

Article 6 (3) Appropriate Assessment Screening Report

Proposed Residential
Development at Bruff, Co.
Limerick





DOCUMENT DETAILS

Client: **Limerick City & County Council**

Project Title: **Proposed Residential Development at Bruff, Co. Limerick**

Project Number: **220421**

Document Title: **Appropriate Assessment Screening Report**

Document File Name: **AASR D2 – 220421 – 2023.03.30**

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Rev	Status	Date	Author(s)	Approved By
01	Draft	05/05/2022	CB	PE
02	Draft	29/07/2022	CB	PE
03	Draft	30/03/2023	CT	NOD/RW
04	Final	11/07/2023	CT	NOD/RW
05	Final	26/02/2024	CT	NOD.RW

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1. INTRODUCTION

1.1 Background

MKO has been appointed to provide the information necessary to allow the competent authority to conduct an Article 6(3) Screening for Appropriate Assessment of a proposed residential development at Bruff, Co Limerick.

Screening for Appropriate Assessment is required under Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive). Where it cannot be excluded that a project or plan, either alone or in combination with other projects or plans, would have a significant effect on a European Site then same shall be subject to an appropriate assessment of its implications for the site in view of the site's conservation objectives. The current project is not directly connected with, or necessary for, the management of any European Site consequently the project has been subject to the Appropriate Assessment Screening process.

The assessment in this report is based on a desk study followed by field surveys undertaken on 6th May 2022. It specifically assesses the potential for the proposed development to result in significant effects on European sites in the absence of any best practice, mitigation or preventative measures.

This Appropriate Assessment Screening Report has been prepared in accordance with the European Commission's Assessment of Plans and Projects Significantly affecting Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC (EC, 2021) and Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2018) as well as the Department of the Environment's Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DoEHLG, 2010) and the Appropriate Assessment Screening for Development Management. Office of the Planning Regulator, Dublin 7, Ireland OPR (2021).

In addition to the guidelines referenced above, the following relevant documents were also considered in the preparation of this report:

1. *Council of the European Commission (1992) Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. Official Journal of the European Communities. Series L 20, pp. 7-49.*
2. *EC (2000) Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg.*
3. *EC (2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence. Opinion of the commission.*
4. *EC (2013) Interpretation Manual of European Union Habitats. Version EUR 28. European Commission.*
5. *EC (2021) Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC*

1.2 Appropriate Assessment

1.2.1 Screening for Appropriate Assessment

Screening is the process of determining whether an Appropriate Assessment is required for a plan or project. Under Part XAB of the Planning and Development Act, 2000, as amended, screening must be carried out by the Competent Authority. As per Section 177U of the Planning and Development Act, 2000, as amended 'A screening for appropriate assessment shall be carried out by the competent authority to assess, in view of best scientific knowledge, if that Land use plan or proposed development, individually or in combination with another plan or project is likely to have a significant effect on the European site'. The Competent Authority's determination as to whether an Appropriate Assessment is required must be made on the basis of objective information and should be recorded. The Competent Authority may request information to be supplied to enable it to carry out screening.

Consultants or project proponents may provide for the competent authority, the information necessary for them to determine whether an Appropriate Assessment is required and provide advice to assist them in the Article 6(3) Appropriate Assessment Screening decision.

Where it cannot be excluded beyond reasonable scientific doubt at the Screening stage, that a proposed plan or project, individually or in combination with other plans and projects, would have a significant effect on the conservation objectives of a European site, an Appropriate Assessment is required.

Where an Appropriate Assessment is required, the Competent Authority may require the applicant to prepare a Natura Impact Statement.

The term Natura Impact Statement (NIS) is defined in legislation¹. An NIS, where required, should present the data, information and analysis necessary to reach a definitive determination as to 1) the implications of the plan or project, alone or in combination with other plans and projects, for a European site in view of its conservation objectives, and 2) whether there will be adverse effects on the integrity of a European site. The NIS should be underpinned by best scientific knowledge, objective information and by the precautionary principle.

This Article 6(3) Appropriate Assessment Screening Report has been prepared in compliance with the provision of section 177U of the Planning & Development Act 2010 as amended.

Statement of Authority

Baseline ecological surveys were undertaken on the 6th of May 2022 by Cathal Bergin (BSc. Wildlife Biology) of MKO. Cathal has relevant academic qualifications and survey experience and is a competent expert for the purposes of undertaking this assessment. This report has been prepared by Cathal Bergin (BSc.) and Cora Twomey (BSc. Ecology). Neansai O Donovan (BSc., Wildlife Biology) and Rachel Walsh (BSc. Environmental Science). Neansai has over 2 years' experience in professional ecological consultancy, Rachel has 3 years' experience in consultancy and ecological impact assessment.

¹ As defined in Section 177T of the Planning and Development Act, 2000 as amended, an NIS means a statement, for the purposes of Article 6 of the Habitats Directive, of the implications of a proposed development, on its own and in combination with other plans and projects, for a European site in view of its conservation objectives. It is required to include a report of a scientific examination of evidence and data, carried out by competent persons to identify and classify any implications for the European site in view of its conservation objectives

2. DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 Site Location

The site is located in the village of Bruff, Co. Limerick (Grid Reference: ITM: X 563047, Y 636454). The site is located approximately 300m northeast of the village of Bruff, in the Townland of Bruff. It is accessible from the southern boundary via a slip road joining the R516. Footpath connectivity is also present from the development site to Bruff village via this road network. The development site is surrounded by residential and commercial properties to the south and west with improved agricultural grassland fields to the north and east. The village of Bruff is located approximately 22km to the south of Limerick City.

The location of the site is shown in Figure 2.1.

2.2 Characteristics of the Proposed Development

2.2.1 Description of the project

Planning Permission is sought from Limerick City & County Council for the development of a site approximately 0.66ha in area within the townland of Bruff, County Limerick.

The proposed development will consist of the following:

1) Construction of 18 no. residential units comprising of:

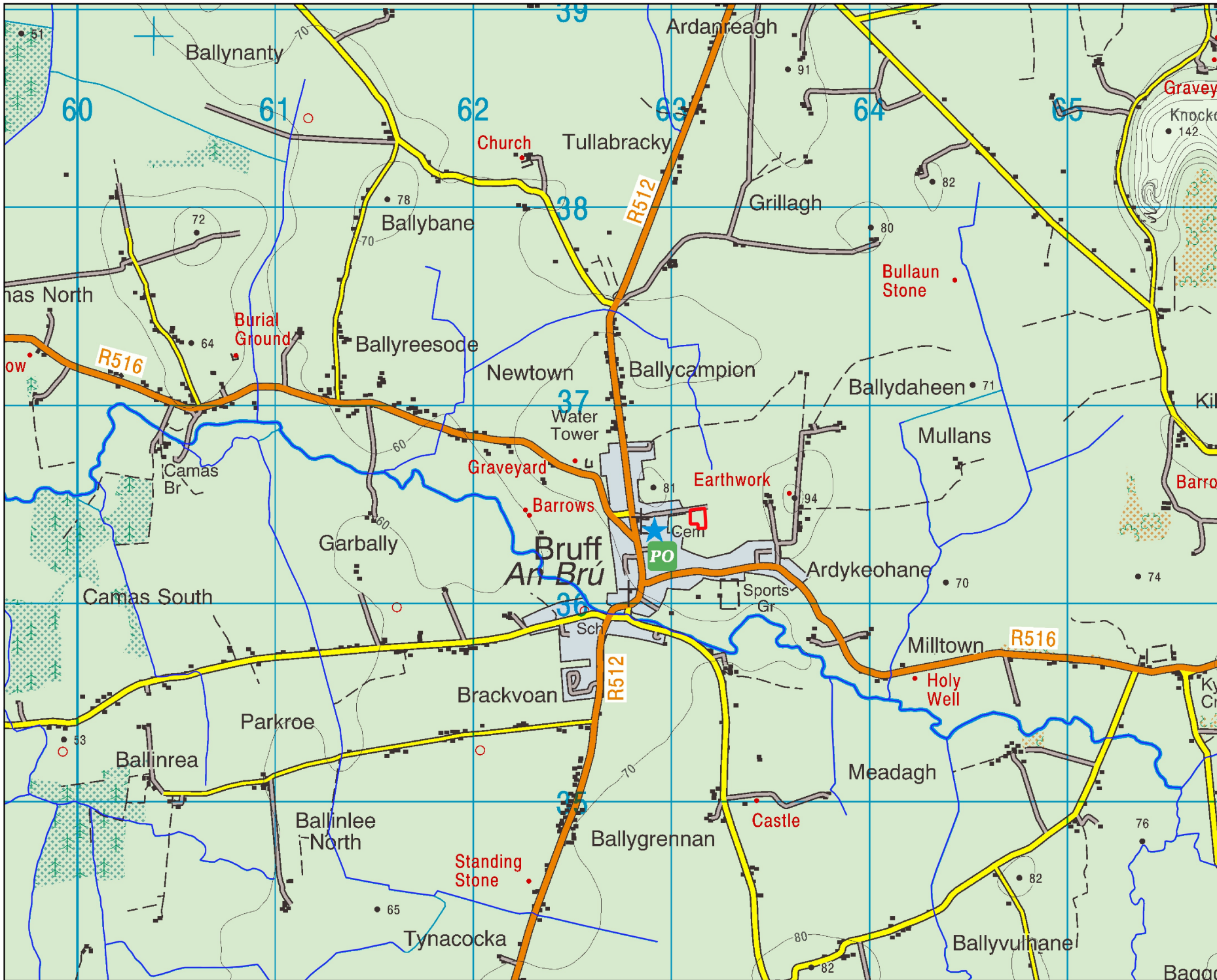
- 2 no. 1-bed, 2 person apartments, single story.
- 2 no. 2-bed 4 person houses, single story
- 1 no. 2-bed 4-person house, two story.
- 4 no. 3-bed 5/6 person houses, single story.
- 6 no. 3-bed 5/6 person houses, two story.
- 2 no. 4-bed 7 person houses, single story.

