Eastern Railway was constructed along the northern boundary of the proposed development area and the surrounding fields were subject to reorganisation. There is no reference to the mill site in the second edition 6-inch map of 1871. The 25-inch OS map of 1909 shows the site in its current layout with the townland boundary now matching the realigned stream channel. A footbridge is shown crossing the Carrickmines Stream on the eastern perimeter of the proposed development area providing access for a footpath. The route of the Water Mains pipeline (Dublin Corporation Waterworks) runs north–south through the application site, through the site of mill DU026-080 (marked as a dashed line). This is identified on modern utility drawings as an abandoned 33-inch cast-iron pipe dating to 1867. By the time of the later 1909 OS map, Priorsland House (RPS 1746, NIAH Ref. 60260234) has been constructed, c. 142m to the northwest.

PLACENAMES AND TOWNLAND BOUNDARIES

The proposed development is located within the townlands of Brenanstown and Carrickmines Great in the Parish of Tully and Barony of Rathdown. Carrickmines may derive from '*Carraig-Maighin'* meaning 'little plain of rocks' (Clinton and Shiels 2013) whereas Brenanstown refers to landownership. To the south Laughanstown has various derivations, of which 'Loghenstonne' is recorded in the Barony Map of 1655. The townland boundary between Carrickmines Great and Brenanstown crosses the area of proposed development along the altered route of the Carrickmines Stream. To the immediate east the Ticknick Stream flows along the eastern boundary of site, comprising the boundary between Carrickmines Great and Laughanstown/ Brenanstown.

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

A review of the Excavations Bulletin (1970–2021) revealed that a significant number of archaeological investigations, including geophysical survey, testing, monitoring and excavation, have been carried out in the immediate vicinity of the proposed development. These investigations have confirmed the presence of known archaeological sites, and notably, identified extensive settlement remains from the prehistoric period through to the post-medieval period.

Prior to the investigations carried out to inform this chapter, no archaeological investigations have been carried out within the proposed development area. Significantly, it appears that no archaeological investigation was carried out in advance of, or during, the construction of the foul sewer pipeline in 1996 which runs through the proposed development area and the centre of the zone of notification for mill and enclosure site DU26-080. The ground disturbances for this pipeline were notable with photographs taken at the time showing groundworks along a wayleave to the south of the stream. The concrete pipe runs parallel and south of the current stream channel, and manholes are visible on the surface today.

The nearest archaeological excavations were undertaken within the footprint of the M50 c. 20m south, within the footprint of Castle Street c. 20m east and in the Luas Park & Ride carpark to the immediate north. Excavations in Carrickmines Great townland revealed extensive evidence for Neolithic, Bronze Age and Iron Age settlement (Ó Drisceoil 2013) to the south of the application area while evidence for domestic Bronze Age activity has been identified to the immediate east (Whitty, McIlreavy and Kavanagh 2018). Monitoring of groundworks for the Bord Gais Eireann pipeline to the west of the M50 in 1998 revealed a burnt mound (DU026-150) in Carrickmines Great which was subsequently excavated (O'Neil 1998). Archaeological testing was carried out in advance of the Luas Line Park & Ride to the immediate northwest of the proposed development area (Cryerhall 2005) at which time a single posthole and two stray prehistoric artefacts were identified.

In the wider area evidence for prehistoric occupation was revealed during monitoring for the Phase 1 Cherrywood SDZ Infrastructure (Whitty, McIlreavy and Kavanagh 2018), Tully Park (McIlreavy and Tobin 2018), Beckett Park (Whitty and Kavanagh 2018), and Cherrywood Business Park further to the southeast (McQuade 2003a, 2003b, and 2013). Finds from monitoring in the general area include post-medieval ceramics, glass, a clay pipe, non-diagnostic fragments of metal and a flint scraper.

AERIAL IMAGERY ANALYSIS

A review of the aerial imagery for the proposed development area and surrounding lands was undertaken as part of this assessment. This included Ordnance Survey Ireland images (1995–2013) and Google Earth (2005–2021), which show the area comprising two large fields of pasture, separated by the Carrickmines Stream, situated to the north of the M50 and south of the Luas line. No evidence for any previously unrecorded sites or features of archaeological potential was noted. Traces of the former meandering course of the stream and land drains are identifiable in the imagery and the northeast corner of the largest field frequently appears waterlogged. The land to the immediate south of the proposed development area, bordering the M50 seems to have been covered with imported soil in c. 2009. The fields within the study area were ploughed in 2013 however the land was predominantly maintained as pasture in recent years. The 2017 Google Earth imagery shows the construction of Castle Street and Barrington's Road approaching the eastern perimeter of site.

FIELD INSPECTION

During the course of two field inspections, undertaken in August 2018 and January 2019, the proposed development area and its surrounding environs were inspected for known or previously unknown sites of archaeological, architectural and cultural heritage interest (Figure 13.1, Plates 13.1–9). The latter visual inspection was undertaken by the author accompanied by a built heritage specialist, Rob Goodbody, for the purpose of investigating the date of the stone-faced stream and site of the mill. A full report on the findings of the built heritage inspection are included in Appendix 13.3 and a summary of the conclusions is included here.

The site is situated in the townlands of Carrickmines Great and Brenanstown, traversed by the Carrickmines Stream which forms the townland boundary. The M50 borders the site to the south and the Luas line passes to the immediate north. The Luas Park & Ride facility is situated to the immediate northwest with Priorsland House to the west of this. The site currently comprises two fields of level pasture, used by the Carrickmines

Equestrian Centre for grazing. Overhead electricity cables cross the western limit of the site and concrete manholes were visible along the route of the foul sewer, running parallel and south of the Carrickmines Stream. The fields are lined with mature trees and overgrown hedgerow to the north and east, and the eastern boundary is delineated by the course of the Ticknick Stream.

The southern field, the larger of the two, is slightly wet underfoot and there are small undulations in the field indicative of the former course of the stream, as shown on the early 19th century mapping. The zone of notification for recorded mill and enclosure (DU026-080001-2) is located within the eastern half of site, largely contained within the southern field but extending northwards into an area containing a tree plantation. There is no above ground expression of any building remains or indications of sub-surface features, such as wall footings or enclosure ditches.

The surrounding fields have been intensively farmed for centuries and the fields subject to reorganisation with the rerouting of the stream. The Carrickmines Stream flows within a deep narrow cutting measuring a maximum of c. 1.5m depth and 1.5–2.5m in width. The sides of the cutting are partially stone-faced although the passage of time has impacted on sections of this which have collapsed into the bed. Parts of the linear cutting have been altered through water action and collapsed embankment, and as such the channel is reverting to its natural meandering course. An earthen embankment, measuring c. 2m in width and up to 0.5m in height in places, runs along the northern perimeter of the stream, probably representing the up-cast from the excavation of the cutting in the 1830s. A line of mature trees are present along this embankment. At the eastern perimeter of the site the stream channel changes direction, leading north with a bend of almost 90 degrees. At this point the remains of a former footbridge illustrated on the 1909 OS map are present, comprising metal struts or beams. To the north of this the junction of the Ticknick Stream is visible. It was intended to carry out a wade survey with metal detection of the stream bed during the January inspection however recent rainfall had swelled the water level in the channel and visibility was too poor to allow the survey to be completed. The depth of water in the channel ranged from 0.3m to c. 0.7m depending on the width of the channel. A full description of the stream course and photographs are included in Appendix 13.3.

GEOPHYSICAL SURVEY

A geophysical survey was undertaken within the application site (fields M1–M2) in September 2018 by John Nicholls under licence 18R0197 (Figure 13.3, Appendix 13.1). No responses confirming the exact location of enclosure and watermill remains DU026-080001-2 are evident in the results from survey. Anomalies located in proximity to the zone of archaeological potential associated with DU026-080001/002 have, however, been recorded. These include strongly magnetic linear anomalies (Anomaly A-B), discrete positives and weak trends (Anomalies C, J-N), although the exact origin of these responses remains unclear, particularly in view of adjacent disturbance from modern buried services, land drains and ferrous debris. A natural soil/geological, recent land-use, or modern ferrous origin for these responses should not be dismissed.

To the west-northwest the results from survey confirm the location of one ringditch (Anomaly D), and further linear/pit remains (Anomaly E-I) including a possible posthole structure. The results also display remnants of past cultivation (green lines), former land divisions (brown lines), and an extensive network of land drains (pink lines). Interpretation of the results has been complicated by modern interference deriving from high voltage overhead power cables, buried services and modern ferrous debris.

TEST TRENCHING

A programme of archaeological test trenching was undertaken in November 2018 by Liza Kavanagh of IAC under licence 18E0650 within the application site (Figure 13.4 and 13.5). The trenches targeted the zone of notification for mill and enclosure DU026-080001-2, the geophysical anomalies A-N and all the available open green space to fully investigate the archaeological potential of the site. Testing confirmed that the area was crossed by numerous linear land drains, which increased in density towards the south eastern quadrant of site. A total of 41 trenches were excavated across the available area measuring 1,810 linear metres. Testing was carried out in wet conditions and water pooling was evident in the northeast quadrant of the southern field within the zone of notification of DU026-080001-2.

A total of 11 trenches investigated the zone of notification for DU026-080 which revealed that this area had been heavily disturbed by modern land drains and services, as indicated by the geophysical survey. It is possible that land improvement during the late 19th century or ground works carried out in the 1990s may have removed any remaining trace of a former mill building; however, it is also possible that the location of the mill was misidentified in the 1830s, and the actual location could be situated further to the northeast beyond the application site boundary. There is a low possibility that heavily truncated remains for the former mill may be preserved in areas not suitable for geophysical survey or testing.

Testing did reveal seven previously unrecorded areas of archaeological significance, which have been designated as Archaeological Areas 1–7 (AA1-7). These comprise a probable Bronze Age penannular ditch enclosing at least four cremation pit burials and two pits (AA1, Plates 13.10-12), two single pits (AA2 and AA3) and four areas containing disturbed spreads of burnt mound material (AA4–7, Plate 13.13). The latter features have been heavily truncated by modern drainage and in AA6 and AA7 scant remains of the presumed original archaeology.

The archaeology identified in AA1 is significant in both its type and form. The presence and density of the urn burials within such an enclosure is indicative of its local importance. As discussed above previous excavations to the south in Laughanstown, c. 1.3–1.5km south, identified cremation burials associated with pots and urns, and one particular example was accompanied by a pin and burnt lithics. It is a testament to both the affluence and longevity of the Bronze Age community in this area that this landscape contains so many high-status burials. Megalithic monuments are also known in the area at Glebe and Laughanstown, and further west at Kiltiernan. Following consultation with the National Museum and National Monuments Service it was determined that the exposed prehistoric urn burials in AA1 would deteriorate following exposure and as such emergency excavation was carried out for all features noted in Trench 37. This was carried out under an extension to licence 18E0650 by Liza Kavanagh in late November 2018 and was accompanied by metal

detection survey under licence 18R0249. The remains of the monument extend beyond the test trench and there is high potential that further burial pits exist within the enclosure. The four burials with urns were block lifted by a conservator, Susannah Kelly, and have been excavated in laboratory conditions (Plate 13.12).

The remainder of the archaeological areas (AA2–7) largely represent prehistoric burnt mound activity, similar to those recorded in the adjacent fields to the east and south within the footprints of Castle Street and the M50 respectively. These features are considered to have local significance.

This investigation has confirmed the accuracy of the geophysical survey and as such we now have a good understanding of the site. With the exception of the features noted above all other geophysical anomalies including A-C and E-I corresponded to drainage features or variations on the natural subsoil. There is potential however for previously unrecorded archaeology to survive beneath the current ground surface, outside of the investigated trenches in areas that were not accessible for survey (i.e. beneath overhead wires and along hedgerows). Small ephemeral features, such as the pits in AA2 and AA3, do not have a geophysical signature.

BUILT HERITAGE ASSESSMENT OF CARRICKMINES STREAM & MILL SITE

An assessment of the Carrickmines Stream and surrounding area was carried out by Rob Goodbody of IAC to investigate the period of construction straightened Carrickmines Stream and a determination of the identity of the mill site marked on that map (Plates 13.14–15). A summary of the results is included here and a full copy of Goodbody's report is included in Appendix 13.3. It was intended to undertake a metal detection survey of the stream bed under a reactivation of licence 18R0249 by Liza Kavanagh of IAC at this time however the visibility was too poor due to high levels of sediment in the water.

In particular, the study was to determine the period of construction of the stonework that lines the river channel and to establish whether or not this straight channel was a millrace. The report finds through documentary research that the straight channel was not a millrace but represents the straightening of a river that previously meandered to a considerable extent. This work was carried out in about 1840 and the channel was lined with stone at that time. It is clear from the contemporary mapping that the river has been straightened and that this work was under way in the early 1840s when the Ordnance Survey staff were updating the maps for publication in 1843. The straight-line water course marked on the 1843 edition was not a millrace.

The study also investigated the possible former existence of a mill (DUR026-080) adjacent to the river at this location. In the investigation of the former existence of a mill, the only evidence found is the first-edition Ordnance Survey map, published in 1843, which shows "*Site of Ancient Mill".* What is missing is the basis for the Ordnance Survey's label noting the site of the ancient mill. Earlier evidence for mills on this river place them further downstream and this makes sense, as the relatively flat land that caused the extensive meandering of the river would not make a good location for a mill, where the millrace needs to run almost level for a distance in order to achieve a fall back into the river. Clearly this will not occur where the fall on the river is so small that meandering takes place. Conversely, where the river enters the Druid's Glen, which is the wooded area downstream, there is a greater fall and achieving the necessary head of water to drive the millwheel is more likely. The only evidence in the Ordnance Survey's background surveys showing evidence for a mill that has come to light to date is Eugene O'Curry's sketch map, though, as seen above, this does not indicate that the quern stone was anywhere near the river. No mention of this ancient mill appears in various other documents produced by the Ordnance Survey at that time. In conclusion no evidence was found for a mill at this location, while other mills further downstream were identified from a number of sources.

13.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The development will comprise a mixed-use village centre and residential development of 443 no. units comprising 6 no. blocks of apartments (up to 5 storeys with basement/undercroft parking) providing 402 no. apartments units (146 no. 1-beds; 218 no. 2-beds and 38 no. 3-beds), and 41 no. houses (19 no. 3-beds and 22 no. 4-beds). All apartments provided with private balconies/terraces. Provision of indoor residential facilities to serve apartment residents.

The Village Centre and non-residential elements will comprise a supermarket, local retail/retail service units, non-retail commercial units, creche, gym, community space, and offices (High Intensity Employment) use.

Provision of car/bicycle/motorcycle parking; ESB sub-stations; bin storages areas, and all associated plant areas.

Provision of the first phase of Priorsland Park (on lands within the applicant's ownership) and other public and communal open spaces.

Construction of Castle Street through the subject lands and two road bridges across the Carrickmines Stream, one to serve the future school site/ park, the second to provide pedestrian and cyclist access to the Carrickmines Luas station and future Transport Interchange to the north. Provision of additional pedestrian bridge to the park. Provision of an acoustic barrier along the southern/western edge of the site.

All associated site development works, landscaping, boundary treatments and services provision.

A more detailed description is outlined in Chapter 3.

13.5 POTENTIAL IMPACTS

Construction Phase

- The zone of notification for mill and enclosure DU026-080, within the eastern part of site, has been investigated through geophysical survey and targeted by 11 test trenches. This area had been heavily disturbed by 19th and 20th century services (foul and water) and drainage. A review of the documentary sources and field inspection has indicated that the only evidence for the site of a mill at this location is based on the sketch maps from the 1830s and that these are not reliable in terms of scale and accuracy. While it cannot be entirely dismissed, current evidence suggests that the location of the mill was misidentified, and the actual location could be situated further to the northeast beyond the application site boundary.