2) Provision of all associated surface water and foul drainage services and connections with all associated site works and ancillary services.

3) Pedestrian, cycle, and vehicular access/egress with Brugh na Deise estate through to Crawford's Street and then to Main Street Bruff.

4) Provision of public open space, communal open space, private open space, site landscaping, public lighting, refuse storage, resident and visitor car parking including electric vehicle charging points, bicycle parking, boundary treatments, and all associated site development works.

The proposed layout plan for the proposed development is provided in Fig 2.2.



Map Legend

Site Boundary



Site Location Map

Project Title
Proposed Development at Bruff,
Co Limerick

Drawn By	C.B	Checked By	P.E
Project No.	220421	Drawing No.	Figure 2.1
Scale	1:25000	Date	05.05.22



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DO NOT SCALE from this drawing. Use figured dimensions.
Contractor to check all dimensions on site prior to commencement of works. Any discrepancies are to be referred to the ARCHITECT.

NOTES:

Development Summary

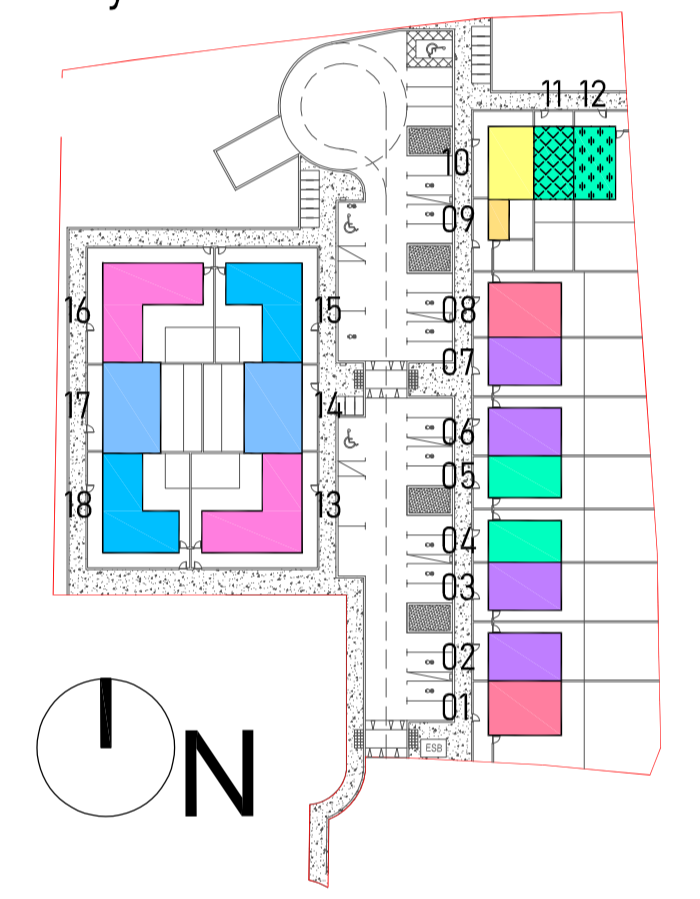
Development Summary		G.B. No.	
Site Area	18		
No. of Units	18		
Density	22 (Units/ha)		
No. of Bed Spaces	83 (Units/ha per unit)		
No. of Parking Spaces	30		
Public Open Space Provision	9% of site area		

No. of Backlogs	House Type	Description	No. of Type	% of Total
1 BED	A	18 - 20' x 25'	1	5.6
	B	18 - 20' x 25'	1	5.6
	C	18 - 20' x 25'	1	5.6
2 BED	D	20 - 25' x 25'	1	5.6
	E	20 - 25' x 25'	1	5.6
	F	20 - 25' x 25'	1	5.6
3 BED	G	25 - 30' x 25'	2	11.1
	H	25 - 30' x 25'	2	11.1
	I	25 - 30' x 25'	2	11.1
4 BED	J	30 - 35' x 25'	1	5.6
	K	30 - 35' x 25'	1	5.6
	L	30 - 35' x 25'	1	5.6
				83

Schedule of Units

Unit Number	House/Flat	No. of Stories	Unit Type	Description	GFA Area (sqm)
1	H	2	H	18 - 20' x 25'	119.2
2	H	2	H	18 - 20' x 25'	102.8
3	H	2	F	20 - 25' x 25'	102.8
4	H	2	C	18 - 20' x 25'	81.4
5	H	2	C	18 - 20' x 25'	81.4
6	H	2	F	20 - 25' x 25'	102.8
7	H	2	H	18 - 20' x 25'	102.8
8	H	2	H	18 - 20' x 25'	102.8
9	A	1	B	18 - 20' x 25'	81.4
10	A	1	A	18 - 20' x 25'	48.5
11	H	2	C	18 - 20' x 25'	81.4
12	H	2	C	18 - 20' x 25'	81.4
13	H	1	D	20 - 25' x 25'	81.4
14	H	1	E	20 - 25' x 25'	76.2
15	H	1	G	25 - 30' x 25'	119.2
16	H	1	H	25 - 30' x 25'	119.2
17	H	1	I	25 - 30' x 25'	119.2
18	H	1	J	30 - 35' x 25'	152.2

Key Plan



**FOR PLANNING PURPOSES ONLY
NOT FOR CONSTRUCTION**

REVISIONS

DATE	REV.	BY	CHECKED	DESCRIPTION

Limerick City & County Council
LA Housing Construction & Maintenance
Doonardoyle
Limerick
Tel. 061-556000

PROJECT:
18 no. HOUSING UNITS AT BRUGH Na DEISE, BRUFF, COUNTY LIMERICK

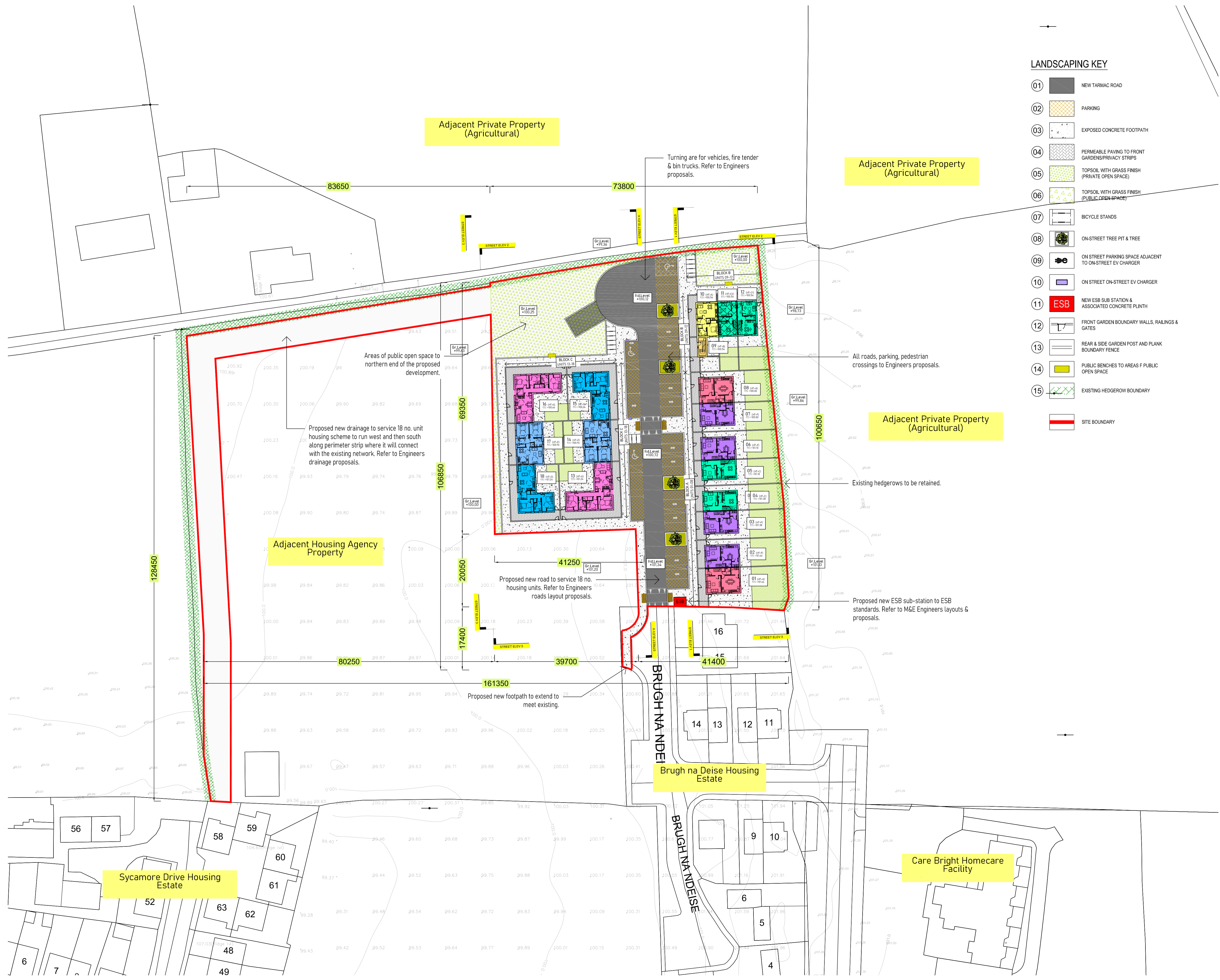
STAGE:
SECTION 179A

DRAWING TITLE:
PROPOSED SITE LAYOUT PLAN
1:500

DATE: 26th February 2024	DRAWING NO: 19101-002
SCALE: 1:500	
DRAWN: BR	
CHECKED: -	SHEET SIZE: REVISION: A1
JOB NO: 19101	
FILE NAME: -	