  There is a low possibility that truncated remains of the former mill may be preserved in areas not suitable for geophysical survey or testing to the northeast however the extensive ground works carried out for the previous services in this area will have significantly impacted on any surviving sub-surface remains. Notwithstanding this there may be a negative direct impact on any surviving elements of the mill or enclosure DU026-080, if present, caused by the construction works associated with the proposed extension of Castle Street, diversion of trunk water mains, village centre and the green infrastructure. Prior to the application of mitigation negative impacts could range from moderate to very significant in nature.

- Testing revealed seven previously unrecorded areas of archaeological significance, which have been designated as Archaeological Areas 1–7. These comprise a probable Bronze Age penannular ditch enclosing at least six cremation pit burials (AA1), two single pits (AA2 and AA3) and four areas containing disturbed spreads of burnt mound material (AA4–7). Emergency excavation of the features exposed in Trench 37 (within the core of AA1) was carried out in late November 2018 as advised by the NMI and NMS; however, the burial monument extends beyond this trench as indicated by the geophysical signature and there is high potential that further burials exist outside of the investigated test trench.

  The archaeology in AA1–7 lie within the footprint of proposed buildings and the access road. Development densities and layout of the infrastructure has been prescribed in the Cherrywood Planning Scheme. Ground works associated with the proposed development, such as topsoil stripping and excavation (prior to the application of mitigation), would have a very significant direct negative impact on the archaeological features or deposits in AA1–7 and associated remains.

- This investigation has confirmed the accuracy of the geophysical survey. The potential remains that previously unrecorded archaeology to survive beneath the current ground surface, outside of the investigated trenches in areas that were not accessible for survey (i.e. beneath overhead wires and along hedgerows). Small ephemeral features, such as the pits in AA2 and AA3, do not have a geophysical signature. Ground works associated with the proposed development, such as topsoil stripping and excavation, would have a direct negative impact on previously unrecorded archaeological features or deposits that have the potential to survive. Prior to the application of mitigation negative impacts may range from moderate to significant in nature.

- Sections of the existing 19th century stone-faced stream channel will be impacted to facilitate two crossing points of the watercourse. Groundworks may also have a direct negative impact on any archaeological features surviving beneath the current ground surface, such as that identified in AA7 (noted above) to the north of the stream. Prior to the application of mitigation negative impacts may range from moderate to significant in nature.

Operational Phase

There are no predicted impacts upon the archaeological, architectural or cultural heritage resource as a result of the operation of the proposed development. This is due to the distance of separation between the site and recorded sites within the study area, the already developed nature of the landscape to the north and south and existing woodland to the northeast of the site.

13.6 POTENTIAL CUMULATIVE IMPACTS

Archaeological remains have been identified and excavated as part of the recently constructed Phase 1 Cherrywood Infrastructure and Beckett Park to the immediate east and southeast (Reg. Ref. DZ15A/0758 and DZ15A/0814) and future development of the Cherrywood SDZ lands may reveal further archaeological remains. These remains, and any other archaeological remains identified as part of surrounding future development, will be identified and preserved either in-situ or by record. As such, no negative cumulative impacts have been identified.

13.7 MITIGATION MEASURES

Construction Phase

Mitigation Measure 13.1: No groundworks will be carried out within the zone of notification for DU026-080 without prior consultation with an archaeologist. All ground disturbances associated with the proposed development within this area, including site investigations and topsoil stripping, will be monitored by a suitably qualified archaeologist under licence to, and in consultation with the NMS. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation in-situ or by record. Any further mitigation will require approval from the NMS.

Mitigation Measure 13.2: While it is acknowledged that preservation *in-situ* of newly discovered archaeological sites is the preferred policy of the development plan where possible, the locations of AA1-7 are situated within the footprint of numerous proposed buildings and access roads. As such the archaeology in AA1–7, and any associated features, will be preserved by record (i.e. excavation) in advance of construction. Excavation will be carried out by a licence eligible archaeologist in consultation with the NMS. No ground works, such as site investigations, will be undertaken within the vicinity of AA1–7 without prior consultation with an archaeologist.

Mitigation Measure 13.3: All ground disturbances associated with the proposed development, including site investigations and topsoil stripping, will be monitored by a suitably qualified archaeologist under licence to, and in consultation with the NMS. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation in-situ or by record. Any further mitigation will require approval from the NMS.

Mitigation Measure 13.4: The record included within Appendix 13.3 adequately describes the 19th century stream channel in advance of its partial removal and no further mitigation is deemed necessary.

13.8 PREDICTED IMPACTS

Following the completion of the mitigation measures, there will be no significant predicted impacts upon the archaeological, architectural or cultural heritage resource.

13.9 'DO NOTHING' SCENARIO

Should the proposed development not proceed there will be no impact on the archaeological, architectural or cultural heritage resource.

13.10 WORST CAST SCENARIO

In a worst-case scenario, the recently identified archaeological remains in AA1–7 would be removed prior to archaeological recording.

13.11 MONITORING & REINSTATEMENT

The mitigation measures noted above for archaeological, architectural and cultural heritage will also function as a monitoring system to allow the further assessment of the scale of the predicted impacts and the effectiveness of the recommended mitigation measures.

No reinstatement measures are required.

13.12 DIFFICULTIES IN COMPILING INFORMATION

No difficulties were encountered during this assessment.

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Plate 13.1 Southern field showing overhead wires, facing northeast

Plate 13.2 Southern field with zone of notification for DU026-080, facing northwest

Plate 13.3 Southern field with zone of notification for DU026-080 in right foreground and Carrickmines in mid-background, facing west

Plate 13.4 Southern field showing modern services south of stream, facing south

Plate 13.5 Carrickmines Stream in August 2018, facing east

Plate 13.6 Carrickmines Stream in January 2019, facing east

Plate 13.7 Earthen embankment along northern perimeter of stream, facing east

Plate 13.8 Northern field showing zone of notification for DU026-080, facing east

Plate 13.9 Tree plantation to northeast of site, within the zone of notification for DU026-080

Plate 13.10 Remains of a prehistoric ringditch and cremation burial pits at AA1

Plate 13.11 Three of the cremation burial pits identified during testing at AA1, facing southwest

Plate 13.12 Ceramic urn from cremation burial in AA1 under excavation by conservator

Plate 13.13 Remains of truncated burnt mound identified in AA5 facing southeast

Plate 13.14 Visual inspection of stream, facing east

Plate 13.15 Example of stone facing on stream cutting, facing north

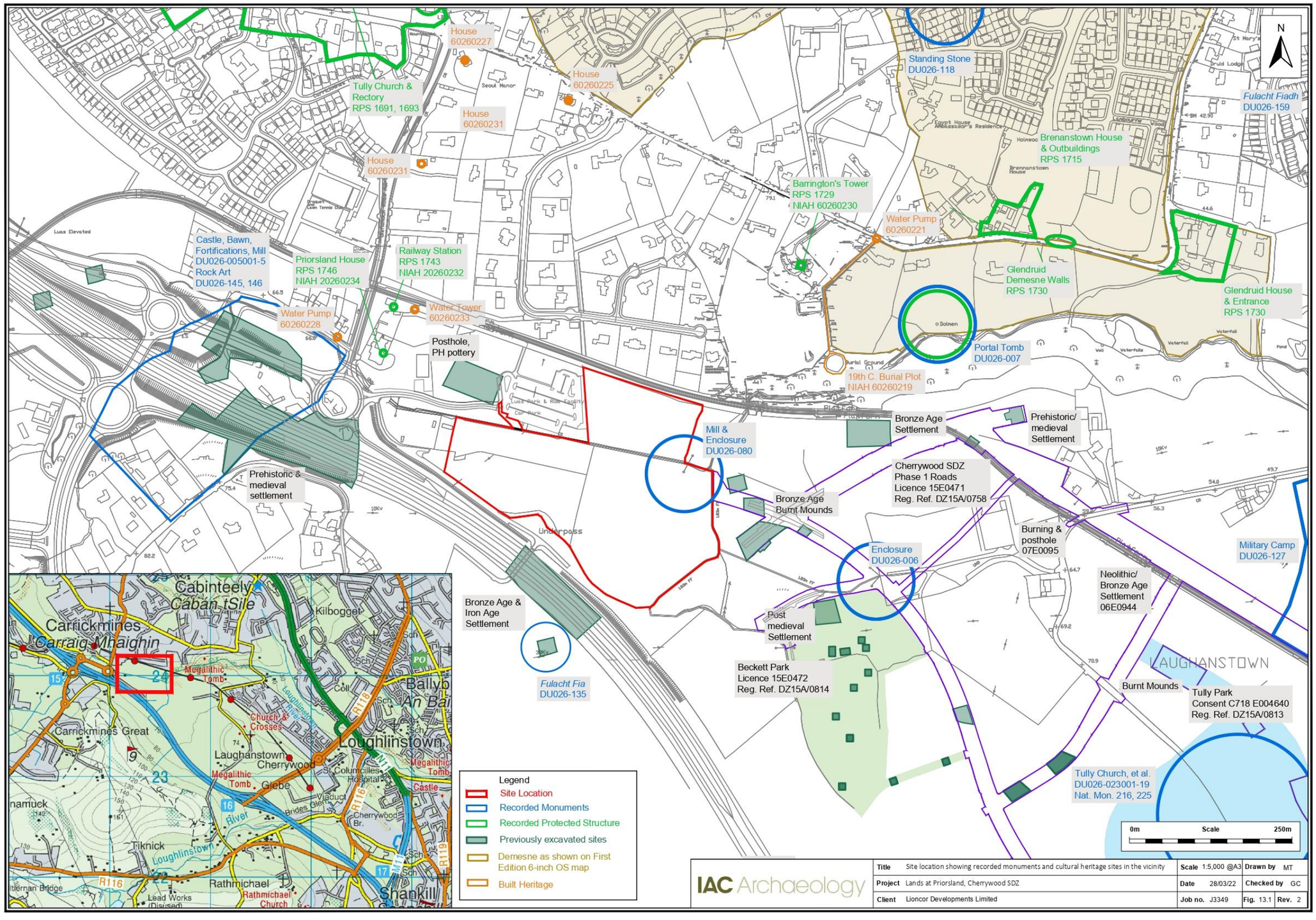

Figure 13.1: Site location showing recorded monuments and cultural heritage sites in the vicinity

Figure 13.2: Extracts from historic mapping (1655-1909) showing the approximate site location

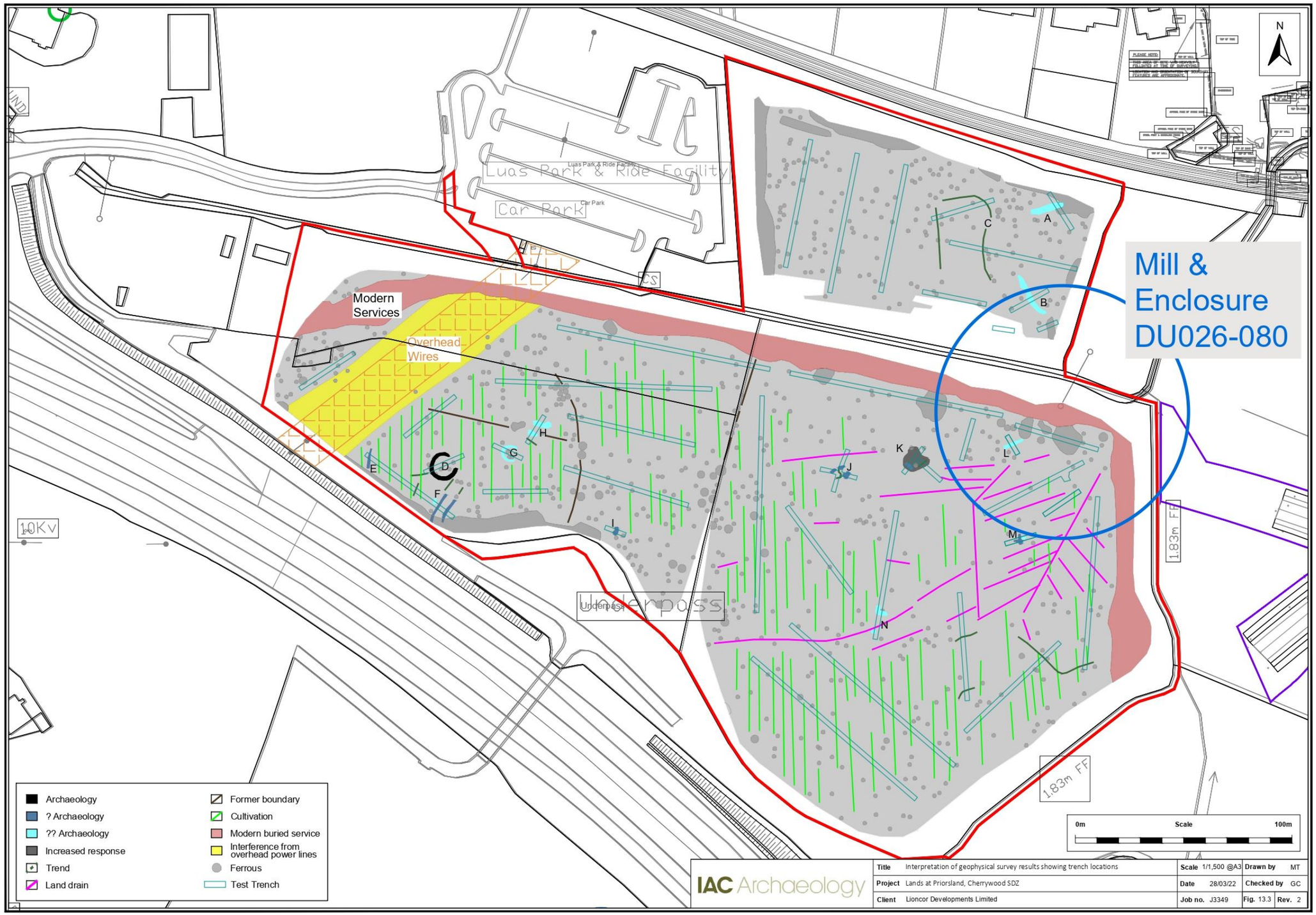

Figure 13.3: Interpretation of geophysical survey results showing trench locations

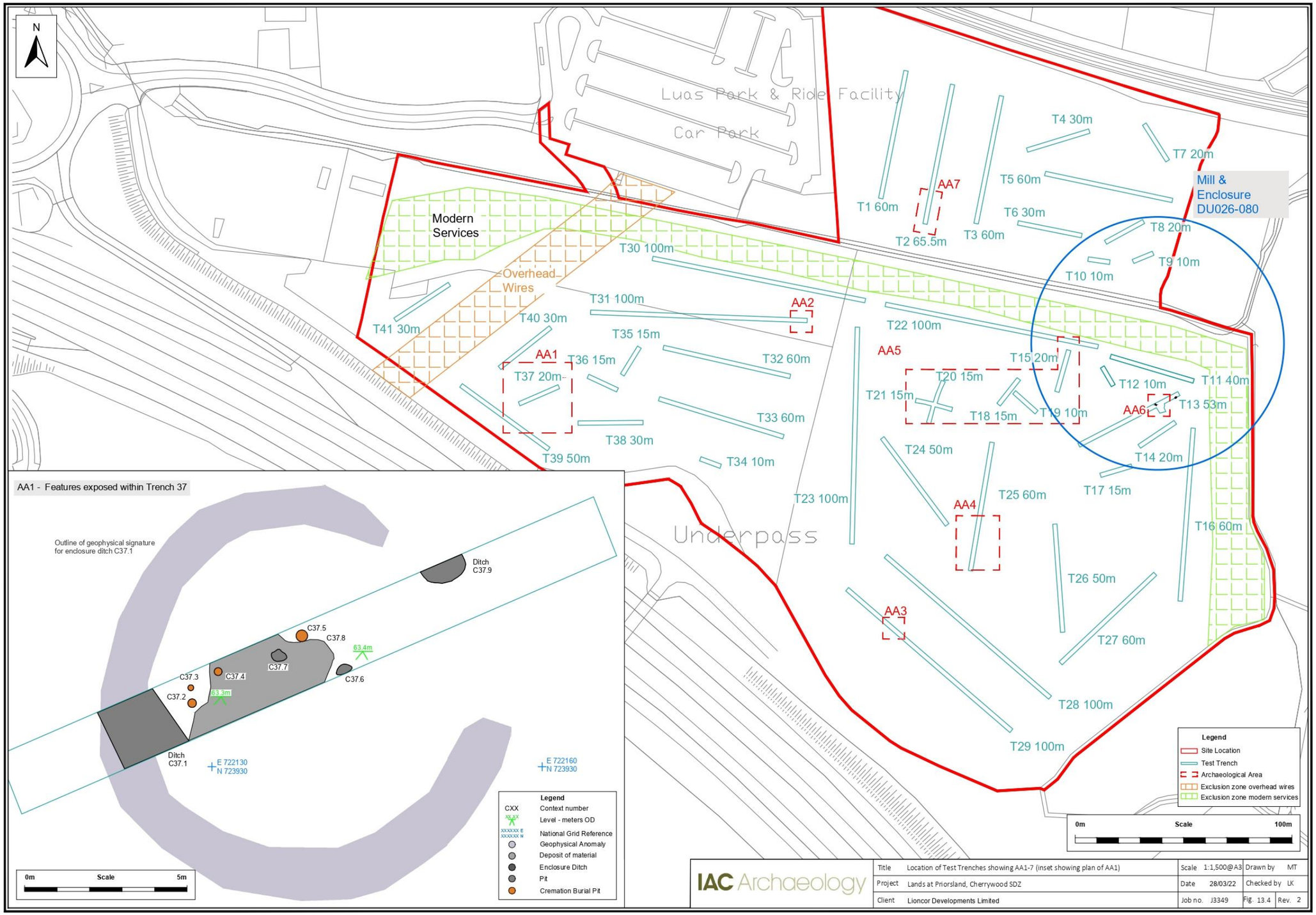

Figure 13.4: Location of test trenches showing AA1-7 (inset showing plan of AA1)

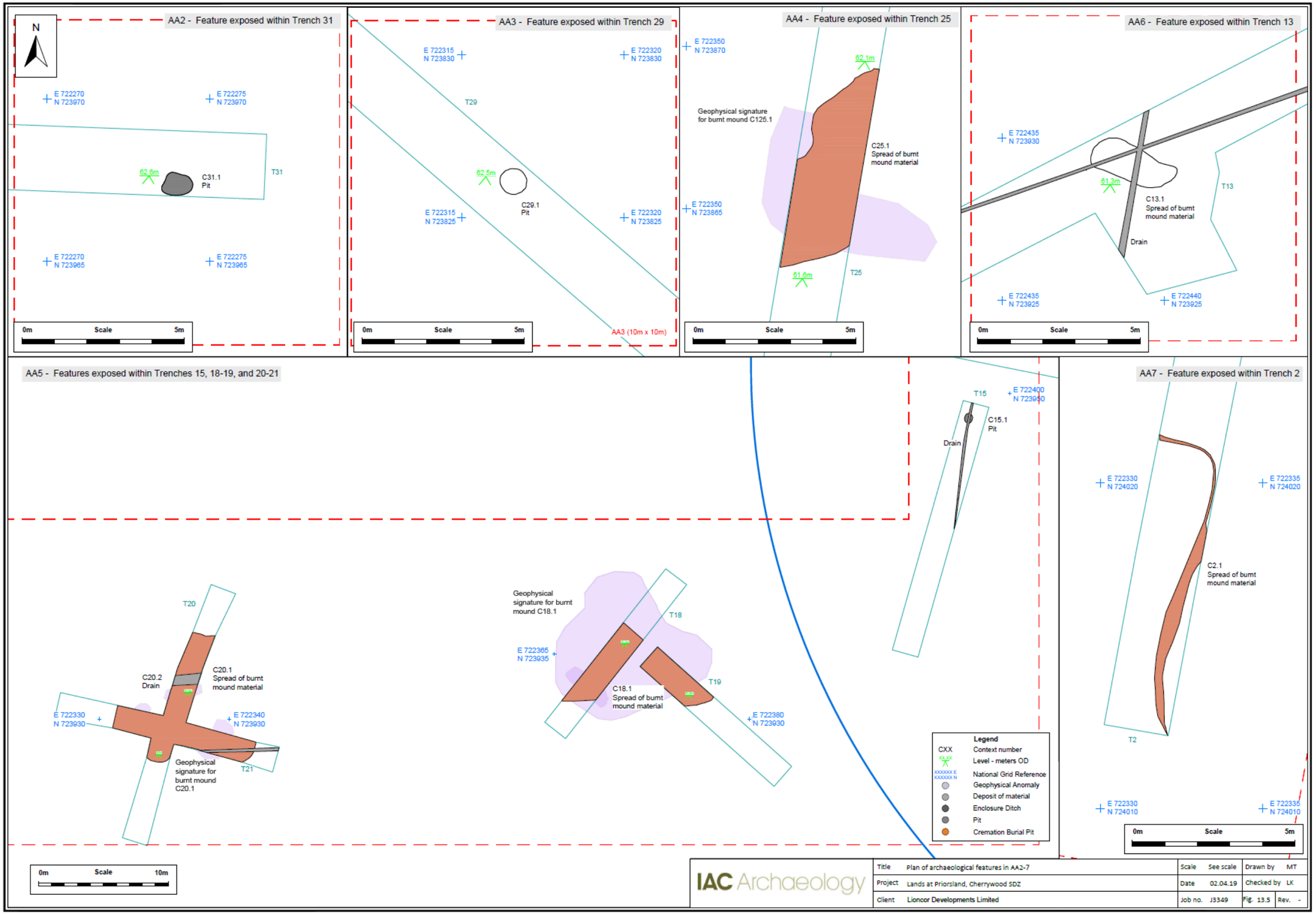

Figure 13.5: Plan of archaeological features in AA2-7

14.0 MATERIAL ASSETS

14.1 INTRODUCTION

McGill Planning Ltd. have prepared the Materials Assets Chapter of the Environmental Impact Assessment Report (EIAR), with the assistance of Punch Consulting Engineers, CLV Consulting, IAC Archaeology, Fallon Design Ltd., Traynor Design Ltd., Scott Cawley Ecologists and 3D Design Bureau.

Material Assets are described as relating to the built services and infrastructure on a particular site. Traffic is included within Material Assets due to the relationship between traffic and roads infrastructure.

14.2 METHODOLOGY

With reference to the criteria set out in the Guidelines on Information to be Contained in an Environmental Impact Statement (EPA 2002), the Advice Notes On Current Practice (in preparation of Environmental Impact Statements) (EPA 2003) and the Draft EPA guidelines published in 2017 this chapters assesses the "economic assets of human origin" based on a desktop study of material assets associated with the development site.

The four economic assets of human origin include biodiversity, land and soil, and water are also addressed within the EIAR located at Chapters 5, 6 and 7 respectively. With respect to this Chapter, a desktop study was carried out on the existing material assets of human origin in relation to the proposed development at Priorsland in the Cherrywood SDZ. The resource use during both construction and operational phases has been projected and will provide analysis of any related impacts, and the appropriateness of any mitigation measures.

14.3 RECEIVING ENVIRONMENT

URBAN ENVIRONMENT

The subject site is located c. 12km south east of Dublin City Centre in the suburb of Carrickmines, Dublin 18. The subject site is located in the north-western section of the Cherrywood SDZ area. The lands are currently undeveloped, greenfield and rural in nature. There are no inhabitants, structures or buildings on the application site at present.

The site is bounded to the north by the Luas Green Line, to the south by agricultural lands, an agricultural access road and further south by the M50 Motorway, to the east by Cherrywood SDZ development lands and to the west by Carrickmines Luas Park and Ride Car Park and undeveloped lands located between the agricultural access road and access road leading to the Park and Ride car park.

On the north side of the Green Luas line is the existing low density residential neighbourhood known as Brennanstown. This properties are typically larger residential properties with established gardens, often large hedges and established landscaping along property boundaries and large dwellings.

Given the lack of population on the site and adjoining lands south of the Luas there are no existing ancillary social infrastructure including education, employment, healthcare, community services or public amenities.

These are designated to be delivered in tandem with the new population as outlined in the SDZ Planning Scheme for Priorsland Development Area 3. The development of Cherrywood from greenfield lands into a new residential community will incorporate these mixed uses to ensure there is no strain or dependence on the existing infrastructure that currently serve the nearby settlements of Carrickmines, Brennanstown, Cabinteely and Loughlinstown.

ACCESS & OWNERSHIP

The lands comprising of the planning application site are predominantly owned by the applicant. The red line boundary of the proposed development also takes in lands under the ownership of an additional property owner to the north, with a letter of consent from said party accompanying the application. Construction access to the application site will be provided via an existing access road to the west of the application site which the applicant has a Right of Way across and which also connects with the Glenamuck Road Roundabout. Operational access will be via the completed and taken in charge Castle Street connecting to the Cherrywood road network to the east.

TRANSPORT INFRASTRUCTURE
The subject site is situated adjacent from the existing Carrickmines Luas stop, located on the Green Luas line. There is also access to a number of bus routes located on the N11 and Bray Road at Cabinteely, including the 84, 84a, 84X, 84N, 143, 145, 181 and the 702. The stops are located within 3km via the car (7 min drive) or c. 2.6km (30min walk, 10 min cycle) walk or cycle through Cabinteely Park.

The location of the site is within proximity to the M50, with access onto the M50 (north and south bound) provided via Glenamuck Road. Upon further completion of the Cherrywood development, access to the N11 and M50 will be made available through the Cherrywood development.

The site is also within proximity to the N11 which provides cycle lanes into Dublin city centre and in a southerly direction. For further information with regard to the impacts of the proposed development on, please refer to Chapter 11 – Traffic and Transportation.

WATER
The following drainage and water supply services are present within and adjacent to the site:

1) Foul water:
   a) A 750mm concrete public sewer runs from east to west through the site, parallel to the Carrickmines River.
   b) A 225mm diameter uPVC public sewer connects from a housing estate to the north of the development into the 750mm sewer within the proposed development site.

2) Surface Water:
   a) As the Priorsland site is a greenfield site, there is no existing surface water drainage system within the site boundary. A surface water drainage system has been developed to the east of the site, as per Planning Application Reference: DZ15A/0758. However, due to the flow path and levels of the Carrickmines River and Ticknick Stream it is not feasible to propose a gravity connection to the existing drainage system to the east of the Priorsland site.

3) Potable Water:
   a) 300mm nominal diameter HDPE watermain is located at Castle Street to the east of the Ticknick Stream.
   b) 33” trunk watermain running from south to north through the site boundary at the eastern side.

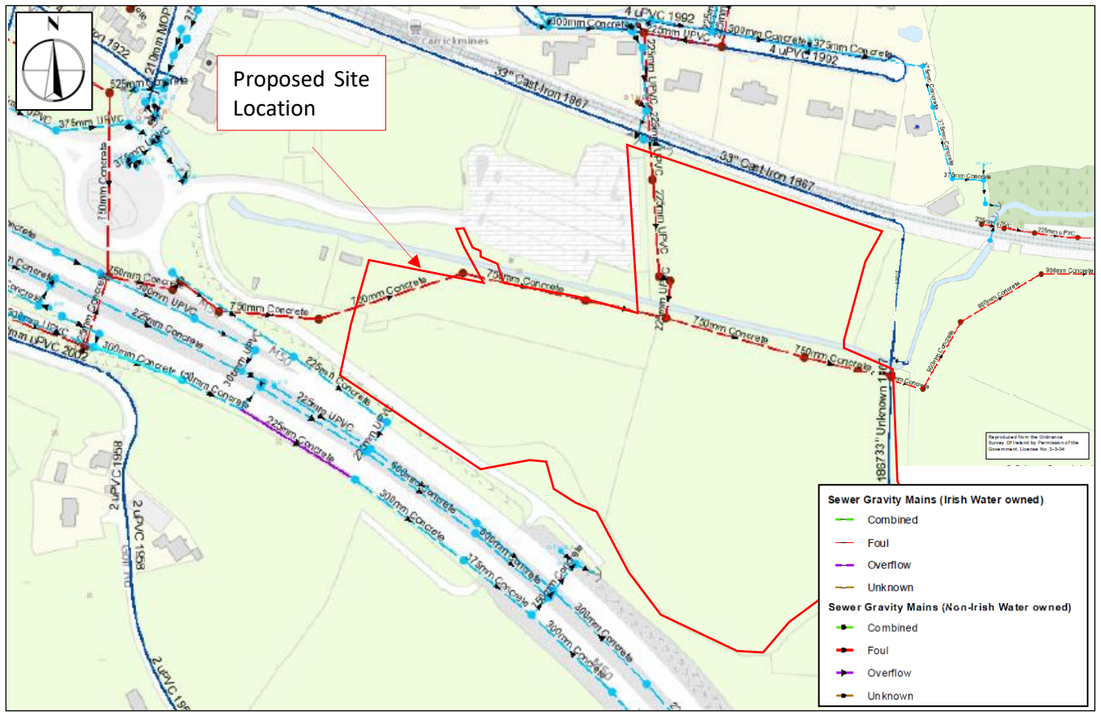

Figure 14.1: Existing Public Watermain & Foul Drainage in the Vicinity of the Priorsland Site (Irish Water Records)

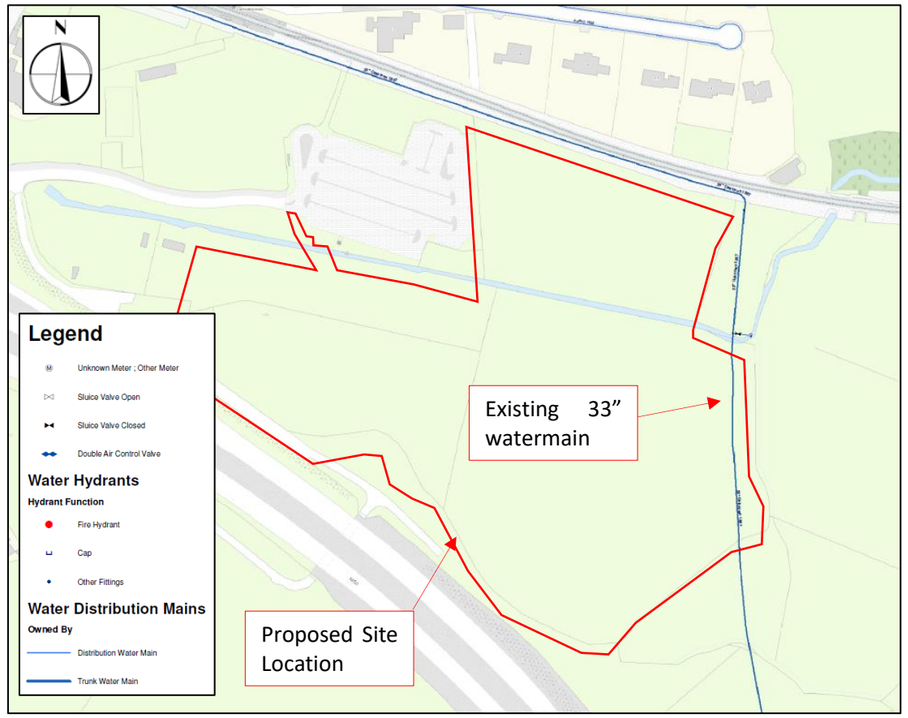

Figure14.2: Location of Existing 33" Watermain at Priorsland (Irish Water Records)

The following water courses are present within and adjacent to the site:

1) Carrickmines River
   a) The Carrickmines river runs through the site, to the north of the proposed development, from west to east.
   b) As per CFRAMS flood mapping for the site, the site of the proposed development is shown as being located in the fluvial Flood Zone A (the 1 in 100-year flood zone). This flooding emanates from the Carrickmines River and flows in across the site in a southerly direction.
   c) CFRAMS flood depth mapping shows floodwaters to be less than 250 mm at the site during a 1 in 100-year event and less than 500 mm for the 1 in 1000-year event at the development site.