LANDSCAPING KEY

- 01 NEW TARMAC ROAD
- 02 PARKING
- 03 EXPOSED CONCRETE FOOTPATH
- 04 PERMEABLE PAVING TO FRONT GARDENS/PRIVACY STRIPS
- 05 TOPSOIL WITH GRASS FINISH (PRIVATE OPEN SPACE)
- 06 TOPSOIL WITH GRASS FINISH (PUBLIC OPEN SPACE)
- 07 BICYCLE STANDS
- 08 ON-STREET TREE PIT & TREE
- 09 ON STREET PARKING SPACE ADJACENT TO ON-STREET EV CHARGER
- 10 ON STREET ON-STREET EV CHARGER
- 11 NEW ESB SUB STATION & ASSOCIATED CONCRETE PLINTH
- 12 FRONT GARDEN BOUNDARY WALLS, RAILINGS & GATES
- 13 REAR & SIDE GARDEN POST AND PLANK BOUNDARY FENCE
- 14 PUBLIC BENCHES TO AREAS F PUBLIC OPEN SPACE
- 15 EXISTING HEDGEROW BOUNDARY
- SITE BOUNDARY



2.2.2 Wastewater and Surface Water

Wastewater and Foul Water Drainage

According to the Engineering Services Report: ‘*Irish Water drainage records do not indicate any public foul sewer in the proximity to the subject site. However, a topographical survey was carried out in and around the development site. The survey results indicate that there is an existing 225mm foul sewer to the south on the development site.*

The proposed development comprises of 18no. residential dwellings. The Irish Water Code of Practice for Wastewater Infrastructure specifies an average foul effluent flow rate of 165 litres per person per day for domestic dwellings (150 litres per person per day, plus a 10% allowance for external infiltration) and an average occupancy of 2.7 persons per residential unit. The development’s maximum design population is therefore 49 people (49 pe), and the maximum average effluent flow (dry weather flow or DWF) to be generated by the proposed development may be calculated as:

$$DWF=49pe \times 165l/day/pe=8,085l/day=0.093l/s$$

The peak effluent flow (Design Flow) is calculated by applying a domestic peak factor (PFDOM) of 6;

$$Design\ Flow=DWF \times PFDOM =0.093l/s \times 6=0.561l/s$$

All foul effluent generated from the proposed development shall be collected in a separate foul pipe of 150mm diameter and flow under gravity to the existing 225mm foul sewer to the south-west of the development site. A wayleave of 3m either side shall be maintained along the proposed foul sewer until the final outfall into the existing foul sewer. The drainage network for the development shall be in accordance with Part H of the Building Regulations and to the requirements and specifications of Irish Water. A Pre-Connection Enquiry has been made to Irish Water in relation to the proposed development.’

Water Main

According to the Engineering Services Report: ‘*Irish Water drainage records indicate an existing 100mm uPVC potable watermain to the south of the development site.*

The proposed development comprises of 18no. residential dwellings. The Irish Water Code of Practice for Water Infrastructure specifies an average potable water demand of 150 litres per person per day for domestic dwellings, and an average occupancy of 2.7 persons per residential unit. The development’s maximum design population is therefore 49 people (49 pe), and the average potable water demand of the proposed development may be calculated as;

$$Avg.Demand=49pe \times 150l/day/pe=7,350l/day=0.085l/s$$

The peak potable water demand is calculated by applying a domestic peak factor (PFDOM) of 5, in accordance with the Irish Water Code of Practice for Water Infrastructure;

$$Peak\ Demand=Avg.Demand \times PFDOM =0.085l/s \times 5=0.425l/s$$

It is proposed to provide a new watermain for the development. It is proposed to take the supply of the existing 100mm uPVC watermain that runs along Brugh na Deise to the south of the development site. The watermain network for the development shall be in accordance with the Building Regulations and to the requirements and specifications of Irish Water. A Pre-Connection Enquiry has been submitted to Irish Water in relation to the subject development.’

Surface Water and Site Drainage

According to the Engineering Services Report: ‘*Irish Water Drainage Records do not indicate any public storm water sewers in the vicinity of the development site. However, a topographical survey was*

carried out in and around the development site. The survey indicates that there is an existing 300mm storm sewer to the south on the development site.

The storm water drainage for the proposed development shall be managed in two phases. The first phase is to restrict storm water runoff from the proposed development to greenfield runoff rates or 2.0l/sec, whichever is greater. The development is to retain storm water volumes predicted to be experienced during extreme rainfall events. This is defined as the volume of storm water generated during a 1-in-100-year storm event, increased by 20% for predicted climate change factors. These parameters allow the Q-Bar greenfield runoff rate to be calculated. The calculated Q-Bar rate was determined to be 2.51l/sec. Therefore, the allowable discharge rate off site for any given storm event will be limited to 2l/sec by way of using an approved flow control device. The proposed development is to retain storm water volumes predicted to be experienced during extreme rainfall events. This is defined as the volume of storm water generated during a 1-in-100-year storm event increased by 30% for predicted climate change factors. No additional storage has been provided to account for urban creep as it is not anticipated. It is proposed to provide an attenuation tank of volume 200m³ for the 1-in-100-year storm event. This attenuation tank shall be located beneath the open space to the north-west of the development site.

The proposed new storm water drainage arrangements shall be designed and carried out in accordance with:

- a) BS EN – 752:2008, Drains & Sewer Systems Outside Buildings.
- b) Part H, Building Drainage of The Building Regulation.

All the storm water collected in the attenuation tank shall be discharged into the existing 300mm storm sewer to the south-west of the development site by gravity via a flow control mechanism. The proposed discharge rate shall be 2.0l/s. Separate sewers and manholes for foul and storm water shall be maintained within the development site boundary. A wayleave of 3m shall be maintained along the proposed storm sewer until the final outfall into the existing storm sewer.

The second phase is to include Sustainable Drainage Systems (SuDS) within the proposed development, these proposed SuDS features are listed below;

- i) *Permeable Paving: Car parking spaces shall be constructed of permeable paving to allow for local infiltration.*
- ii) *Tree Pits: SuDS Tree pits shall be incorporated to increase biodiversity and amenity. Tree pits shall collect and attenuate water runoff and provide improvements to water quality.*
- iii) *The use of low water usage sanitary appliances to reduce the reliance on potable water supplies.*
- iv) *Attenuation storage with flow control, sized to contain a 1-in-100-year storm event and increased by 20% for predicted climate change effects, to limit discharge from the site during extreme rainfall events.'*

Flood Risk

According to the Site-Specific Flood Risk Assessment: 'Review of the Office of Public Works flood maps database, for the area does not indicate historical flooding at the site.

Recent modelling of the area as part of Limerick City and County Council's Strategic Flood Risk Assessment, indicates that the subject lands are deemed to be located outside of the 0.1% AEP fluvial floodplain, based on the currently available maps. Therefore, the risk of fluvial flooding is not deemed

to be significant. Therefore, the risk of fluvial flooding is not an issue, and no mitigation measures are required.

The sites elevated location indicates that the subject lands are not going to be affected by tidal flooding, the councils flood risk map does not indicate that the site is located in a tidal flood zone.

Pluvial flooding is flooding which has originated from overland flow resulting from high intensity rain fall. The historical flood mapping indicates a past flood event to the south (approx. 600m) of the development site. However, due to the topography of the surrounding area there shall be no potential effect on the proposed development lands. Therefore, the risk of pluvial flooding is not an issue, and no mitigation measures are required.

According to the Geological Survey of Ireland interactive maps, the subject site is underlain with Dark muddy limestone, shale (Ballysteen Formation). The groundwater vulnerability assessment of the site shows that the vulnerability of groundwater in the area is high. The proposed development and the general geology of the subject lands means that the potential risk from groundwater is deemed acceptable. Therefore, the risk of groundwater flooding is not an issue, and no mitigation measures are required.

The site is currently developed but does not have any attenuation systems in place. As such the proposed redevelopment of the site shall require attenuation to be provided. The attenuation tank shall be sized for a 1-in-100-year storm event (including 20% increase for climate change) and shall release the storm water in a controlled manner after the peak storm duration has passed. By restricting the flow, the likelihood of the proposed development adversely affecting the public drainage system or contributing to downstream flooding is mitigated. Therefore, the risk of off-site flooding is not an issue, and no mitigation measures are required.'

2.3 Description of the Baseline Ecological Environment

2.3.1 Survey Methodology

Assessing the impacts of any project and associated activities requires an understanding of the ecological baseline conditions prior to and at the time of the project proceeding. Ecological Baseline conditions are those existing in the absence of proposed activities (CIEEM, 2022).

A multidisciplinary ecological walkover survey of the entire site was conducted on the 6th of May 2022 in line with NRA (2009) guidelines. The habitat classifications and codes correspond to those described in 'A Guide to Habitats in Ireland' (Fossitt, 2000). All habitats within and adjacent to the works area were readily identifiable during the site visit. During the survey, the site was also searched for species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations (S.I. 477 of 2011).

2.3.2 Survey Findings

2.3.2.1 Habitats

The main Fossitt habitat types recorded within the boundary of the proposed development are **Improved agricultural grassland (GA1)** and **Hedgerows (WL1)**, which bordered the site on the north and east sides.

Improved agricultural grassland (GA1) comprises the majority of the lands within the site boundary, being present from the northern to southern boundary and from the western to the eastern boundary

(Plate 2-1). These areas were dominated by perennial rye grass (*Lolium perenne*) with other species such as white clover (*Trifolium repens*), meadow buttercup (*Ranunculus acris*), creeping buttercup (*Ranunculus repens*), ribwort plantain (*Plantago lanceolata*), broad-leaved dock (*Rumex obtusifolius*), dandelion (*Taraxacum vulgaria*), common chickweed (*Stellaria media*) and Sweet Vernal-grass (*Anthoxanthum odoratum*), all common and widespread throughout the site.