2) Ticknick Stream
   a) The Ticknick stream runs along the eastern border of the site, from south to north. It then joins the Carrickmines river at a point adjacent to the north east corner of the development site.

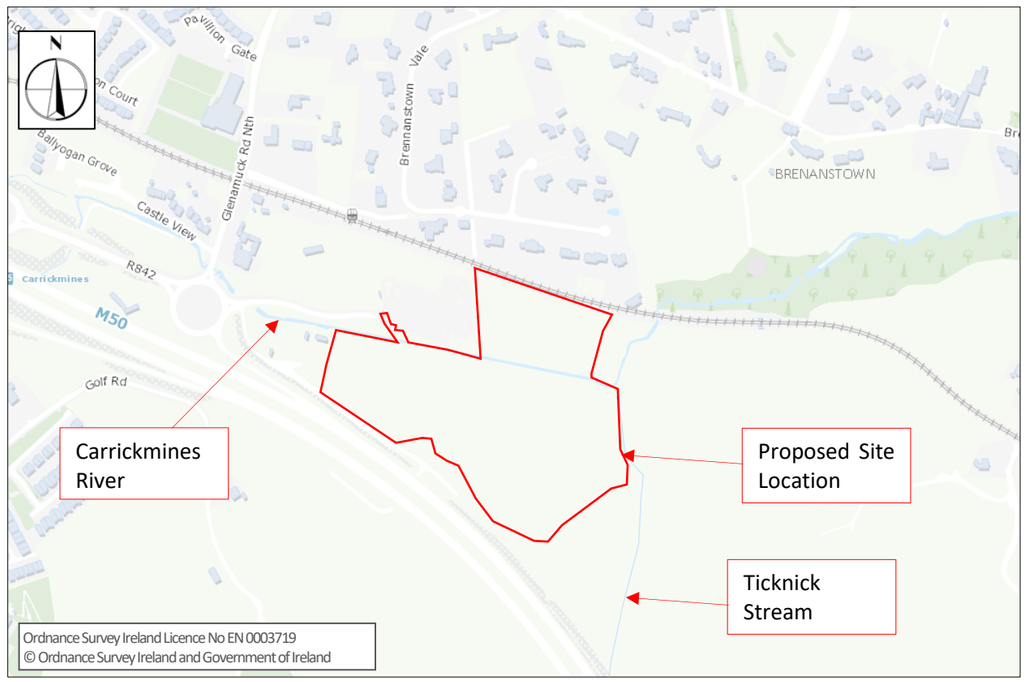

Figure 14.3: Water Courses in the vicinity of the Proposed Development

ELECTRICAL SUPPLY

The proposed development will be supplied by the existing ESB MV/LV cabling and the MV cabling infrastructure in the greater Cherrywood scheme.

There is an existing ESB Networks overhead LV line crossing the site to be diverted during the site works to the development which will be delivered as part of the project.

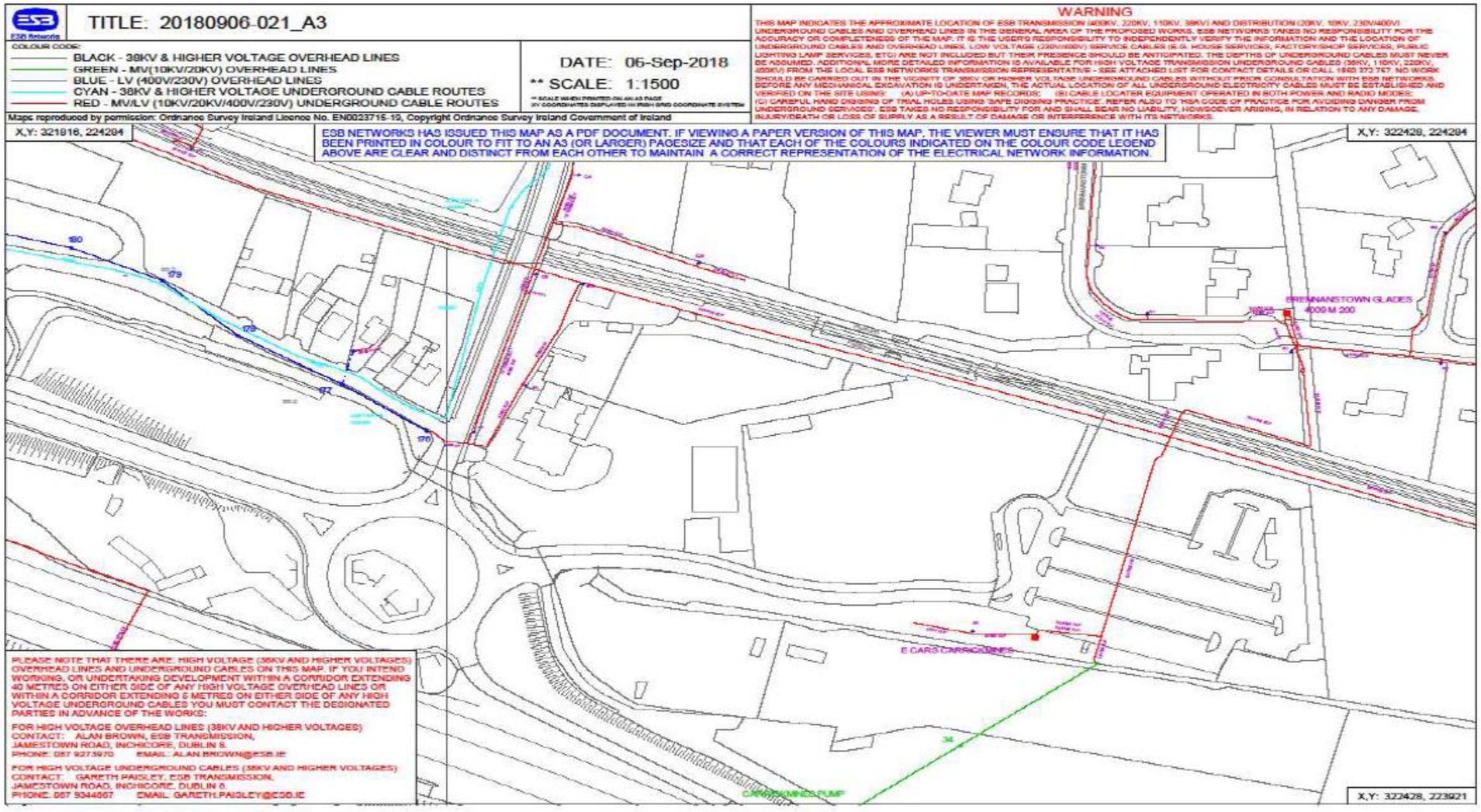

Figure 14.4: ESB Existing Map Extract 1

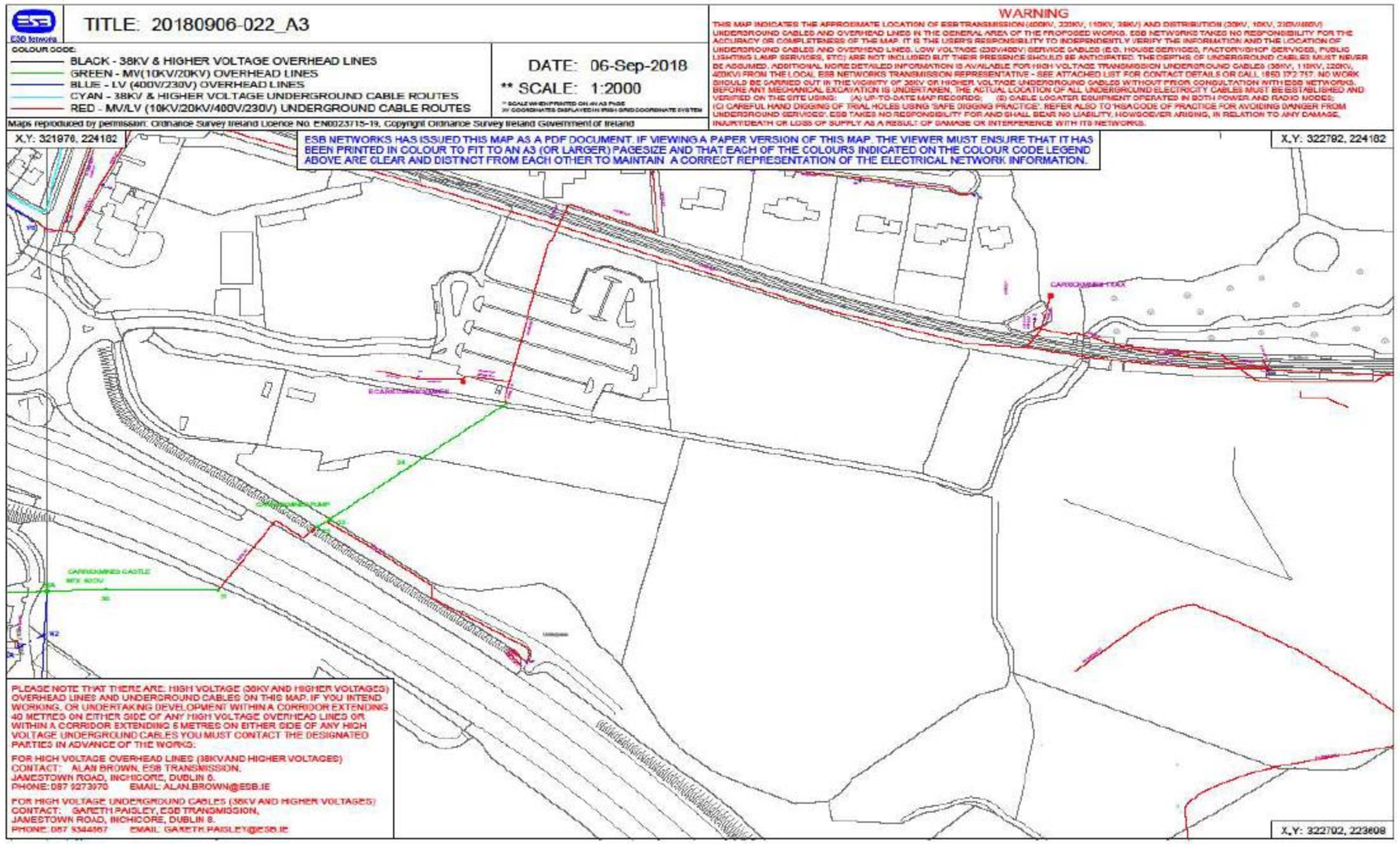

Figure 14.5: ESB Existing Map Extract 2

NATURAL GAS CONNECTION

The proposed development will be supplied by the existing Gas Networks Ireland infrastructure in the greater Cherrywood scheme.

There is no existing site infrastructure to be diverted or altered as part of the project.

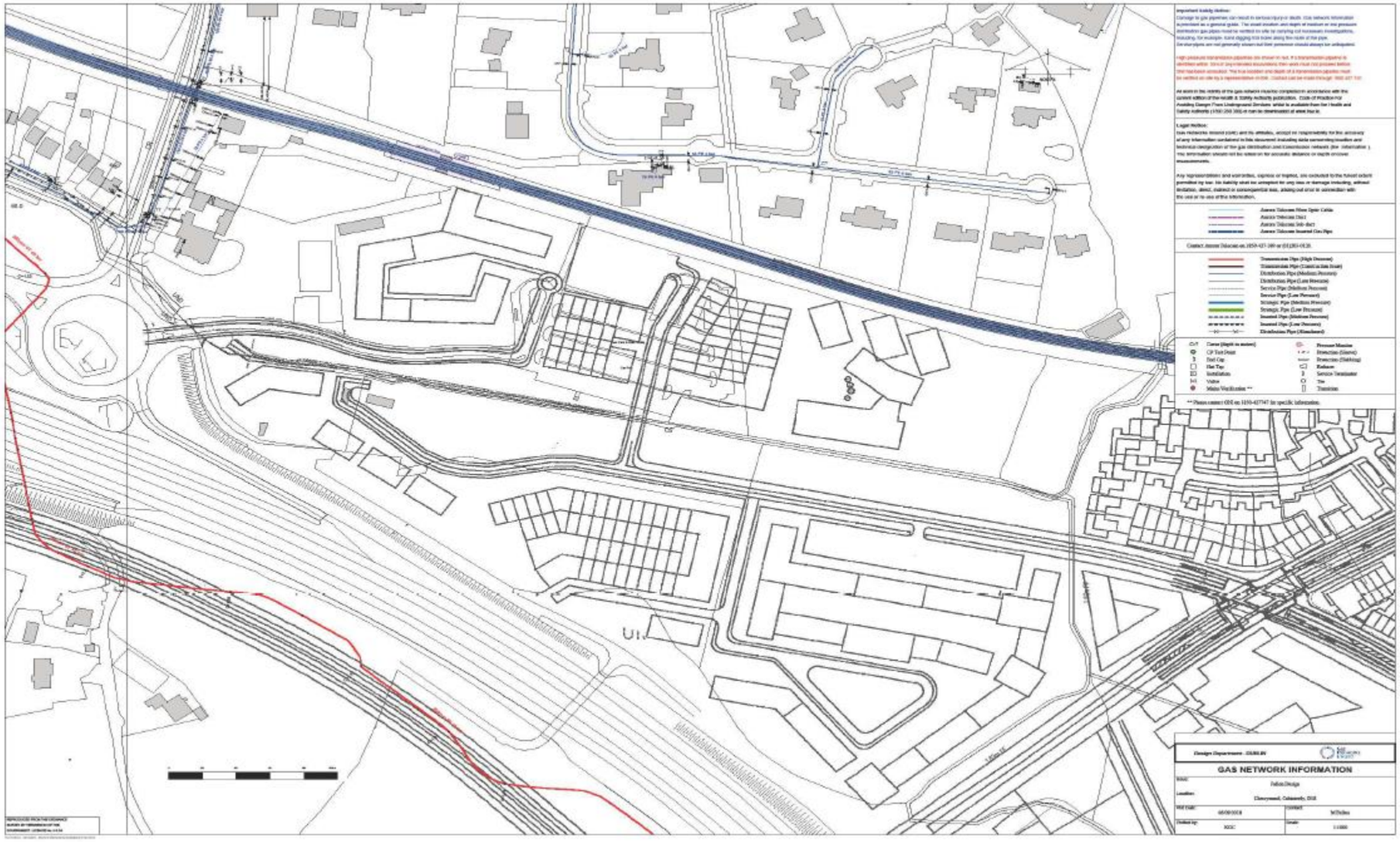

Figure 14.6: Gas Networks Ireland Extract Map

TELECOMS/MEDIA

The proposed Priorsland development is currently enabled with a six way media and communication ducting layout to bring all the major utility providers into the Priorsland scheme. This infrastructure shall be continued into the entire scheme and maintained for the maximum flexibility of the residents of Priorsland into the future.