Hedgerows (WL1) were present along habitat margins to the north and east of the site. The dominant species present in hedgerow habitats was hawthorn (*Crataegus monogyna*). Within and adjacent to hedgerows were species such as Thistles (*Cirsium spp*), nettles (*Urtica dioica*), silverweed (*Potentilla anserina*), vetch spp (*Vicia spp*), cleavers (*Galium aparine*), hogweed (*Heracleum sphondylium*), cow parsley (*Anthriscus sylvestris*), hedge mustard (*Sisymbrium officinale*) and thyme leaved speedwell (*Veronica serpyllifolia*), see Plate 2-2 below.

No watercourses or invasive species were identified within or adjacent to the surveyed area. No species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were recorded during the survey. No habitats listed under Annex I of the EU Habitats Directive were identified within the boundary of the proposed development. There are no watercourses within the proposed development site, therefore the site does not offer suitable supporting habitat for otter. No evidence of Annex I or Special Conservation Interest (SCI) bird species associated with any SPA was recorded within the site boundaries.



Plate 2-1 Example of **Improved agricultural grassland (GAI)** found within the Proposed Development Site



Plate 2-2 Example of *Hedgerow (WLI)* found onsite

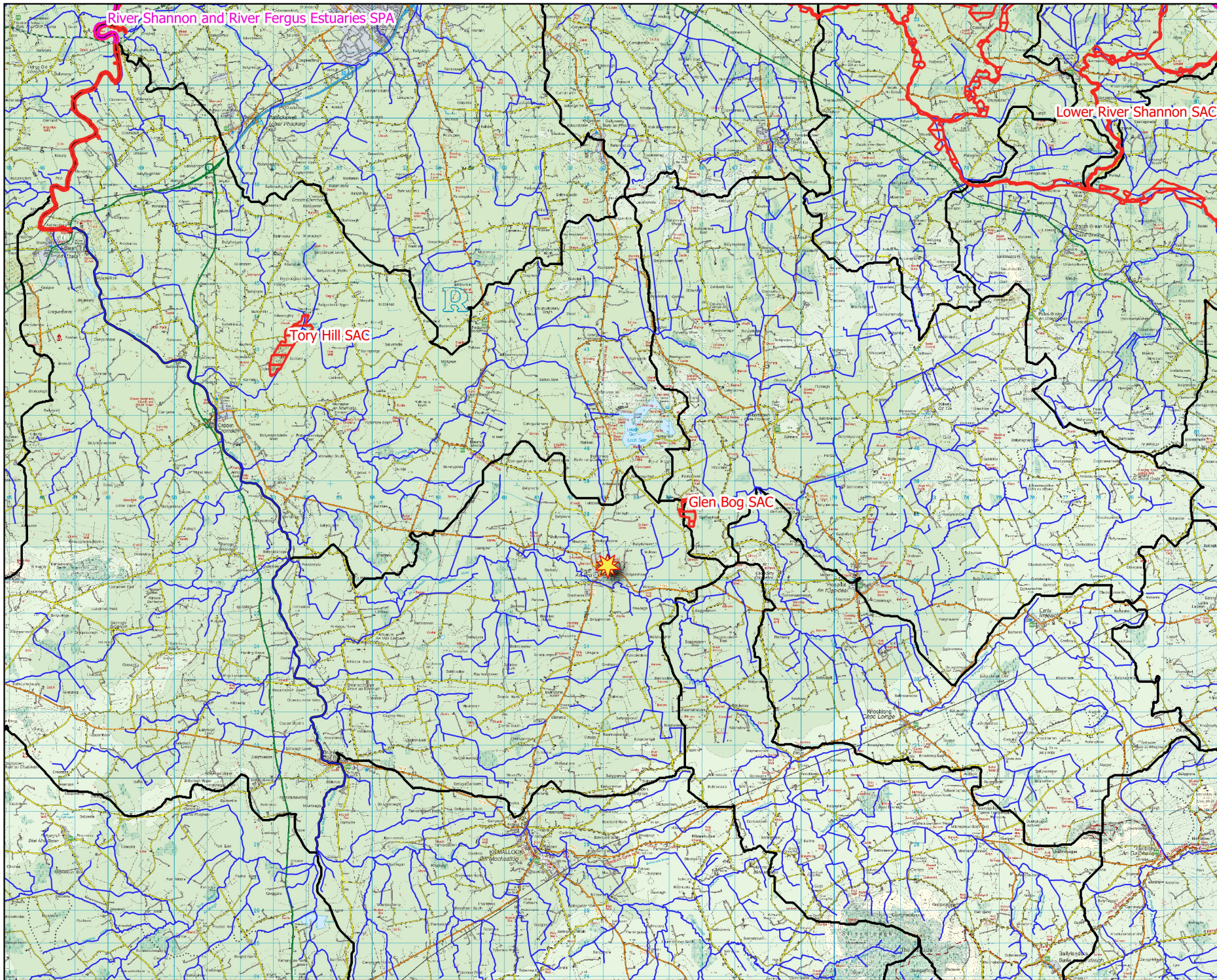
3. IDENTIFICATION OF RELEVANT EUROPEAN SITES

3.1 Identification of the European Sites within the Likely Zone of Impact







The following methodology was used to establish which European Sites are within the Likely Zone of Impact of the proposed development:

- Initially the most up to date GIS spatial datasets for European designated sites and water catchments were downloaded from the NPWS website (www.npws.ie) and the EPA website (www.epa.ie) on the 10/07/2023. The datasets were utilized to identify European Sites which could feasibly be affected by the proposed development.
- All European Sites that could potentially be affected were identified using a source-pathway - receptor model. To provide context for the assessment, European Sites within the locality of the proposed development site are shown on Figure 3.1. Information on these sites according to their site-specific conservation objectives is provided in Table 3-1². Sites that were further away from the proposed development were also considered; no complete source-pathway-receptor chain for significant effect was identified for any European Site.
- EPA catchment mapping was used to establish or discount potential hydrological connectivity between the site of the proposed development and any European Sites. The Water Framework Directive hydrological sub-catchments are also shown in Figure 3.1.
- In relation to Special Protection Areas, in the absence of any specific European or Irish guidance in relation to such sites, the Scottish Natural Heritage (SNH) Guidance, ‘Assessing Connectivity with Special Protection Areas (SPA)’ (2016) was consulted. This document provides guidance in relation to the identification of connectivity between proposed development and Special Protection Areas. The guidance takes into consideration the distances species may travel beyond the boundary of their SPAs and provides information on dispersal and foraging ranges of bird species which are frequently encountered when considering plans and projects.
- Table 3.1, provides details of all relevant European Sites as identified in the preceding steps and assesses which are within the likely Zone of Impact. The assessment considers any likely direct or indirect impacts of the proposed development, both alone and in combination with other plans and projects, on European Sites by virtue of the following criteria: size and scale, land-take, distance from the European Site or key features of the site, resource requirements, emissions, excavation requirements, transportation requirements and duration of construction, operation and decommissioning were considered in this screening assessment.
- The site synopses and conservation objectives of these sites, as per the NPWS website (www.npws.ie), were consulted and reviewed at the time of preparing this report 10/07/2023.
- The potential for the proposed development to result in cumulative impacts on any European Sites in combination with other plans and projects was considered in the assessment that is presented in Section 4.

² Office of the Planning Regulator (2021) guidance; ‘OPR Practice Note PN01 Appropriate Assessment Screening for Development Management’, utilises the Source-Pathway-Receptor model. This Appropriate Assessment Screening Report follows this guidance as well as providing information on European sites located within 15km of the proposed development as recommended in guidance provided by DEHLG (2010).



Map Legend

-  Site Location
-  Special Area of Conservation (SAC)
-  Special Protection Area (SPA)
-  Hydrological Catchments (WFD)
-  Hydrological SubCatchments (WFD)
-  River Waterbodies (WFD)



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Drawing Title
EU Designated Sites within Zone of Likely Influence

Project Title
Proposed Development at Bruff, Co. Limerick

Drawn By	Checked By
C.B	P.E
Project No. 123456	Drawing No. Figure 3.1
Scale 1:150000	Date 05.05.22

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 email: info@mkofireland.ie
 Website: www.mkofireland.ie

Table 3.1 Identification of Designated sites within the Likely Zone of Impact

European Sites and distance from proposed development	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 10/07/2023	Conservation Objectives	Identification of Source-Pathway-Receptor chain and Likely Zone of Impact Determination
Special Areas of Conservation (SAC)			
Glen Bog SAC [001430] Distance: 2.6km	<ul style="list-style-type: none"> ➤ [91E0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) 	Detailed conservation objectives for this site, (Version 1, November 2017 ³), were reviewed as part of the assessment and are available at: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO001430.pdf	<p>There will be no direct effects as the proposed development site is located entirely outside the designated site.</p> <p>No surface water connectivity is present between the site of the proposed development and the SAC; the SAC is located upstream of the proposed development site and at the site of a former lake, all water flow of nearby watercourses is away from the SAC. The proposed development and SAC are located within the same groundwater catchment (Hospital), however given the nature and scale of the proposed works, further by the fact that the groundwater flow within the groundwater body is in the direction of the Rivers Maigne, Morningstar, Camoge and Mahore and the topography sloping westerly away from the SAC, there is no potential for impact on the SAC. Therefore, no potential pathway for significant effects on the QI habitat of the SAC via hydrological pathways.</p>

³ NPWS (2017) Conservation Objectives: Glen Bog SAC 001430. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