MUNICIPAL WASTE
Given that the site is currently greenfield and vacant there are no existing municipal waste services operating to this location. DLRCOCO no longer operates any municipal waste landfill in the area. There are numerous wastes permitted and licensed facilities located in the Eastern-Midlands Waste Region for management of waste from the construction industry as well as municipal sources. These include soil recovery facilities, inert C&D waste facilities, hazardous waste treatment facilities, municipal waste landfills, material recovery facilities, waste transfer stations and two waste-to-energy facilities.

14.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The development will comprise a mixed-use village centre and residential development of 443 no. units comprising 6 no. blocks of apartments (up to 5 storeys with basement/undercroft parking) providing 402 no. apartments units (146 no. 1-beds; 218 no. 2-beds and 38 no. 3-beds), and 41 no. houses (19 no. 3-beds and 22 no. 4-beds). All apartments provided with private balconies/terraces. Provision of indoor residential facilities to serve apartment residents.

The Village Centre and non-residential elements will comprise a supermarket, local retail/retail service units, non-retail commercial units, creche, gym, community space, and offices (High Intensity Employment) use.

Provision of car/bicycle/motorcycle parking; ESB sub-stations; bin storages areas, and all associated plant areas.

Provision of the first phase of Priorsland Park (on lands within the applicant's ownership) and other public and communal open spaces.

Construction of Castle Street through the subject lands and two road bridges across the Carrickmines Stream, one to serve the future school site/ park, the second to provide pedestrian and cyclist access to the Carrickmines Luas station and future Transport Interchange to the north. Provision of additional pedestrian bridge to the park. Provision of an acoustic barrier along the southern/western edge of the site.

All associated site development works, landscaping, boundary treatments and services provision.

It is proposed that construction traffic will access / exit the proposed development via an existing access route utilising the available wayleave immediately west of the application site (itself accessed via the M50 Southbound Roundabout).

A more detailed description is outlined in Chapter 3.

14.5 POTENTIAL IMPACTS

The potential impacts of the proposed development are assessed below in terms of the construction and operation phase taking into consideration the Characteristics of the Receiving Baseline Environment and Characteristics of the Proposed Development.

URBAN ENVIRONMENT
Construction Phase
There will likely be some temporary impacts to the existing urban settlement that surrounds the subject lands. The impacts will be short term and relate to construction activity such as an increase in noise, traffic, dust etc. The localised, short term impacts will be appropriately mitigated through the appropriate measures which is explained in greater detail in the relevant Chapters of this EIAR.

Operational Phase
Upon completion of the development, the former greenfield land will house a total of 404 no. of apartments, 41 no. dwellings, a supermarket, 7 no. retail/retail services units, 3 no. non-retail commercial units, crèche, gym, community space, residential facilities within 2 no. units, office/High Intensity Employment use. The change from agricultural land to mixed use is in accordance with the zoning objectives pertained within the Cherrywood SDZ Planning Scheme.

Due to the location of the Luas line, the M50 and existing urban environments, the operation of the development will not adversely impact the existing urban environment, and will form part of normalised urban growth for the area.

TRANSPORT INFRASTRUCTURE

Construction Phase – Interim:
Construction traffic travelling to the proposed development site at Priorsland will, on a temporary basis, use the western route via the available access wayleave. The increase in traffic volumes as a result of construction vehicles visiting the site in the interim scenario is considered negligible and will be spread out over the duration of the construction phases of the development. It is recommended that all deliveries are provided with instructions/directions on accessing the site.

Construction Phase – Permanent:
Construction traffic travelling to the proposed development site at Priorsland will, in the permanent scenario, use Castle St once in operation, if it becomes available during construction. The construction works associated with progressing with the permanent scenario are limited and small in scale compared to the preceding interim construction phase. As a significant area of the whole SDZ is as-yet undeveloped, it is likely therefore that there will be an amount of other construction traffic working on other nearby sites at the same time.

Operational Phase – Permanent:
Access to the proposed development is to be facilitated via the existing junction of Barrington Road and Castle Street. Buses, cyclists and pedestrians exiting from Priorsland will be able to proceed along Castle Street and then along the link to Wyattville Road. For incoming traffic, the movement is reversed. Other exiting vehicular traffic will turn left the junction of Castle Street and Barrington Road and then join Grand Parade or continue north along Druids Glen Road to join the existing N11. The permanent impact on the local road network within the Cherrywood SDZ area has not been assessed, as the projected traffic flows were accounted for in the overall design of the development.

'Do – Nothing' Scenario
If the proposed development does not proceed there would be no additional demand or loading on the existing road network other than the naturally growing baseline traffic figures.

Residual Impact
The volumes of traffic generated from the currently proposed development will have a negligible effect on the highway network traffic volumes and can be considered within the norms for urban developments.

Cumulative Assessment
The proposed development is located at the western end of the Cherrywood SDZ. In the interim scenario, where the construction vehicle (only) access to the proposed development is proposed to the west, the additional traffic will have negligible impact on the existing road network. In the permanent scenario, the cumulative effects are understood to have been addressed in the overall Cherrywood SDZ planning assessment. The cumulative effects of the adjacent sites have been discussed further in the TTA in relation to traffic impact.

In the short term, there will be a slight increase in traffic on the surrounding highway network. However, with the combination of the LUAS system and car reduction measures such as cycle lanes and bus lanes then as they become widely used, the volumes of traffic for the surrounding highway network, generated from the proposed development, will have a minimal effect on the overall traffic volumes.

WATER SUPPLY, FOUL AND SURFACE WATER

Construction – Interim
During the construction phase of the proposed development with the proposed interim arrangement, there are several potential processes that could impact the existing surface water, foul water and watermain networks including the Carrickmines stream and Ticknick stream watercourses:

1) Topsoil stripping and cut/fill earthworks activities may cause an elevated silt load to the adjacent watercourses,
2) Hydrocarbons may be released into networks from accidental spills,
3) The construction of the proposed in-ground services will require the excavation, removal and reinstatement of existing natural and man-made ground,
4) There is potential for existing infrastructure to conflict with proposed excavation works, by existing infrastructure being close to the proposed works,

5) Construction of 2 no. vehicular bridge structures over the Carrickmines River/Flood Containment Zone.
6) The permanent floodwater culvert north of the stream will be constructed in the Interim period as far as the boundary with the third-party lands to the east. The alternative floodwater culvert south of the river will be constructed and will operate in the interim.

Construction – Permanent
During the construction phase of the proposed permanent arrangement, there are a number of potential processes that could impact the existing watermain networks and the Ticknick stream watercourses:

1) The permanent floodwater culvert north of the stream will be completed when the remainder of the culvert is completed on the adjoining lands by others.
2) The diversion of the existing 33" DCC trunk watermain that will be carried out by others in adjacent lands will require the public water network to be suspended for a period to allow connection into the existing network with the diverted line. It will also involve installation of the diverted watermain under the Carrickmines River and Ticknick Stream at isolated locations.
3) Construction of 1 no. vehicular bridge structure over the Ticknick Stream forming the extension of Castle Street into the Priorsland Area.

Operational – Interim
If the material assets are not constructed appropriately, then there is a risk of pipe leakage.

Operational – Permanent
As per the interim arrangement, if the material assets are not constructed appropriately, then there is a risk of pipe leakage.

Do Nothing Scenario
If the proposed works are not implemented, then the existing ground levels will remain as per existing, the Carrickmines river flood plain will remain unaltered and existing services will remain in place. Under a 'Do Nothing' scenario there would be no change in the site's current use, and the impacts to the water environment would be insignificant. The site in its existing greenfield state does not give rise to any significant emissions to any surface water bodies or foul network system.

ELECTRICAL SUPPLY
Construction Phase
The construction phase will require temporary connection to the local electrical supply network. The potential impact from the construction phase of the proposed development on the local electrical supply network is likely to be short-term and low. Due to the surrounding environment the short term impacts will not be of detriment to the existing residents, primarily being those within Carrickmines to the south and Brennanstown to the north.

Operational Phase
The operation of the proposed mixed use development will see a significant increase in the demand for the electricity supply network in comparison to when the lands were agricultural. The potential impact from the operational phase on the electricity supply network is likely to be long term and moderate, however will not be of detriment to the surrounding developments which vary from the M50, Green Luas line and residential development.

NATURAL GAS CONNECTION
Construction Phase

The supply of gas to the proposed development site will not be operational during the construction phase. The potential impact from the construction phase of the proposed development on the local gas supply network is likely to be neutral.

Operational Phase
The development will be connected to the Gas Networks Ireland national gas supply network. There will be an increased demand for the gas supply network as a result of the proposed development. The potential impact from the operational phase on the gas supply network is likely to be long term and moderate, however will not be of detriment to the surrounding environment.

TELECOMS/MEDIA

Construction Phase

The Telecommunications will not be operational during the construction phase. If not undertaken in accordance with best practice procedure, this has the potential to impact on local telecoms connectivity. This will be connected on the eastern boundary of the site along Castle Street and will be coordinated with Hines who own the adjoining land parcel. The potential impact from the construction phase of the proposed development on the local telecoms network is likely to be short-term and low.

Operational Phase

The impact of the operation of the mixed use development will see an increase in the demand for the telecoms network. The potential impact from the operational phase on the telecoms network is likely to be long term and low, and is not anticipated to have any detrimental impacts to the surrounding environment.

MUNICIPAL WASTE

Construction Phase

The proposed development will generate a range of non-hazardous and hazardous waste materials during demolition and construction. General housekeeping and packaging will also generate waste materials as well as typical municipal wastes generated by construction employees including food waste.

Waste materials will be required to be temporarily stored on site pending collection by a waste contractor. Dedicated areas for waste skips and bins will need to be identified across the site. These areas will need to be easily accessible to waste collection vehicles.

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development and on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the development and the surrounding areas. The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices.

Wastes arising will need to be taken to suitably registered/permitted/licenced waste facilities for processing and segregation, reuse, recycling, recovery and/or disposal as appropriate. There are numerous licensed waste facilities in the Eastern Midlands region which can accept hazardous and non-hazardous waste materials. Acceptance of waste from the proposed development would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the likely C&D waste arising at facilities in the region. Where possible, waste will be segregated into reusable, recyclable and recoverable materials. The majority of demolition and construction materials are either recyclable or recoverable.

Recovery and recycling of C&D waste has a positive impact on sustainable resource consumption, for example where waste timber is mulched into a landscaping product or waste asphalt is recycled for use in new pavements. The use of recycled materials, where suitable, reduces the consumption of natural resources.

There is a quantity of top soil and sub soil which will need to be excavated to facilitate the proposed development. The project engineers Punch Consulting have advised that it is likely that all of this material will be suitable for reuse onsite. However, if there is surplus excavated material it will need to be removed off-site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

The opportunities for waste materials to be reused off-site will provide positive impacts in the resourcing of materials for other developments and reduce the requirement for raw material extraction.

The potential effect of construction waste generated from the proposed development is considered to be short-term, and not significant

Operational Phase

The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy. This would lead to volumes of waste being sent unnecessarily to landfill.

The nature of the development means the generation of waste materials during the operational phase is unavoidable. Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion in recycled products (e.g. paper mills and glass recycling).

The waste materials generated on a daily basis will be stored in dedicated waste storage areas.

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development and on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the development and the surrounding areas.

Waste collection vehicles will be required to service the development on a regular basis to remove waste. The use of non-permitted waste contractors or unauthorised facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously. Time and resources should be dedicated to ensuring efficient waste management practices. An operational waste management plan has been included as an appendix.

The potential impact of operational waste generation from the development is considered to be long-term and not significant.

14.6 POTENTIAL CUMULATIVE IMPACTS

The cumulative effects of development on material assets have been assessed taking other planned, existing and permitted developments in the surrounding area into account. The area surrounding the proposed development site accommodates existing residential north of the Luas line, lands zoned for development within the Cherrywood SDZ to the east, the M50 and agricultural lands to the south.

The development within the Cherrywood SDZ Planning Scheme has seen a number of applications lodged and granted for development. These relate to varying applications for mixed use development, residential, infrastructure and road applications. To date, only the roads and a number open space infrastructure developments have been/partially under construction. There has been no residential or retail/commercial development completed within the Cherrywood scheme to date.

As there is not a significant amount for residential/mixed use development currently under construction/completed within the Cherrywood lands, the cumulative impacts on material assets are identified as being low. The existing settlements surrounding the subject lands include Carrickmines to the south west, Brennanstown to the north and Druid's Valley and Laughlinstown to the east. The cumulative impact of the proposed development on existing material assets is not anticipated to be detrimental to the continued operation of these settlements.

Due to the location of the proposed development in relation to the Green Luas line, the M50 Motorway and the Carrickmines Stream, it is predicted that that the proposed development will contribute to the improvement of the treatment of surface water disposal and access to transport infrastructure. The cumulative effects of development on foul and surface water disposal, potable water supply, natural gas supply, electrical supply, telecoms and municipal waste are considered to be negligible.

14.7 MITIGATION MEASURES

TRANSPORT INFRASTRUCTURE

Construction Phase– Interim/Permanent:

As with any construction project, the contractor will be obliged to prepare a comprehensive traffic management plan for the construction phase. The purpose of such a plan is to outline the measures to manage the expected construction traffic activity during the construction period. In the interim, however, this section will provide a preliminary overview of the likely volume and routing of construction vehicles, based on a most likely scenario of construction.

The site as proposed would be expected to require approximately 3 years to complete from commencement of works. Parking for site operatives will be a requirement throughout the contract. It would be expected that a site of this size would generate a requirement for in the region of up to 300 site operatives during the peak period of construction and would lead to a parking requirement for up to about 100 vehicles. This could be accommodated within the curtilage of the site.

Construction traffic approaching the site will travel via the existing Right of Way to the west of the site in the interim and the internal SDZ road system if the Castle Street extension is delivered and access made available via Cherrywood lands to the east in the short term. Again, the Traffic Management Plan for the construction stage would identify haulage routes and restrictions as appropriate in discussion with the Local Authority.

There will also be a requirement for comprehensive measures as part of the construction management, such as:

- Temporary warning signs;
- Banksmen controlling access and egress from the site;
- All marshalling areas and site offices will be contained within the site boundary and will therefore have little impact on external roads;
- Wheel washers/judder bars to clean off vehicles exiting the site during spoil removal;
- All loads to be properly stowed and secured with a tarpaulin, where appropriate;
- Routine sweeping/cleaning of the road and footpaths in front of the site;
- No uncontrolled runoff to the public road from dewatering/pumping carried out during construction activity.
- Hoarding will be provided along the site frontage to protect pedestrians using the footpaths.

Any increase in volumes on the surrounding highway network as a result of the proposed development's construction traffic will likely have a short-term insignificant impact.

Operational Phase – Permanent:

The design of the site layout, roads and accesses in accordance with the relevant guidelines and codes of practice is likely to mitigate any potential impacts during the operational phase of the development.

WATER SUPPLY, FOUL AND SURFACE WATER

Construction – Interim

Surveys will be undertaken to ascertain the exact location of all infrastructure. The material assets are to be constructed in accordance with all relevant Dun Laoghaire Rathdown County Council and Irish Water standards.

The contractor for the proposed works will be required to implement the following measures to protect the Carrickmines river and Ticknick stream watercourses:

1) Discharge permits & licenses
2) Preparing appropriate construction method statements
3) Settlement ponds
4) A "no-go" zone is to be implemented where-by the watercourses will be fenced off so construction vehicles will not impose on sensitive areas.
5) Bunding of hydrocarbons or any liquids that could adversely affect the receiving environment
6) Compliance and adherence to best practise as outlined in the Inland Fisheries Ireland guideline document 'Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters (2016)'.

These measures will be addressed within the Contractors method statements for the works.

The contractor is to conduct the works in accordance with all relevant local authority requirements, and health and safety legislation.

Construction – Permanent

As per above, the contractor for the proposed works will be required to implement the following measures to protect the Carrickmines river and Ticknick stream watercourses:

1) Discharge permits & licenses
2) Preparing appropriate construction method statements
3) Settlement ponds
4) A "no-go" zone is to be implemented where-by the watercourses will be fenced off so construction vehicles will not impose on sensitive areas.
5) Bunding of hydrocarbons or any liquids that could adversely affect the receiving environment
6) Compliance and adherence to best practise as outlined in the Inland Fisheries Ireland guideline document 'Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters (2016)'.

These measures will be addressed within the Contractors method statements for the works.

The contractor is to conduct the works in accordance with all relevant local authority requirements, and health and safety legislation.

Operational – Interim
The Carrickmines River and Ticknick Stream watercourses will be protected during the operational phase through the implementation of sustainable drainage systems (SuDS) on site conforming to the various Cherrywood Planning Scheme (CPS) requirements as outlined in the Specific Objectives set out in Chapter 4 Section 4.1.2 of the CPS. These SuDS measures will intercept and attenuate surface water on site. The surface water will be passed through petrol interceptors and other SuDS measures that will clean the surface water. The water will be discharged to the Ticknick Stream at a rate of 1l/s/ha.

The material assets (surface water, foul water and watermain networks) will be pressure tested to relevant Dun Laoghaire Rathdown County Council and Irish Water standards prior to completion of the works. The drainage networks will also be CCTV surveyed and reviewed to ensure there are no defects. These test measures will ensure to a reasonable degree that the pipes have been installed to the required standard and the risk of leakage will be greatly reduced.

Operational – Permanent
As per the interim arrangement, as there will be no alteration to the proposed drainage systems and watermain systems, the Carrickmines River and Ticknick Stream watercourses will be protected during the operational phase through the implementation of sustainable drainage systems (SuDS) on site conforming to the various Cherrywood Planning Scheme (CPS) requirements as outlined in the Specific Objectives set out in Chapter 4 Section 4.1.2 of the CPS. These SuDS measures will intercept and attenuate surface water on site. The surface water will be passed through petrol interceptors and other SuDS measures that will clean the surface water. The water will be discharged to the Ticknick Stream at a rate of 1l/s/ha.

The material assets (surface water, foul water and watermain networks) will be pressure tested to relevant Dun Laoghaire Rathdown County Council and Irish Water standards prior to completion of the works. The drainage networks will also be CCTV surveyed and reviewed to ensure there are no defects. These test measures will ensure to a reasonable degree that the pipes have been installed to the required standard and the risk of leakage will be greatly reduced.

ELECTRICAL / GAS / TELECOMS
No specific mitigations measures required. Service providers will liaise with local residents as required when connection to services is planned. ESB substations and other associated infrastructure will be provided as part of the development to facilitate connection to services.

WASTE

Construction phase
A project specific CDWMP has been prepared in line with the requirements of the guidance document issued by the DoEHLG. Adherence to the high-level strategy presented in this CDWMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the construction phase of the proposed development.

Punch Consulting Engineers have estimated that c. 15,000m^3 of topsoil and sub soil will be generated from the excavations required to facilitate the basement. It is anticipated that all of this material will be reused onsite, and it will not require removal for offsite. If excavated material is to be taken offsite the contractor(s) will endeavour to ensure that material is reused or recovered off-site or disposed of at authorized facility.

In addition, the following mitigation measures will be implemented:

12.7.1 Building materials will be chosen with an aim to ‘design out waste’;

12.7.2 On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery – that the following waste types, at a minimum, will be segregated:

- Concrete rubble (including ceramics, tiles and bricks);
- Plasterboard;
- Metals;

- Glass; and
- Timber.

12.7.3 Left over materials (e.g., timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials shall be re-used on-site, where possible;
12.7.4 All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
12.7.5 Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
12.7.6 A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works;
12.7.7 All construction staff will be provided with training regarding the waste management procedures;
12.7.8 All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal;
12.7.9 All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities; and
12.7.10 All waste leaving the site will be recorded and copies of relevant documentation maintained.

These mitigation measures will ensure that the waste arising from the construction phase of the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997* and the *EMR Waste Management Plan (2015 - 2021)*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will encourage sustainable consumption of resources.

Operational Phase
All waste materials will be segregated into appropriate categories and will be stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas of the site in accordance with the *Dún Laoghaire-Rathdown County Development Plan 2016 – 2022*.

In addition, the following mitigation measures will be implemented:

12.7.11 On-site segregation of all waste materials into appropriate categories including (but not limited to):
- Organic/catering waste (including garden waste from landscaping activities).
- Dry Mixed Recyclables;
- Mixed Non-Recyclable Waste;
- Glass;
- Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment;
- Batteries (non-hazardous and hazardous)
- Fluorescent bulb tubes and other mercury containing waste (if arising).
- Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.); and

12.7.12 All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials;
12.7.13 All waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available;
12.7.14 All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities; and

These mitigation measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, and all associated Regulations. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

14.8 PREDICTED IMPACTS

TRANSPORT INFRASTRUCTURE

Construction Phase – Interim:
There will be a short-term insignificant negative impact to local traffic during the construction phase.

Construction Phase – Permanent:
The increase in traffic volumes as a result of construction vehicles visiting the site in the permanent scenario is considered negligible.

Operational Phase - Permanent
There will be a long-term slight impact to local traffic. But this arrangement will reflect and be consistent with the final SDZ traffic configuration.

WATER SUPPLY, FOUL AND SURFACE WATER
Construction – Interim
There are no predicted significant impacts arising from the construction phase due to the temporary nature of construction and the expected use of portable or temporary toilets only, which will be contracted out to an authorised disposal agent.

A wide range of mitigation measures have been specified for the construction and operational phases of the project. These mitigation methods seek to ensure that construction and operational discharges are controlled to prevent potential pollution impacts to all receiving surface water systems and their downstream catchment areas. Consequently, the mitigation measures detailed will also prevent potential impacts to the ecosystem of the Carrickmines river and the Ticknick stream.

Construction – Permanent
There are no predicted significant impacts arising from the construction phase due to the temporary nature of construction and the expected use of portable or temporary toilets only, which will be contracted out to an authorised disposal agent.

A wide range of mitigation measures have been specified for the construction and operational phases of the project. These mitigation methods seek to ensure that construction and operational discharges are controlled to prevent potential pollution impacts to all receiving surface water systems and their downstream catchment areas. Consequently, the mitigation measures detailed will also prevent potential impacts to the ecosystem of the Carrickmines river and the Ticknick stream.

Operational – Interim
No negative residual impacts are anticipated with the implementation of the construction and operational mitigation measures as stated.

Operational – Permanent
No negative residual impacts are anticipated with the implementation of the construction and operational mitigation measures as stated.

ELECTRICAL / GAS / TELECOMS
Construction Phase
There will be a short-term insignificant negative impact to local residents when connection to services may impact local residences for a short period of time.

Operational Phase
Fallon Design M&E Engineers have been in liaison with all main services providers in relation to future servicing of this development and no restrictions to providing these services are foreseen at this stage.

WASTE

Construction Phase

A carefully planned approach to waste management as set out in Section 12.7 and adherence to the CDWMP during the construction phase will ensure that the impact on the environment will be *short-term, neutral* and *imperceptible.*

Operational Phase

During the operational phase, a structured approach to waste management as set out in Section 12.7 will promote resource efficiency and waste minimisation. Provided the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted impact of the operational phase on the environment will be *long-term, neutral* and *imperceptible*.

14.9 'DO NOTHING' SCENARIO

A *'do nothing'* impact would result in the subject lands remaining green-field state and undeveloped. From a planning and development perspective, this situation would be contrary to the provisions of the SDZ Planning Scheme which identified these lands for providing significant residential population and a new Village Centre to serve the area. Were the lands to remain undeveloped in the long term it would restrict the development of adjoining Planning Scheme lands also which require the delivery of key infrastructure on these subject lands, to allow them in turn be permitted and develop – these include the links to the Cherrywood Luas stop/Transport Interchange and the new Village Centre.

Failure to deliver the proposed residential units would result in existing housing need and demand remaining unmet. The new pedestrian and cycle links, childcare facility, and public open spaces to be provided in the development and serving the wider area would also not be provided.

14.10 MONITORING & REINSTATEMENT

TRANSPORT INFRASTRUCTURE

Construction Phase– Interim/Permanent:

The contractor will be obliged to appoint a traffic liaison officer/traffic manager who will be involved in preparing the CTMP and to monitor the performance of the CTMP. The traffic liaison officer will be available to receive complaints, comments and queries about the traffic generated by the construction site. and traffic issues associated with the site. Regular meetings will be held on-site to which with all relevant stakeholders will be invited. The traffic liaison officer/traffic manager will liaise with:

- An Garda Siochana
- Irish Rail
- Other relevant statutory bodies
- Members of the community.
- Adjacent contractors

The traffic liaison officer/traffic manager will be sufficiently senior in position and will responsible for dealing with any complaints and remedying any non-compliance and developing solutions to prevent re-occurrence.

Operational Phase – Permanent:

The overall facilities on site such as roads and car parks will be maintained and managed by a management company. The management company will ensure the security and maintenance of the internal roads and car parks. This would entail the use of CCTV and necessary barriers throughout the car parks.

WATER SUPPLY, FOUL AND SURFACE WATER

The construction of works should be monitored to ensure compliance with relevant local authority requirements, and health and safety legislation.

The operational phase of public works should be monitored by the local authority responsible for the respective asset.

The operational phase of private assets should be monitored by the management company for the building.

ELECTRICAL / GAS / TELECOMS
The construction of works should be monitored to ensure compliance with relevant health and safety legislation.

WASTE
Construction Phase
The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the construction phases where there is a potential for waste management to become secondary to progress and meeting construction schedule targets. As specified in the CDWMP, the need for a waste manager will be appointed who will have responsibility to monitor the actual waste volumes being generated and to ensure that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the waste manager should identify the reasons for targets not being achieved and work to resolve any issues. Recording of waste generation during the project will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future projects.

Operational Phase
During the operational phase, waste generation volumes should be monitored by the management company or equivalent, against the predicted waste volumes outlined in the OWRMP. There may be opportunities to reduce the number of bins required in the communal Waste Storage Areas (WSAs) where estimates have been too conservative. Reductions in bin requirements will improve efficiency and reduce waste contractor costs. Waste legislation should also be consulted on a regular basis in case of any changes which may impact on waste management procedures.

14.11 DIFFICULTIES IN COMPILING INFORMATION

There were no significant difficulties that arose during the compiling of this report.

14.12 REFERENCES

Not applicable.

15.0 INTERACTIONS

15.1 INTRODUCTION

As a requirement of the Planning and Development Regulations 2001, as amended, and the draft EPA guidelines (2017)., not only are the individual significant impacts required to be considered when assessing the impact of a development on the environment, but so must the interrelationships between these factors be identified and assessed.

Under the Regulations interactions between the various environmental factors, are to be assessed as well as the vulnerability of the proposed development to the risk of natural disaster.

15.2 ASSESSMENT

Where an interaction is considered to be both likely and significant, it is given a reference number in the matrix and detail of the interaction is recorded below. The interactions are listed in numerical sequence, purely for referencing purposes.

	Biodiversity	Soils/Geology	Water	Noise	Air Climate	Landscape	Cultural Heritage
Biodiversity	*	1	*	2	3	4	*
Soils/Geology	1	*	5	*	6	7	*
Water	*	5	*	*	*	*	*
Noise	2	*	*	*	*	*	*
Air Climate	3	6	*	*	*	*	*
Landscape	4	7	*	*	*	*	*
Cultural Heritage	*	*	*	*	*	*	*

1. Soils & Geology / Biodiversity

The proposed works include the removal of existing topsoil, re-profiling and importing of fill which will have some impact to the biodiversity of the site. This impacts may be felt by the local badger, reptile and amphibians located on the site, as well as habitats located adjacent to vegetation and hedgerows and within proximity to the Carrickmines and Ticknick Streams. Features such as the Turkey Oaks treeline, hedgerows, woodland and watercourses (Ticknick and Carrickmines Stream) have been assessed as having high ecological value. The provided mitigation measures will ensure that during the construction and operation phases, impacts to the local flora and fauna are mitigated to an acceptable level.

2. Biodiversity / Noise

Both the construction and operation phases will lead to activities on site that will generate noise which may impact on local wildlife. The disturbance will be an increase from the existing disturbances generated from the current agricultural land use. The provision of the noise barrier will reduce the noise generated from the M50 entering the site, as well as providing a barrier to prevent wildlife from entering the motorway. The noise implications associated with the proposed development are not expected to be significant and will be short term in duration.

3. Biodiversity /Air

The construction phase may give rise to an increase in dust emissions generated by the increase in construction traffic and groundworks, whilst both phases will see a localised increase in emissions through increased population and traffic. These minor negative impacts will be short term, localised and can be appropriately mitigated, whilst the increase in landscaping will improve the above concerns in the long term. As a result the impact is considered to be minimal to the flora and fauna on site.

4. Landscape / Biodiversity

The landscape will be considerably altered from existing fields to an urban environment with the proposed mixed use development. Given there will be minimal change to the existing vegetation and hedgerows on site, along with the protection of natural habitats in the Carrickmines and Ticknick Streams, the overall impact of the changes in landscape to the local flora and fauna will be low to medium impact. The proposed development also provides for open space and a significant landscaping scheme which will further enhance the habitat opportunities on the site in comparison to the predominantly open fields.

5. Soils & Geology / Water

During the construction phase the use of appropriate secondary containment for the storage of fuels, and other potentially hazardous materials on the site will minimise the risk of accidental release of these compounds to the soil and Carrickmines Stream.

When soil is exposed after vegetative clearance there will be increased run-off and evaporation. Mitigation measures will be implemented during construction to prevent this run-off water from discharging directly to watercourses in the wider vicinity.

The proposed works include the removal of existing topsoil, re-profiling and importing of fill may affect the way in which water flows across the site at both the construction and operation phase.

Due to the presence and proximity of the Carrickmines Stream to the proposed development, appropriate measures will be taken to ensure contaminated soils and/or water runoff does not enter the Stream during the construction phase or through drainage infrastructure during the operation of the development.

6. Soils & Geology /Air

Exposed soil during the construction phase of the proposed scheme may give rise to increased dust emissions. The increase of population on the site particularly during the construction phase will see an increase in construction traffic which as a result may lead to an increase in dust emissions from the site. Due to the stripping of top soil, re-profiling and the importation of fill onto the site, dust management and dust control measures will be implemented as required to mitigate significant dust emissions from the site that may impact in the surrounding local population.

7. Soils & Geology / Landscape

The proposed works include the removal of existing topsoil, re-profiling and importing of fill which to an extent, slightly alter the existing landscape. In conjunction with the development, landscaping will also be a key change with the inclusion of new soil and designated areas for increased landscaping.

16.0 SCHEDULE OF MITIGATION MEASURES

16.1 INTRODUCTION

Given the complexity of the proposed development and this EIAR, this chapter seeks to provide a complete summary of mitigation measures proposed in Chapters 4 to 13. The appointed contractor will be required to adhere to the mitigation contained in the EIAR. Monitoring of the effectiveness of mitigation measures put forward in the EIAR document by the competent authorities is also integral to the process.