European Sites and distance from proposed development	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 10/07/2023	Conservation Objectives	Identification of Source-Pathway-Receptor chain and Likely Zone of Impact Determination
			<p>No other potential pathway for significant effect on this SAC exists.</p> <p>No complete Source-Pathway-Receptor chain has been identified when considered in the absence of any mitigation, individually or cumulatively with other plans or projects, and this SAC is <i>outside</i> the Likely Zone of Impact. No further assessment is required.</p>
<p>Tory Hill SAC [000439]</p> <p>Distance: 11.3km</p>	<ul style="list-style-type: none"> ➤ [6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (*important orchid sites) ➤ [7210] Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i>. ➤ [7230] Alkaline fens 	<p>Detailed conservation objectives for this site, (Version 1, August 2018⁴), were reviewed as part of the assessment and are available at:</p> <p>https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000439.pdf</p>	<p>There will be no direct impact on the SAC as it is located entirely outside of the footprint of the proposed development site.</p> <p>Due to the intervening distance, the nature and the scale of the proposed development, there is no pathway for connectivity and no potential for indirect effects on the terrestrial habitats for which the SAC has been designated.</p> <p>The proposed development site is located within a separate hydrological sub-catchment and groundwater body to the SAC and no hydrological connectivity to the SAC has been identified; there can therefore be no effect on ground or surface water within the locality of the SAC.</p>

⁴ NPWS (2018) Conservation Objectives: Tory Hill SAC 000439. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

European Sites and distance from proposed development	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 10/07/2023	Conservation Objectives	Identification of Source-Pathway-Receptor chain and Likely Zone of Impact Determination
			<p>No pathway for indirect effects on the aquatic influenced fen habitats of the SAC exist.</p> <p>No complete Source-Pathway-Receptor chain has been identified when considered in the absence of any mitigation, individually or cumulatively with other plans or projects, and this SAC is <i>outside</i> the Likely Zone of Impact. No further assessment is required.</p>
<p>Lower River Shannon SAC [002165]</p> <p>Distance: 19.1km</p>	<p>Species</p> <ul style="list-style-type: none"> ➤ [1029] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) ➤ [1095] <i>Petromyzon marinus</i> (Sea Lamprey) ➤ [1096] <i>Lampetra planeri</i> (Brook Lamprey) ➤ [1099] <i>Lampetra fluviatilis</i> (River Lamprey) ➤ [1106] <i>Salmo salar</i> (Salmon) ➤ [1349] <i>Tursiops truncatus</i> (Common Bottlenose Dolphin) ➤ [1355] <i>Lutra lutra</i> (Otter) 	<p>Detailed conservation objectives for this site, (Version 1, August 2012⁵), were reviewed as part of the assessment and are available at:</p> <p>www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002165.pdf</p>	<p>There will be no direct impact on the SAC as it is located entirely outside of the footprint of the proposed development site.</p> <p>The proposed development site is located within a separate groundwater body to the SAC. The proposed development site is within 200m of the Bruff (IE_SH_24M020600) watercourse to the north, and within 550m of the Morningstar River (IE_SH_24M020600) to the south, of which the Bruff watercourse is a tributary. The Morningstar River ultimately flows to the SAC. The hydrological distance to the SAC from the nearest watercourse to the site is over 31km. Given the distance between the site and the SAC, together with the nature and scale of the proposed works, the SAC is judged to be outside of the likely zone of impact of the proposed works,</p>

⁵ NPWS (2012) Conservation Objectives: Lower River Shannon SAC 002165. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht

European Sites and distance from proposed development	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 10/07/2023	Conservation Objectives	Identification of Source-Pathway-Receptor chain and Likely Zone of Impact Determination
	<p><u>Habitats</u></p> <ul style="list-style-type: none"> ➤ [1110] Sandbanks which are slightly covered by sea water all the time ➤ [1130] Estuaries ➤ [1140] Mudflats and sandflats not covered by seawater at low tide ➤ [1150] Coastal lagoons ➤ [1160] Large shallow inlets and bays ➤ [1170] Reefs ➤ [1220] Perennial vegetation of stony banks ➤ [1230] Vegetated sea cliffs of the Atlantic and Baltic coasts ➤ [1310] <i>Salicornia</i> and other annuals colonising mud and sand ➤ [1330] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) ➤ [1410] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) 		<p>and no pathway for indirect effects on the aquatic dependant habitats of the SAC therefore exists.</p> <p>There are no watercourses within or adjacent to the site and no suitable habitat for QI species of the SAC; therefore, there is no pathway for potential habitat loss or disturbance related effects on any QI species of the SAC.</p> <p>No complete Source-Pathway-Receptor chain has been identified when considered in the absence of any mitigation, individually or cumulatively with other plans or projects, and this SAC is <i>outside</i> the Likely Zone of Impact. No further assessment is required.</p>

European Sites and distance from proposed development	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 10/07/2023	Conservation Objectives	Identification of Source-Pathway-Receptor chain and Likely Zone of Impact Determination
	<ul style="list-style-type: none"> ➤ [3260] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation ➤ [6410] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) ➤ [91E0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, <i>Alnion incanae</i>, <i>Salicion albae</i>) 		
Special Protection Area (SPA)			
River Shannon and River Fergus Estuaries SPA [004077] Distance: 21.7km	Species <ul style="list-style-type: none"> ➤ [A017] Cormorant (<i>Phalacrocorax carbo</i>) ➤ [A038] Whooper Swan (<i>Cygnus cygnus</i>) 	Detailed conservation objectives for this site, (Version 1, September 2012 ⁶), were reviewed as part of the assessment and are available at: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004077.pdf	There will be no direct impacts on the SPA, as it is located entirely outside of the footprint of the proposed development. The site did not provide optimal habitat for any SCI bird species and no SCI species were recorded utilising the site

⁶ NPWS (2012) Conservation Objectives: River Shannon and River Fergus Estuaries SPA 004077. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

European Sites and distance from proposed development	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 10/07/2023	Conservation Objectives	Identification of Source-Pathway-Receptor chain and Likely Zone of Impact Determination
	<ul style="list-style-type: none"> ➤ [A046] Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) ➤ [A048] Shelduck (<i>Tadorna tadorna</i>) ➤ [A050] Wigeon (<i>Anas penelope</i>) ➤ [A052] Teal (<i>Anas crecca</i>) ➤ [A054] Pintail (<i>Anas acuta</i>) ➤ [A056] Shoveler (<i>Anas clypeata</i>) ➤ [A062] Scaup (<i>Aythya marila</i>) ➤ [A137] Ringed Plover (<i>Charadrius hiaticula</i>) ➤ [A140] Golden Plover (<i>Pluvialis apricaria</i>) ➤ [A141] Grey Plover (<i>Pluvialis squatarola</i>) ➤ [A142] Lapwing (<i>Vanellus vanellus</i>) 		<p>during the site survey carried out. The proposed development site is outside of the maximum core ranges for all species (breeding and wintering)⁷ (SNH, 2016). There is judged to be no potential for in situ or ex situ disturbance of SCI species, or for any loss of supporting habitat for SCI species.</p> <p>The proposed development site is located within a separate groundwater body as the SPA and is located within 200m of the Bruff (IE_SH_24M020600) watercourse to the north, and the Morningstar River (IE_SH_24M020600) to the south, of which the Bruff watercourse is a tributary. The Morningstar River ultimately flows to the SPA. The hydrological distance to the SPA from the nearest watercourse to the site is over 40km. Given the distance between the site and the SPA, together with the nature and scale of the proposed works, the SPA is outside of the likely zone of impact of the proposed works, and no pathway for indirect effects on the supporting wetland habitat of the SPA exists.</p> <p>No complete Source-Pathway-Receptor chain has been identified when considered in the absence of any mitigation, individually or cumulatively with other plans or</p>

⁷ Note that where no core foraging distances are available, a maximum distance of 20 km has been assumed as a precaution as explained earlier in Section 3.1. This applies here to wintering Eurasian wigeon and black-headed gull.

European Sites and distance from proposed development	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 10/07/2023	Conservation Objectives	Identification of Source-Pathway-Receptor chain and Likely Zone of Impact Determination
	<ul style="list-style-type: none"> > [A143] Knot (<i>Calidris canutus</i>) > [A149] Dunlin (<i>Calidris alpina</i>) > [A156] Black-tailed Godwit (<i>Limosa limosa</i>) > [A157] Bar-tailed Godwit (<i>Limosa lapponica</i>) > [A160] Curlew (<i>Numenius arquata</i>) > [A162] Redshank (<i>Tringa totanus</i>) > [A164] Greenshank (<i>Tringa nebularia</i>) > [A179] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) <p><u>Habitats</u></p> <ul style="list-style-type: none"> > [A999] Wetland and Waterbirds 		<p>projects, and this SAC is <i>outside</i> the Likely Zone of Impact. No further assessment is required.</p>

4. IN COMBINATION EFFECTS

4.1 Likely Cumulative Impact of the Proposed Works on European Sites, in-combination with other plans and projects

A search and review in relation to plans and projects that may have the potential to result in cumulative and/or in-combination effects on European Sites was conducted. The assessment focuses on the potential for cumulative in-combination effects on European Sites and included a review of online Planning Registers, development plans and other available information and served to identify past and future plans and projects, their activities and their predicted environmental effects.

4.1.1 Review of Plans

The following development plans have been reviewed and taken into consideration as part of this assessment:

- Limerick County Development Plan 2022 – 2028
- Regional Spatial and Economic Strategy for the Southern Region (RSES) (2020-2032)
- National Biodiversity Action Plan 2017-2021
- Draft 4th National Biodiversity Action Plan 2023-2027

Table 4-1: Review of development plans

Plans	Key Policies/Issues/Objectives Directly Related to European Sites in the Zone of Influence	Assessment of Potential Impact on European Sites
<p>Limerick Development Plan 2022 - 2028</p>	<p>Policy EH P1 Protection of Natural Heritage and Biodiversity It is a policy of the Council to: a) Protect and conserve Limerick’s natural heritage and biodiversity, in particular, areas designated as part of the European Sites Natura 2000 network, such as Special Protection Areas (SPAs) and Special Areas of Conservations (SACs), in accordance with relevant EU Directives and national legislation and guidelines.</p> <p>b) Maintain the conservation value of all-Natural Heritage Areas and proposed Natural Heritage Areas (pNHAs) for the benefit of existing and future generations.</p> <p>Policy EH P2 Sustainable Management and Conservation It is a policy of the Council to ensure the sustainable management and conservation of areas of natural environmental and geological value within Limerick and to protect, enhance, create and connect, where ecologically suitable, natural heritage, green spaces and high-quality amenity areas for the benefit of biodiversity.</p> <p>Objective EH O1 Designated Sites and Habitats Directive It is an objective of the Council to ensure that projects/plans likely to have significant effects on European Sites (either individually or in combination with other plans or projects) are subject to an appropriate assessment and will not be permitted under the Draft Plan unless they comply with Article 6 of the Habitats Directive. The Council, will through the planning enforcement process where applicable, seek to restore the ecological functions of designated sites, where they have been damaged through inappropriate development.</p> <p>Objective EH O3 Ecological Impact Assessment It is an objective of the Council to require all developments where there are species of conservation concern, to submit an ecological assessment of the effects of the development on the site and nearby designated sites, suggesting appropriate mitigation measures and establishing, in particular, the presence or absence of the following species: Otter, badger, bats, lamprey and protected plant species such as the Triangular Club Rush, Opposite Leaved Pond Weed and Flora Protection Order Species generally.</p>	<p>The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the Natura 2000 network and other natural heritage interests.</p> <p>No potential for cumulative impacts when considered in conjunction with the current proposal were identified in relation to any European Sites, which have been screened out in Table 3.1 of this screening report.</p>

Plans	Key Policies/Issues/Objectives Directly Related to European Sites in the Zone of Influence	Assessment of Potential Impact on European Sites
<p>Regional Spatial and Economic Strategy for the Southern Region (RSES) (2020-2032)</p>	<p>RPO 1 Environmental Assessment b. The RSES seeks to protect, manage, and through enhanced ecological connectivity, improve the coherence of the Natura 2000 Network in the Southern Region.</p> <p>RPO5 Population Growth and Environmental Criteria Increased population growth should be planned with regard to environmental criteria, including: • Proximity of Natura 2000 sites and potential for adverse effects on these sites, and their conservation objectives;</p> <p>RPO 11 Key Towns k. To plan increasing population growth in all Key Towns on a phased basis in collaboration with Irish Water, the local authority and other stakeholders to ensure that the assimilative capacity of the receiving environment is not exceeded and that increased wastewater discharges from population growth does not contribute to degradation of water quality and avoids adverse impacts on the integrity of water dependent habitats and species within the Natura 2000 network;</p> <p>l. To give due consideration to the suitability of new and/or existing drinking water sources (e.g. hydro morphological pressures) to meet the increased demands on the water supply and prevent adverse impacts on the integrity of water dependent habitats and species within the Natura 2000 network. The National Water Resources Plan (NWRP) will outline how we move towards a sustainable, secure and reliable public drinking water supply over the next 25 years, whilst safeguarding our environment.</p> <p>RPO 117 Flood Risk Management and Biodiversity It is an objective to avail of opportunities to enhance biodiversity and amenity and to ensure the protection of environmentally sensitive sites and habitats, including where flood risk management measures are planned. Plans and projects that have the potential to negatively impact f sites are subject to the requirements of the Habitats Directive.</p> <p>RPO 124</p>	<p>The RSES was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the Natura 2000 network and other natural heritage interests.</p> <p>No potential for cumulative impacts when considered in conjunction with the current proposal were identified in relation to any European Sites, which have been screened out in Table 3.1 of this AA Screening Report.</p>

Plans	Key Policies/Issues/Objectives Directly Related to European Sites in the Zone of Influence	Assessment of Potential Impact on European Sites
	<p>Green Infrastructure a. It is an objective to promote the concept of connecting corridors for the movement of wildlife and encourage the retention and creation of features of biodiversity value, ecological corridors and networks that connect areas of high conservation value such as woodlands, hedgerows, earth banks, watercourses and wetlands. The RSES recognises the necessity of protecting such corridors and the necessity to encourage the management of features of the landscape that support the Natura 2000 network;</p> <p>RPO 126 Biodiversity c. Local Authorities are required to carry out required screening of proposed projects and any draft land-use plan or amendment/ variation to any such plan for any potential ecological impact on areas designated or proposed for inclusion as Natura 2000/ European Sites and shall decide if an Appropriate Assessment is necessary, of the potential impacts of the project or plan on the conservation objectives of any Natura 2000/European Site;</p> <p>RPO 151 Integration of Land Use and Transport j. The protection of the Natura 2000 networks and the ecological linkages connected to the Natura 2000 network.</p> <p>RPO208 Irish Water and Water Supply c. Deliver and phase services, subject to the required appraisal, planning and environmental assessment processes and avoid adverse impacts on the integrity of the Natura 2000 network;</p> <p>d. Local Authority Core Strategies shall demonstrate compliance with DHPLG Water Services Guidelines for Planning Authorities and demonstrate phased infrastructure led growth to meet demands on the water supply, suitability of new and/or existing drinking water sources (for example hydro morphological pressures) and prevent adverse impacts on the integrity of water dependent habitats and species within the Natura 2000 network.</p> <p>RPO 212</p>	

Plans	Key Policies/Issues/Objectives Directly Related to European Sites in the Zone of Influence	Assessment of Potential Impact on European Sites
	<p>Strategic Wastewater Treatment Facilities</p> <p>b. For the management of wastewater, increasing population growth should be planned on a phased basis in collaboration with Irish Water and the local authorities to ensure that the assimilative capacity of the receiving environment is not exceeded and that increased wastewater discharges from population growth does not contribute to degradation of water quality and to avoid adverse impacts on the integrity of the Natura 2000 network.</p> <p>Limerick-Shannon MASP Policy Objective 1 Limerick-Shannon Metropolitan Area</p> <p>e. The MASP seeks to protect, manage and through enhanced ecological connectivity, to improve the coherence of the Natura 2000 Network in the Region.</p>	
<p>National Biodiversity Action Plan 2017-2021</p>	<p>Target 6.2: Sufficiency, coherence, connectivity, and resilience of the protected areas network substantially enhanced by 2020.</p>	<p>The BAP was comprehensively reviewed, with particular reference to targets that relate to the Natura 2000 network and other natural heritage interests.</p> <p>No potential for cumulative impacts that could affect the sufficiency, coherence, connectivity, and resilience of the protected areas network was identified when considered in conjunction with the current proposal were identified in relation to any European Sites, which have been screened out in Table 3.1 of this screening report.</p>

Plans	Key Policies/Issues/Objectives Directly Related to European Sites in the Zone of Influence	Assessment of Potential Impact on European Sites
<p>Draft 4th National Biodiversity Action Plan 2023-2027</p>	<p>Objective 2 - Meet Urgent Conservation and Restoration Needs</p> <p>Outcome 2A: The protection of existing designated areas and species is strengthened and conservation and restoration within the existing protected area network are enhanced 29</p> <p>Outcome 2B: Biodiversity and ecosystem services in the wider countryside are conserved 32 18 27 Navigation</p> <p>Outcome 2C: All freshwater bodies are of at least ‘Good Ecological Status’ as defined under the EU Water Framework Directive 36</p> <p>Outcome 2D: Genetic diversity of wild and domesticated species is safeguarded 39</p> <p>Outcome 2E: A National Restoration Plan is in place to meet EU Biodiversity Strategy 2030 nature restoration targets 41</p> <p>Outcome 2F: Biodiversity and ecosystem services in the marine environment are conserved and restored 42</p> <p>Outcome 2G: Invasive alien species (IAS) are controlled and managed on an all-island basis to reduce the harmful impact they have on biodiversity and measures are undertaken to tackle the introduction and spread of new IAS to the environment</p>	<p>There will be no significant effects on designated sites or biodiversity as a result of the Proposed retention.</p> <p>The proposed development will not impact on connectivity within the wider area and will maintain watercourses within and adjacent to the development site in good condition.</p>

The review focused on policies and objectives that relate to European Sites. None of the objectives reviewed had the potential to result in cumulative adverse effects on any European Site.

4.1.2 Identification of other projects

The National Planning Application Map Viewer was consulted on 10/07/2023. Projects identified in the 1km radius of the proposed development from the last 5 years are:

- Permission for the filling and levelling an existing quarry with subsoil and topsoil from adjacent site with temporary access entrance and all associated site works at Ardykeohane, Bruff, Co. Limerick. (Planning Application Reference: 19612)
- Permission for the erection of 6 no. 6m lighting columns, 2m high protective netting along the boundary and a synthetic surface to hurling wall area at Bruff. (Planning Application Reference: 13353)
- Permission for the construction of 2 no. dwellings in semi-detached format, hard & soft landscaping, connections to site services and all associated site works at Crawfords Street, Bruff, Co. Limerick. (Planning Application Reference: 201043)
- Permission for the construction of an entrance, dwelling house, connection to main services and all associated site works at Crawford Street, Bruff. (Planning Application Reference: 17900)
- Permission for the construction of a staff canteen building, connect to existing services and all ancillary site works to the rear at Main Street, Bruff, Co. Limerick. (Planning Application Reference: 20586)
- Permission for the construction of a dwelling house, garage, entrance, connection to public sewer and all associated site works at Chapel Lane, Bruff, Limerick. (Planning Application Reference: 211161)
- Permission for the construction of a dwelling house, garage, entrance, connection to public sewer and all associated site works at Chapel Lane, Bruff, Limerick. (Planning Application Reference: 21600)
- Permission for the alterations to existing house and to construct a two-storey extension to house at Ingelnook East, Bruff, Co. Limerick. (Planning Application Reference: 18669)
- Permission for the demolition of existing former dwelling house, construction of a new two storey dwelling house, detached domestic garage, wastewater treatment system, percolation area, new site entrance & associated boundary wall and all ancillary site works at Brackvoan , Athlacca Road , Bruff Co. Limerick. (Planning Application Reference: 20736)
- the erection of dwelling entrance, bored well, waste water treatment system, private domestic storage shed, and all associated site works at Bruff, Co. Limerick. (Planning Application Reference: 211326)
- Permission for the construction of a maintenance shed on the church grounds to include all ancillary site works at Bruff, Co. Limerick. (Planning Application Reference: 18512)
- Permission for the construction of 2 no. dwelling houses consisting of single-storey dwelling adjoining a two-storey dormer style dwelling house, connection to public services, entrances and all ancillary site works at Ballycampion , Bruff , Kilmallock Co. Limerick. (Planning Application Reference: 191255)
- Permission for replacing an existing corrugated steel roof with natural slate to match the remainder of the existing premises and Retention Permission of existing shop signage as constructed. This building is a Protected Structure Ref. No. 995 at Main Street, Bruff, Co. Limerick. (Planning Application Reference: 191014).
- Permission for 9 no. services sites and for permission to construct an entrance, access road, connections to public sewers and all associated site works (Planning ref 18100)
Extension of Permission for Planning File Ref. no. 12/786: the demolition of existing dwelling house and the construction of a single storey replacement dwelling house, upgrade existing entrance, connect to public sewer and all associated site works (Planning ref 187006)
- Permission for the construction of a vehicular entrance, dwelling house, garage domestic wastewater treatment system with polishing filter together with all associated site works (Planning 22107)

- Permission for the construction of an extension to their dwelling house and all associated site works (Planning ref 20629)
- Permission for the construction of two storey and single storey extensions to the side and rear of dwelling, alterations and reconstruction of parts of existing dwelling including removal of rear chimney and all associated site works (Planning ref 201210)
- Permission for the construction of 2 no. dwellings in semi-detached format, hard & soft landscaping, connections to site services and all associated site works (Planning ref 201043)
- Permission for the replacement single storey dwelling to include demolition of existing cottage, upgrade of existing vehicular entrance, the continued use of existing sewerage connection and associated development works (Planning ref 19440)
- Retention permission for the signage to front façade of shopfront, side wall, glass manifestations to windows and green cross pharmacy sign fitted to existing totem sign at the premises (Planning ref 18329)
- Permission for the replacement dormer style dwelling to include demolition of existing dwelling, upgrade of existing vehicular entrance, installation of wastewater treatment system and associated development works (Planning ref 19241)
- Extension of duration for 15/458 for a slatted agricultural livestock unit and all associated site works (Planning ref 217010)
- Permission for the construction of a replacement dwelling house, domestic garage, entrance, wastewater treatment system and percolation area, and change of use of existing derelict farmhouse from dwelling house to agricultural unit and all associated site works (Planning ref 211182)
- Retention permission for alterations to the existing boundary arrangement, including both the field gate to the north, the vehicular entrance to the south and central pedestrian gate. Retention permission is also sought for the enlargement of the front porch (Planning ref 2360157)
- Permission for the carry out of development comprising the installation of a prefabricated building to carry out pre-school & after-school childcare services. The development will include all necessary site/construction works and boundaries, connection to existing piped & cable services, revisions to existing car parking layout and all associated site works (Planning ref 2360147)

4.1.3 Conclusion of in-combination/ cumulative assessment

The Screening Assessment (See Section 3.1) concluded that no pathway or mechanism for the proposed development to result in any significant effect on any European Site was identified when considered on its own during the assessment process and therefore there is no potential for it to contribute to any such effects when considered in-combination with any other development.

In addition, the potential for the developments listed above to act cumulatively with the proposed development in relation to all other European Sites described and subsequently screened out within Section 3.1 has been considered. No pathways for significant effect on any of these other European Sites have been identified in combination with the proposed development. No additional potential pathways for effect on European Sites have been identified as a potential result of those plans or projects in combination with the proposed development.

5. ARTICLE 6(3) APPROPRIATE ASSESSMENT SCREENING STATEMENT AND CONCLUSIONS

The findings of this Screening Assessment are presented following the European Commission's Assessment of Plans and Projects Significantly affecting Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC (EC, 2021) and Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2018) as well as the Department of the Environment's Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DoEHLG, 2010).

5.1 Data Collected to Carry Out Assessment

In preparation of the report, the following sources were used to gather information:

- Review of NPWS Site Synopses, Conservation Objectives for the European Sites
- Review of 2019, 2013 and 2007 EU Habitats Directive (Article 17) Reports.
- Review of online web-mappers: National Parks and Wildlife Service (NPWS), EPA, Water Framework Directive (WFD), Geological Survey of Ireland (GSI).
- Review of OS maps and aerial photographs of the site of the proposed project.
- Review of relevant databases including National Biodiversity Ireland Database and available literature of previous surveys conducted in the area.
- Review of other plans and projects within the area.
- Site visit undertaken by Cathal Bergin (BSc. Wildlife Biology) on the 6th of May 2022.

5.2 Concluding Statement

It can be concluded beyond reasonable scientific doubt, in view of best scientific knowledge, on the basis of objective information and in light of the conservation objectives of the relevant European sites, that the proposed development, both individually and in combination with other plans and projects, will not have a significant effect on any European Site. There is therefore no requirement to proceed to Stage 2 of the Appropriate Assessment process.

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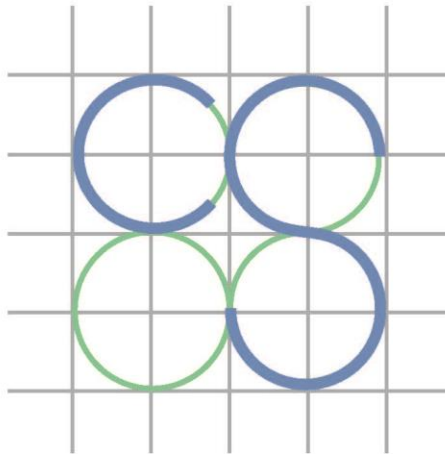
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APPENDIX 1

ENGINEERING SERVICES REPORT



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Engineering Services Report

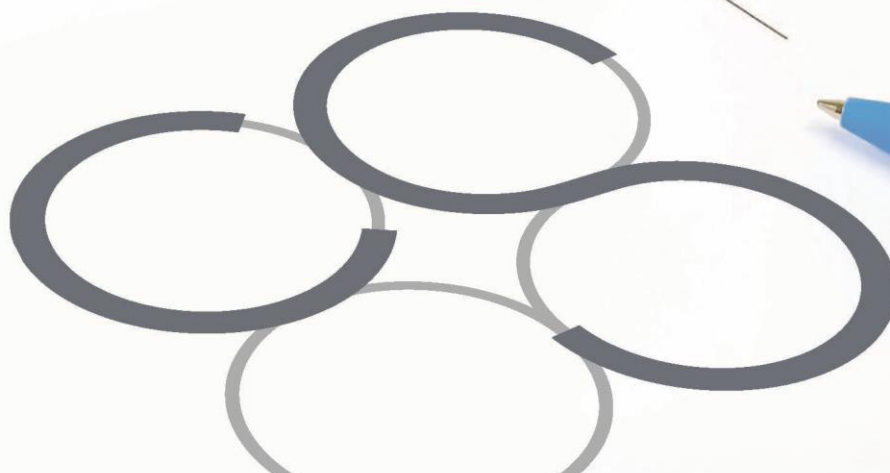
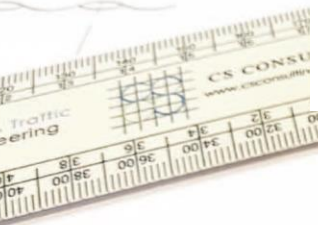
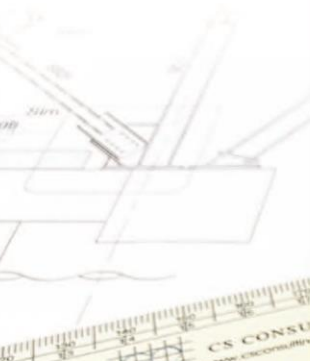
Proposed Residential Development

Bruff, Co. Limerick

Client: Limerick City and County Council

Job No. L105L

February 2024



ENGINEERING SERVICES REPORT

PROPOSED RESIDENTIAL DEVELOPMENT, BRUFF, CO. LIMERICK

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Appendix A: Attenuation Calculations

Appendix B: Irish Water Confirmation of Feasibility

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File Location: Job-L105L\L105L LCCC Bruff Housing\B_DOCUMENTS\1.0 Planning\ESR

BS 1192 FIELD **BRUF-CSC-ZZ-XX-RP-C-0001-P2**

Job Ref.	Author	Reviewed By	Authorised By	Issue Date	Rev. No.
L105L	AC	FB	NB	20.02.2024	P2
L105L	FB	NB	NB	10.05.2023	P1
L105L	LJ	FB	NB	24.03.2023	P0

1.0 INTRODUCTION

Cronin & Sutton Consulting Engineers (CS Consulting) have been commissioned by Limerick City and County Council to prepare an Engineering Services Report for a proposed residential development at Bruff, Co. Limerick.

This report details the following aspects of the proposed development:

- Stormwater Drainage Infrastructure
- Foul Drainage Infrastructure
- Potable Water Infrastructure
- Development Access
- Internal Road Layout
- Car Parking and Bicycle parking Provisions

In preparing this report, CS Consulting has made reference to the following:

- Limerick City and County Development Plan 2022-2028;
- Irish Water Drainage and Water Supply Records;
- CIRIA C753 - The SuDS Manual.

The Engineering Services Report is to be read in conjunction with the engineering drawings and documents submitted by CS Consulting and with all other relevant documentation submitted by other members of the project design team.