16.2 CONSTRUCTION STAGE

Population & Human Health	A Construction and Environmental Management Plan will be prepared by the contractor and implemented during the construction phase. The CEMP will be agreed with the planning authority prior to commencement of development.
Biodiversity	• All enabling, riparian, drainage and instream works are to be carried out in consultation with the project ecologist. • A final CEMP and instream works methodology statement will be submitted to Inland Fisheries Ireland at least three weeks prior ro the commencment of enabling works on site. This will include the name and details of the Ecological Clerk of Works. The ecological clerk of works will have previous experience of the installation of bridges and culverts in addition to the use of instream flumes during instream works. • All instream works methodologies will have prior approval of Inland Fisheries Ireland. • An arborist will place a tree ptotection zone at the initial phase of the project prior to machinery commencing enabling works on site. This will assist in protecting the main waterourse on site from impacts. • The Carrickmines Stream and Ticknick Stream will be protected from dust, silt and surface water throughout the works. • Local silt traps established throughout site. • Mitigation measures on site include dust control, stockpiling away from watercourse and drains • Stockpiling of loose materials will be kept to a minimum of 20m from watercourses and drains. • Stockpiles and runoff areas following clearance will have suitable barriers to prevent runoff of fines into the drainage system and watercourses. • Fuel, oil and chemical storage will be sited within a bunded area. The bund will be at least 50m away from drains, ditches or the watercourse, excavations and other locations where it may cause pollution. • Bunds will be kept clean and spills within the bund area will be cleaned immediately to prevent groundwater contamination. Any water-filled excavations, including the attenuation tank during construction, that require pumping will not directly discharge to the stream. Prior to discharge of water from excavations adequate filtration will be provided to ensure no deterioration of water quality. • De-stocking of the Carrickmines Stream and Ticknick Stream are to be carried out prior to the commencement of works (if required by IFI) and upstream and downstream permeable barriers to remain in place until construction is completed. • In stream works to be carried out in full consultation with and to the advice of Inland Fisheries Ireland and the project ecologist. • Staging of project to initially stabilise, isolate, fence off watercourse on site. • Any in-stream works are to be carried out “in the dry” with temporary diversions in place. Given the restricted nature of the site due to trees this may involve instream diversions through the use of flumes to allow for the culvert to be placed under the stream. • Mitigation measures on site include dust control, stockpiling away from watercourses and drains • During the construction works silt traps will be put in place in the vicinity of all runoff channels the stream to prevent sediment entering the watercourse. • Petrochemical interception and bunds will be in the refuelling area • Planting in the vicinity of the stream crossings should be put in place as soon as possible to allow biodiversity corridors to establish. • On-site inspections to be carried out by project ecologist. • No discharges will be to the watercourse during and post works • Silt traps established throughout site including a double silt fence between the site and the watercourse.

	• Sufficient onsite cleaning of vehicles prior to leaving the site and on nearby roads, will be carried out, particularly during groundworks. • The Site Manager will be responsible for the pollution prevention programme and will ensure that at least daily checks are carried out to ensure compliance. A record of these checks will be maintained. • The site compound will include a dedicated bund for the storage of dangerous substances including fuels, oils etc. Refuelling of vehicles/machinery will only be carried out within the bunded area. • A project ecologist will be appointed and be consulted in relation to all onsite drainage during construction works. • Dewatering of excavations may be necessary. Appropriate monitoring of groundwater levels during site works will be undertaken. Standard construction phase filtering of surface water for suspended solids will be carried out. Unfiltered surface water discharges or runoff are not permitted from the site into the Carrickmines Stream or Ticknick Stream during the works. Trenched double silt fencing shall be put in place along boundary of the proposed development site with 10m buffer from the Carrickmines Stream and Ticknick Stream. This fencing must be in place as one of the first stages on site and prior to the full site clearance. Clearance of scrub in these areas will be monitored by the project ecologist while on site. The silt fencing will act as a temporary sediment control device to protect the watercourse from sediment and potential site water runoff but also act as a tree protection zone for the riparian buffer. The fencing will be inspected twice daily, based on site and weather conditions, for any signs of contamination or excessive silt deposits. • Concrete trucks, cement mixers or drums/bins are only permitted to wash out in designated wash out area greater than 50m from sensitive receptors including drains and drainage ditches. • Spill containment equipment shall be available for use in the event of an emergency. The spill containment equipment shall be replenished if used and shall be checked on a scheduled basis. • All site personnel will be trained in the importance of good environmental practices including reporting to the site manager when pollution, or the potential for pollution, is suspected. All persons working on-site will receive work specific induction in relation to surface water management and run off controls. Daily environmental toolbox talks / briefing sessions will be conducted to outline the relevant environmental control measures and to identify any environment risk areas/works. • Environmental risks due to construction and operation of the proposed development do potentially exist, particularly in relation runoff from sloping site, drains that could lead to the Carrickmines Stream and Ticknick Stream. Ecological supervision will be required during demolition, excavation and enabling works stages. Silt interception measures will need to be in place to ensure that the watercourses are not impacted during works and in particular during the site clearance, instream works and reprofiling stages. Landscaping of the grassed areas of the site proximate to the Carrickmines Stream and Ticknick Stream should take place immediately following re-profiling, to act as a buffer to protect the watercourse. • Daily turbidity monitoring of the Carrickmines Stream and Ticknick Stream should take place during works in consultation with the project ecologist. This monitoring will be particularly important following high rainfall events. It is recommended that sufficient baseline readings are made prior to construction. Monitoring will take place upstream, within the works area and immediately downstream of the works. This will include the taking of digital photograph images that will be catalogued so that the dates of the creation of the images can be inspected by the project ecologist and Inland Fisheries Ireland. Monitoring will take place at least 2 times per working day within the range of 11-1pm and 3-5 pm. This will ensure that works that are being carried out during the day are assessed, rather than monitoring is carried out early in the morning when impacts may be minimal as works may not have commenced on site. • maintenance of any drainage structures (e.g. de-silting operations) must not result in the release of contaminated water to the surface water network. • no entry of solids to the associated stream or drainage network during the connection of pipework to the existing surface water system • Landscaping of the Riparian corridor will be carried out to the satisfaction of IFI and the biodiversity officer of DLR. **Air & Dust** Dust may enter the Carrickmines Stream and Ticknick Stream via air or surface water with potential downstream impacts. Mitigation measures will be carried out reduce dust emissions to a level that avoids the possibility of adverse effects on the Carrickmines Stream and Ticknick Stream. The main activities that may give rise to dust emissions during construction include the following: • Demolition • Excavation of material; • Materials handling and storage; • Movement of vehicles (particularly HGV's) and mobile plant. • Contaminated surface runoff

	Mitigation measures to be in place: • Maintain the existing 10m buffer with the Carrickmines Stream and Ticknick Stream with a double layer of silt fences • Consultation will be carried with an ecologist throughout the construction phase; • Trucks leaving the site with excavated material will be covered so as to avoid dust emissions along the haulage routes. • Speed limits on site (15kmh) to reduce dust generation and mobilisation. • The stream is to be protected from dust on site. This may require additional measures in the vicinity of the building during demolition e.g. placing of terram/protective material over the stream. • *Site Management* • Regular inspections of the site and boundary should be carried out to monitor dust, records and notes on these inspections should be logged. • Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. • Make the complaints log available to the local authority when asked. • Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book. *Monitoring* • Undertake daily on-site and off-site inspection, where receptors are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces within 100 m of site boundary, integrity of the silt control measures, with cleaning and / or repair to be provided if necessary. *Preparing and Maintaining the Site* • Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. • Fully enclose specific operations where there is a high potential for dust production and the site is active for an extensive period. • Avoid site runoff of water or mud. • Keep site fencing, barriers and scaffolding clean using wet methods. • Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. • Cover, seed or fence stockpiles to prevent wind whipping. • Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic. • Any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions. • Maintain a vegetated strip and vehicle exclusion zone between the works and the Carrickmines Stream and Ticknick Stream in consultation with the project ecologist. *Operations* • Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems. • Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate. • Use enclosed chutes and conveyors and covered skips. • Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. • Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods. *Waste* • Avoid bonfires and burning of waste materials. *Measures Specific to Earthworks* • Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. • Only remove the cover in small areas during work and not all at once.

	• During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust. • Due to the proximity of the Carrickmines Stream and Ticknick Stream, an ecologist will oversee works in particular the excavation of material from the perimeter of the site. **Birds** • "Relevant guidelines and legislation (Section 40 of the Wildlife Acts, 1976 to 2012) Should this not be possible, a pre-works check by a qualified ecologist should be undertaken to ensure nesting birds are absent. This would include nesting gulls on buildings if present. • 30 Nest boxes placed on site to compensate for resource loss. • Removal of potential nesting habitats outside of bird breeding season (March to August inclusive). Should this not be possible, a pre-works check by a qualified ecologist should be undertaken to ensure nesting birds are absent **Bats** • Pre Construction inspection of any trees to be felled for bats • NPWS will be notified and conditions carried out if bats found in any trees to be felled. • Lighting at all stages should be done sensitively on site with no direct lighting of hedgerows and treelines. **Mammals** • A preconstruction mammal inspection will be carried out. • Lighting on site during construction will be directed downwards and internally to the site to the satisfaction of the project
Soils & Geology	**Construction Phase – Interim:** **Stripping of Topsoil** The proposed site will require full topsoil stripping. Any temporary storage of soil required will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment; the material will also be stored away from any surface water drains. Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust. The soil will be stored in accordance with TII's Specification for Road Works Series 600. Please note that topsoil removal will not be carried out in designated areas of protection as identified in Chapter 5 the Cherrywood Planning Scheme (CPS), including the mature tree line along Carrickmines River, the riparian habitat associated with the Carrickmines river and Ticknick Stream watercourses and the protected hedgerow in the southeast corner of the site. Refer to CPS Map 5.2 for further illustration. **Excavation of Subsoil Layers** All excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contaminants in order to ensure that historical pollution of the soil has not occurred at the proposed development site. Should it be determined that any of the soil excavated is contaminated, this will be managed according to best practice and disposed of accordingly by a licensed waste disposal contractor. **Imported Fill** Imported fill for the site is expected to be approximately 36,470m^3. The majority of the developments also under construction within the Cherrywood SDZ are net cut sites, so the fill will come from other areas within the Cherrywood SDZ. All fill materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contaminants in order to ensure that historical pollution of the soil has not occurred at the proposed development site. Should it be determined that any of the soil excavated is contaminated, this will be managed according to best practice and disposed of accordingly by a licensed waste disposal contractor.

Spoil and imported fill material will be distributed within the lands made available (LMA) to the extent practical. This requires proper placement of the spoil and fill material within the LMA using techniques to avoid or minimize environmental disturbance, such as vegetation impacts. If the spoil material cannot be completely distributed within the LMA, spoil disposal sites will be required.

Objectives:

- To ensure that all spoil shall be controlled to protect environment
- To ensure proper disposal of all spoil in the spoil disposal site in construction stage.

Management Measures:

- Identify an area to dispose of the spoil within the lands made available where possible
- Designate an area for temporary stockpiling if required, temporary stockpiles to be covered with 1.5mm thick polyethylene membrane
- All topsoil to be stored in stockpiles of 1m sloped to ensure no water can pond, they shall be kept weed free and planted with sterile Italian Ryegrass if they are to be in place for over 12 months
- Send samples of the material away for classification in the LoW.
- If no area can be identified for the disposal of spoil on site, material to be disposed of in accordance with the relevant statutory requirements.

Construction Traffic

Construction traffic effects on the underlying soils can be controlled through the use of stabilisation of soils to mitigate any significant effect on the ground. Soil strengthening geogrids and soil separating geotextiles will be used as required.

Works will be undertaken in accordance with local council requirements.

Accidental Spills and Leaks

To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be bunded to a volume of 110% of the capacity of the largest tank/ container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) shall be diverted for collection and safe disposal.

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in a designated area (or where possible off the site) which will be away from nearby surface water gulleys or drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as “Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors” (CIRIA 532, 2001) will be complied with.

All ready-mixed concrete will be brought to site by truck. It is recommended that a suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. The pouring of concrete will take place within a designated area using a geo-synthetic material to prevent concrete runoff into the soil/ groundwater media. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility off site.

In the case of drummed fuel or other chemicals which may be used during construction containers should be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.

Potentially contaminated groundwater and polluted surface water generated during construction activities will not be discharged directly to ground or surface drainage. Welfare facilities will be provided for construction operatives but are only likely to comprise individual ‘portaloos’ with no connection to the foul sewer expected.

Geological Environment

The implementation of the operational phase mitigation measures highlighted above will ensure that the soils geology and hydrogeological environment is not adversely impacted during normal and/ or emergency conditions during the operational phase.

Construction Phase – Permanent:

Stripping of Topsoil
The construction works associated with progressing with the permanent scenario are limited and small in scale compared to the preceding interim construction phase. The proposed construction site extents (comprising principally of the Castle Street connection works) will require full topsoil stripping. Any temporary storage of soil required will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment; the material will also be stored away from any surface water drains. Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust. The soil will be stored in accordance with TII's Specification for Road Works Series 600.

Excavation of Subsoil Layers
All excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contaminants in order to ensure that historical pollution of the soil has not occurred at the proposed development site. Should it be determined that any of the soil excavated is contaminated, this will be managed according to best practice and disposed of accordingly by a licensed waste disposal contractor.

Imported Fill
Imported fill for the site is expected to be minimal as the vast majority of site regrading works will be completed in the Interim Construction Phase. All fill materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contaminants in order to ensure that historical pollution of the soil has not occurred at the proposed development site. Should it be determined that any of the soil excavated is contaminated, this will be managed according to best practice and disposed of accordingly by a licensed waste disposal contractor.

Construction Traffic
Construction traffic effects on the underlying soils can be controlled through the use of stabilisation of soils to mitigate any significant effect on the ground. Soil strengthening geogrids and soil separating geotextiles will be used as required.
Works will be undertaken in accordance with local council requirements.

Accidental Spills and Leaks
To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be bunded to a volume of 110% of the capacity of the largest tank/ container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) shall be diverted for collection and safe disposal.
Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in a designated area (or where possible off the site) which will be away from nearby surface water gulleys or drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.

All ready-mixed concrete will be brought to site by truck. It is recommended that a suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. The pouring of concrete will take place within a designated area using a geo-synthetic material to prevent concrete runoff into the soil/ groundwater media. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility off site.

In the case of drummed fuel or other chemicals which may be used during construction containers should be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.

Potentially contaminated groundwater and polluted surface water generated during construction activities will not be discharged directly to ground or surface drainage. Welfare facilities will be provided for construction operatives but are only likely to comprise individual 'portaloos' with no connection to the foul sewer expected.

	Geological Environment The implementation of the construction phase mitigation measures highlighted above will ensure that the soils geology and hydrogeological environment is not adversely impacted during normal and/ or emergency conditions during the operational phase.
Water Services	**Construction – Interim** Surveys will be undertaken to ascertain the exact location of all infrastructure. The material assets are to be constructed in accordance with all relevant Dun Laoghaire Rathdown County Council and Irish Water standards. The contractor for the proposed works will be required to implement the following measures to protect the Carrickmines river and Ticknick stream watercourses: 1) Discharge permits & licenses 2) Preparing appropriate construction method statements 3) Settlement ponds 4) A “no-go” zone is to be implemented where-by the watercourses will be fenced off so construction vehicles will not impose on sensitive areas. 5) Bunding of hydrocarbons or any liquids that could adversely affect the receiving environment 6) Compliance and adherence to best practise as outlined in the Inland Fisheries Ireland guideline document ‘Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters (2016)’. These measures will be addressed within the Contractors method statements for the works. The contractor is to conduct the works in accordance with all relevant local authority requirements, and health and safety legislation. **Construction – Permanent** As per above, the contractor for the proposed works will be required to implement the following measures to protect the Carrickmines river and Ticknick stream watercourses: 1) Discharge permits & licenses 2) Preparing appropriate construction method statements 3) Settlement ponds 4) A “no-go” zone is to be implemented where-by the watercourses will be fenced off so construction vehicles will not impose on sensitive areas. 5) Bunding of hydrocarbons or any liquids that could adversely affect the receiving environment 6) Compliance and adherence to best practise as outlined in the Inland Fisheries Ireland guideline document ‘Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters (2016)’. These measures will be addressed within the Contractors method statements for the works. The contractor is to conduct the works in accordance with all relevant local authority requirements, and health and safety legislation.
Noise & Vibration	The scheme contractor will be obliged to give due regard to **BS5228**, which offers detailed guidance on the control of noise from construction activities. In particular, it is proposed that various practices be adopted during construction, including: • Limiting the hours during which site activities likely to create high levels of noise are permitted. • Establishing channels of communication between the contractor/developer, local authority and residents. • Appointing a site representative responsible for matters relating to noise.

	• Ensuring all site access roads are kept as even as possible so as to mitigate the potential for vibration from lorries. • Monitoring typical levels of noise during critical periods and at sensitive locations (on lands across the Luas line from the houses along Brennanstown Vale only). Furthermore, it is envisaged that a variety of practicable noise control measures will be employed, including: • Selection of plant with low inherent potential for generation of noise. • Siting of noisy plant as far away from sensitive properties as permitted by site constraints. Vibration from construction activities will be limited to the values set out in Table 8.13 but will likely be far below these values. It should be stressed that these limits are not absolute, but provide guidance as to magnitudes of vibration that are very unlikely to cause cosmetic damage. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Where there is existing damage, these limits may need to be reduced by up to 50%.
Air Quality & Climate	In order to ensure that adverse air quality impacts are minimised during the construction phase and that the potential for soiling of property and amenity, local public roads and the LUAS tram system is minimised, the following mitigation measures shall be implemented during the course of all construction activities: • Avoid unnecessary vehicle movements and manoeuvring, and limit speeds on site so as to minimise the generation of airborne dust. • Use of rubble chutes and receptor skips during construction activities. • During dry periods, dust emissions from heavily trafficked locations (on and off site) will be controlled by spraying surfaces with water and wetting agents. • Hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads will be restricted to essential site traffic only. • Re-suspension in the air of spillages material from trucks entering or leaving the site will be prevented by limiting the speed of vehicles within the site to 10kmh and by use of a mechanical road sweeper. • The overloading of tipper trucks exiting the site shall not be permitted. • Aggregates will be transported to and from the site in covered trucks. • Where the likelihood of windblown fugitive dust emissions is high and during dry weather conditions, dusty site surfaces will be sprayed by a mobile tanker bowser. • Wetting agents shall be utilised to provide a more effective surface wetting procedure. • Exhaust emissions from vehicles operating within the construction site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions from vehicles are minimised by routine servicing of vehicles and plant, rather than just following breakdowns; the positioning of exhausts at a height to ensure adequate local dispersal of emissions, the avoidance of engines running unnecessarily and the use of low emission fuels. • All plant not in operation shall be turned off and idling engines shall not be permitted for excessive periods. • Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods. • Material stockpiles containing fine or dusty elements including top soils shall be covered with tarpaulins. • Where drilling or pavement cutting, grinding or similar types of stone finishing operations are taking place, measures to control dust emissions will be used to prevent unnecessary dust emissions by the erection of wind breaks or barriers. All concrete cutting equipment shall be fitted with a water dampening system. • A programme of air quality monitoring shall be implemented at the site boundaries for the duration of construction phase activities to ensure that the air quality standards relating to dust deposition and PM_{10} are not exceeded. Where levels exceed specified air quality limit values, dust generating activities shall immediately cease and alternative working methods shall be implemented. • A complaints log shall be maintained by the construction site manager and in the event of a complaint relating to dust nuisance, an investigation shall be initiated.

	• Dust netting and site hoarding shall be installed along the northeastern site boundary to minimise fugitive windblown dust emissions falling on the LUAS tram line.
Landscape & Visual	• To reduce the potential negative impacts during the construction phase, good site management and housekeeping practices will be adhered to. • The visual impact of the site compounds and scaffolding visible during the construction phase are of a temporary nature only and therefore require no remedial action. • The areas set aside for open spaces will be fenced off with no compounds or storage of materials taking place in these areas, in accordance with an agreed Construction Management Plan. To ensure the successful retention of trees and hedgerows, an Arborist is recommended to be retained by the contractor or developer to monitor and advise any works within the Root Protection Zones of retained trees.
Traffic &Transportation	As with any construction project, the contractor will be obliged to prepare a comprehensive traffic management plan for the construction phase. The purpose of such a plan is to outline the measures to manage the expected construction traffic activity during the construction period. In the interim, however, this section will provide a preliminary overview of the likely volume and routing of construction vehicles, based on a most likely scenario of construction. The site as proposed would be expected to require approximately 3 years to complete from commencement of works. Parking for site operatives will be a requirement throughout the contract. It would be expected that a site of this size would generate a requirement for in the region of up to 300 site operatives during the peak period of construction and would lead to a parking requirement for up to about 100 vehicles. This could be accommodated within the curtilage of the site. Construction traffic approaching the site will travel via the existing Right of Way to the west of the site in the interim and the internal SDZ road system if the Castle Street extension is delivered and access made available via Cherrywood lands to the east in the short term. Again, the Traffic Management Plan for the construction stage would identify haulage routes and restrictions as appropriate in discussion with the Local Authority. There will also be a requirement for comprehensive measures as part of the construction management, such as: • Temporary warning signs; • Banksmen controlling access and egress from the site; • All marshalling areas and site offices will be contained within the site boundary and will therefore have little impact on external roads; • Wheel washers/judder bars to clean off vehicles exiting the site during spoil removal; • All loads to be properly stowed and secured with a tarpaulin, where appropriate; • Routine sweeping/cleaning of the road and footpaths in front of the site; • No uncontrolled runoff to the public road from dewatering/pumping carried out during construction activity. • Hoarding will be provided along the site frontage to protect pedestrians using the footpaths. Any increase in volumes on the surrounding highway network as a result of the proposed development's construction traffic will likely have a short-term insignificant impact.
Waste Management	A project specific CDWMP has been prepared in line with the requirements of the guidance document issued by the DoEHLG. Adherence to the high-level strategy presented in this CDWMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the construction phase of the proposed development. Punch Consulting Engineers have estimated that c. 15,000m^3 of topsoil and sub soil will be generated from the excavations required to facilitate the basement. It is anticipated that all of this material will be reused onsite, and it will not require removal for offsite. If excavated material is to be taken offsite the contractor(s) will endeavour to ensure that material is reused or recovered off-site or disposed of at authorized facility. In addition, the following mitigation measures will be implemented: • Building materials will be chosen with an aim to 'design out waste';

	• On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery – that the following waste types, at a minimum, will be segregated:
	  - Concrete rubble (including ceramics, tiles and bricks);
	  - Plasterboard;
	  - Metals;
	  - Glass; and
	  - Timber.
	• Left over materials (e.g., timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials shall be re-used on-site, where possible;
	• All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
	• Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
	• A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works;
	• All construction staff will be provided with training regarding the waste management procedures;
	• All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal;
	• All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities; and
	• All waste leaving the site will be recorded and copies of relevant documentation maintained.
	
	These mitigation measures will ensure that the waste arising from the construction phase of the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997* and the *EMR Waste Management Plan (2015 - 2021)*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will encourage sustainable consumption of resources.

Cultural Heritage	**Mitigation Measure 13.1:** No groundworks will be carried out within the zone of notification for DU026-080 without prior consultation with an archaeologist. All ground disturbances associated with the proposed development within this area, including site investigations and topsoil stripping, will be monitored by a suitably qualified archaeologist under licence to, and in consultation with the NMS. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation in-situ or by record. Any further mitigation will require approval from the NMS. **Mitigation Measure 13.2:** While it is acknowledged that preservation *in-situ* of newly discovered archaeological sites is the preferred policy of the development plan where possible, the locations of AA1-7 are situated within the footprint of numerous proposed buildings and access roads. As such the archaeology in AA1–7, and any associated features, will be preserved by record (i.e. excavation) in advance of construction. Excavation will be carried out by a licence eligible archaeologist in consultation with the NMS. No ground works, such as site investigations, will be undertaken within the vicinity of AA1–7 without prior consultation with an archaeologist. **Mitigation Measure 13.3:** All ground disturbances associated with the proposed development, including site investigations and topsoil stripping, will be monitored by a suitably qualified archaeologist under licence to, and in consultation with the NMS. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation in-situ or by record. Any further mitigation will require approval from the NMS. **Mitigation Measure 13.4:** The record included within Appendix 13.3 adequately describes the 19th century stream channel in advance of its partial removal and no further mitigation is deemed necessary.

16.3 OPERATIONAL STAGE

Population & Human Health	N/A
Biodiversity	N/A
Soils & Geology	**Operational Phase – Interim:** All drainage from within the car parks will be collected by gullies and drainage pipelines to petrol interceptors prior to discharge to the surface water network. Surface water will be intercepted by SuDS. Water will be attenuated settled via the detention basins prior to discharge from site. All surface water and foul water pipes will be tested to ensure they do not leak prior to completion of the construction phase. Therefore, the hydrology and geology on site will not be affected during the operational stage of the development. **Operational Phase – Construction:** As per the interim scenario, all drainage from within the car parks will be collected by gullies and drainage pipelines to petrol interceptors prior to discharge to the surface water network. Surface water will be intercepted by SuDS. Water will be attenuated settled via the detention basins prior to discharge from site. All surface water and foul water pipes will be tested to ensure they do not leak prior to completion of the construction phase. Therefore, the hydrology and geology on site will not be affected during the operational stage of the development.
Water Services	**Operational – Interim** The Carrickmines River and Ticknick Stream watercourses will be protected during the operational phase through the implementation of sustainable drainage systems (SuDS) on site conforming to the various Cherrywood Planning Scheme (CPS) requirements as outlined in the Specific Objectives set out in Chapter 4 Section 4.1.2 of the CPS. These SuDS measures will intercept and attenuate surface water on site. The surface water will be passed through petrol interceptors and other SuDS measures that will clean the surface water. The water will be discharged to the Ticknick Stream at a rate of 1l/s/ha. The material assets (surface water, foul water and watermain networks) will be pressure tested to relevant Dun Laoghaire Rathdown County Council and Irish Water standards prior to completion of the works. The drainage networks will also be CCTV surveyed and reviewed to ensure there are no defects. These test measures will ensure to a reasonable degree that the pipes have been installed to the required standard and the risk of leakage will be greatly reduced. **Operational – Permanent** As per the interim arrangement, as there will be no alteration to the proposed drainage systems and watermain systems, the Carrickmines River and Ticknick Stream watercourses will be protected during the operational phase through the implementation of sustainable drainage systems (SuDS) on site conforming to the various Cherrywood Planning Scheme (CPS) requirements as outlined in the Specific Objectives set out in Chapter 4 Section 4.1.2 of the CPS. These SuDS measures will intercept and attenuate surface water on site. The surface water will be passed through petrol interceptors and other SuDS measures that will clean the surface water. The water will be discharged to the Ticknick Stream at a rate of 1l/s/ha. The material assets (surface water, foul water and watermain networks) will be pressure tested to relevant Dun Laoghaire Rathdown County Council and Irish Water standards prior to completion of the works. The drainage networks will also be CCTV surveyed and reviewed to ensure there are no defects. These test measures will ensure to a reasonable degree that the pipes have been installed to the required standard and the risk of leakage will be greatly reduced.
Noise & Vibration	<u>Delivery Truck Events</u> The noise impact assessment outlined in the previous section has demonstrated that no additional noise mitigation measures will be required in respect of delivery truck events. <u>Building Services Plant</u> The noise impact assessment outlined in the previous section has confirmed that the following additional mitigation measures should be provided in relation to building services plant:

	Mitigation Measure 5.5.1: Selected building services plant should have a noise level no louder than 75dB L_{Aeq} at a distance of 1m from the unit or building façade (or have noise control measures incorporated to achieve the same). **Mitigation Measure 5.5.2:** A barrier wall should be provided to screen any noise producing mechanical equipment provided on the roof (or if provided at ground level) with direct line-of-sight with adjacent dwellings. <u>Car Park Activity Noise</u> The noise impact assessment outlined in the previous section has demonstrated that additional noise mitigation measures will not be required in relation to car parking activities. <u>Vehicular Traffic on New Internal Road</u> The noise impact assessment outlined in the previous section has demonstrated that additional noise mitigation measures will not be required in relation to vehicular traffic on the development's new internal road. <u>Additional Vehicular Traffic on Public Roads</u> The noise impact assessment outlined in the previous section has demonstrated that additional noise mitigation measures will not be required in relation to additional vehicular traffic on public roads.
Air Quality & Climate	The Operational Phase of the Proirsland development site will not generate air emissions that would have an adverse impact on local ambient air quality or local human health and as such there are no mitigation measures specified for the Operational Phase. The operational phase mitigation by design measures to minimise the impact of the development on air quality and climate are as follows: • Thermally efficient glazing systems on all units • Mechanical Ventilation and Heat Recovery (MVHR) systems or equivalent installed in all apartments • Thermal insulation of walls and roof voids of all units • Natural Gas heating in all units • Inclusion of electric car charging points to encourage electric vehicle ownership • Proximity of LUAS to the development to provide public transport to residents • Removal of invasive species from the site prior to development
Landscape & Visual	• Mitigation measures have been incorporated into the design to minimise visual intrusion and adverse landscape impact whilst integrating the development into the surrounding landscape character. • Tree and other planting are proposed throughout the site and particularly within the main open spaces. An extensive landscape programme is proposed to create the optimum landscape solution for this new residential area. • The visual massing impact of the development will be reduced through provision of open spaces and streetscape planting throughout the site. Existing boundary hedgerow and planting will be maintained and enhanced where possible to provide natural screening of the site as currently provided. • Streetscape design will incorporate planting and landscaping to reduce the visual impact on parking and to integrate with the building elevations to create a sylvan setting appropriate to its suburban context. • The extensive landscaping proposal will help soften the visual impact of the development and with future maturing of planting will lead to a very attractive residential layout that integrates well with the adjoining uses and with the rural hinterland.

Traffic &Transportation	The design of the site layout, roads and accesses in accordance with the relevant guidelines and codes of practice is likely to mitigate any potential impacts during the operational phase of the development.
Waste Management	All waste materials will be segregated into appropriate categories and will be stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas of the site in accordance with the *Dún Laoghaire-Rathdown County Development Plan 2016 – 2022*. In addition, the following mitigation measures will be implemented: • On-site segregation of all waste materials into appropriate categories including (but not limited to): - Organic/catering waste (including garden waste from landscaping activities). - Dry Mixed Recyclables; - Mixed Non-Recyclable Waste; - Glass; - Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment; - Batteries (non-hazardous and hazardous) - Fluorescent bulb tubes and other mercury containing waste (if arising). - Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.); and • All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials; • All waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available; • All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities; and These mitigation measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, and all associated Regulations. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.
Cultural Heritage	N/A