2.0 SITE LOCATION AND PROPOSED DEVELOPMENT

2.1 Site Location

The proposed development site is located in Ardykeohane, Bruff, Co Limerick. The site is in the administrative jurisdiction of Limerick City and County Council (LCCC) and has a total area of circa 0.82ha.

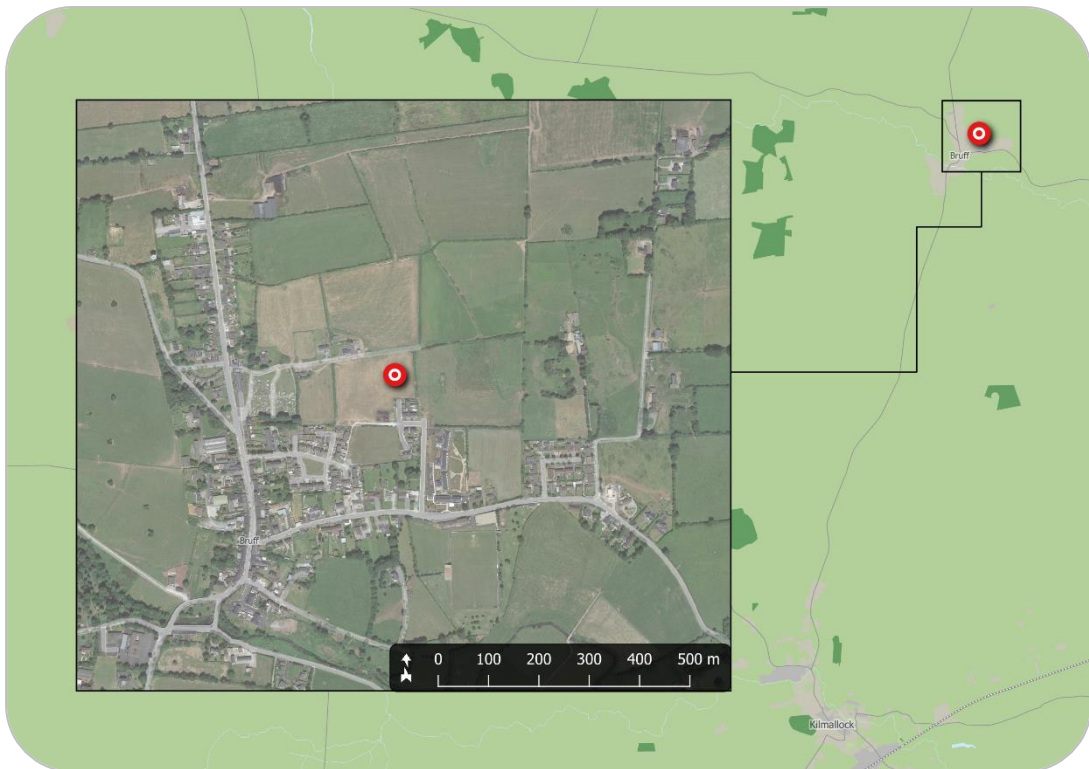


Figure 1 – Location of proposed development site
(map data & imagery: EPA, OSi, OSM Contributors, Google)

The location of the proposed development site is shown in Figure 1 above; the indicative extents of the development site, as well as relevant elements of the surrounding road network, are shown in more detail in Figure 2.



Figure 2 – Indicative site extents
(map data & imagery: OSM Contributors, Google)

The proposed development site is bound by existing single dwelling residential property to the north-west, existing residential buildings to the south-east, and on all other sides by greenfield.

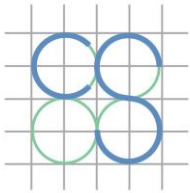
In the Limerick Development Plan 2022-2028, the development site is zoned as 'New Residential Zone'.

2.2 Existing Site Condition

The subject development site is currently greenfield. River Morningstar is located approx. 580m to the south of the development site.

2.3 Description of the Proposed Development

The proposed development primarily consists of:



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The construction of 18no. dwellings, provision of an access road connecting to Brugh na nDeise, 30no. car parking spaces, bicycle parking, infrastructural works, hard and soft landscaping and ancillary works.

3.0 SURFACE WATER DRAINAGE

3.1 Existing Storm Water Drainage

Irish Water Drainage Records do not indicate any public storm water sewers in the vicinity of the development site.

However, a topographical survey was carried out in and around the development site. The survey indicates that there is an existing 300mm storm sewer to the south on the development site.

3.2 Proposed Stormwater Drainage Arrangement

The storm water drainage for the proposed development shall be managed in two phases.

The first phase is to restrict storm water runoff from the proposed development to greenfield runoff rates or 2.0l/sec, whichever is greater. The development is to retain storm water volumes predicted to be experienced during extreme rainfall events. This is defined as the volume of storm water generated during a 1-in-100-year storm event, increased by 20% for predicted climate change factors.

These parameters allow the Q-Bar greenfield runoff rate to be calculated. The calculated Q-Bar rate was determined to be 2.51l/sec. Therefore, the allowable discharge rate off site for any given storm event will be limited to 2l/sec by way of using an approved flow control device.

The proposed development is to retain storm water volumes predicted to be experienced during extreme rainfall events. This is defined as the volume of storm water generated during a 1-in-100-year storm event increased by 30% for predicted climate change factors. No additional storage has been provided to account for urban creep as it is not anticipated. It is proposed to provide an attenuation tank of volume 200m³ for the 1-in-100-year storm



event. This attenuation tank shall be located beneath the open space to the north-west of the development site.

The proposed new storm water drainage arrangements shall be designed and carried out in accordance with:

- a) BS EN – 752:2008, Drains & Sewer Systems Outside Buildings.
- b) Part H, Building Drainage of The Building Regulation.

All the storm water collected in the attenuation tank shall be discharged into the existing 300mm storm sewer to the south-west of the development site by gravity via a flow control mechanism. The proposed discharge rate shall be 2.0l/s. Separate sewers and manholes for foul and storm water shall be maintained within the development site boundary. A wayleave of 3m shall be maintained along the proposed storm sewer until the final outfall into the existing storm sewer.

Refer to CS Consulting drawing **BRUF-CSC-ZZ-XX-DR-C-0002** for the proposed stormwater drainage layout for the development and **Appendix A** for Attenuation Calculations.

3.3 Proposed Sustainable Drainage Systems

The second phase is to include Sustainable Drainage Systems (SuDS) within the proposed development, these proposed SuDS features are listed below;

- i) Permeable Paving: Car parking spaces shall be constructed of permeable paving to allow for local infiltration.
- ii) Tree Pits: SuDS Tree pits shall be incorporated to increase biodiversity and amenity. Tree pits shall collect and attenuate water runoff and provide improvements to water quality.

- iii) The use of low water usage sanitary appliances to reduce the reliance on potable water supplies.
- iv) Attenuation storage with flow control, sized to contain a 1-in-100-year storm event and increased by 20% for predicted climate change effects, to limit discharge from the site during extreme rainfall events.

3.4 Stormwater Treatment

Land use is the primary influencing factor in the quality of urban surface water runoff and can therefore be used to represent the likely significance of the expected pollutant concentrations generated during rainfall events.

Considering the nature of the scheme, which is a small-sized residential area with low traffic roads, it does not pose a significant threat to the receiving water bodies. Therefore, the Simple Index Approach (SIA) described in chapter 26 of C753 -The SuDS Manual will be applied in this case.

To implement this method effectively, the steps described below will be followed.

- **Step 1:** Allocate suitable pollution hazard indices to the proposed land use.
- **Step 2:** Select SuDS with a total pollution mitigation index that equals or exceeds the pollution hazard index determined in Step 1.
- **Step 3:** Where the discharge is to protected surface waters or groundwater, a more precautionary approach is needed – not applicable in this case.



STEP 1: The following pollution hazard indices are anticipated for the subject development site. Refer to **Table 1**.

Table 1 - Pollution Hazard Indices (Extract from Table 26.2 of CIRIA C753 The SuDS Manual)				
Land Use	Pollution Hazard Level	Total Suspended Solids	Metals	Hydro-carbons
Residential Roofs	Very Low	0.2	0.2	0.05
Individual property driveways, low traffic roads.	Low	0.5	0.4	0.4

STEP 2: In order to ensure adequate treatment, the selected SuDS components must have a total pollution mitigation index that is equal to or greater than the pollution hazard index for each contaminant type.

Total SuDS mitigation index \geq Pollution Hazard Index

As the principal destination of the runoff is to a surface water, but small amounts of infiltration may occur from the permeable pavement areas and the tree pits, then the groundwater indices should be used for the discharge to groundwater (as provided in Table 26.4 of The SuDS Manual). These indices are more stringent than the ones applicable to discharging to a surface water body. Refer to **Table 2**.

Table 2 - Pollution Mitigation Indices for discharges to groundwater Extract from Table 26.4 of CIRIA C753 The SuDS Manual			
SuDS Component	Total Suspended Solids	Metals	Hydro-carbons
Tree Pit (Bioretention system)	0.8	0.8	0.8
Permeable Pavement	0.7	0.6	0.7

If the mitigation index of an individual component is insufficient, additional components arranged in series will be required, where:

Total SuDS mitigation index = mitigation index₁ + 0.5 (mitigation index₂)

Driveways and low traffic roads

Run-off from the development driveways and low-traffic roads shall be treated by the proposed permeable pavement and tree pits. The pollution mitigation index for each contaminant is as follows:

- TSS: Pollution Mitigation Index= $0.7 + 0.5 * 0.8 = 1.1 \geq 0.5$
- Metals: Pollution Mitigation Index= $0.6+0.5 * 0.8 = 1.0 \geq 0.4$
- Hydrocarbons: Pollution Mitigation Index = $0.7 + 0.5 *0.8 = 1.1 \geq 0.4$

Since all the pollution mitigation indices for each type of contaminant are greater than the pollution hazard indices, the required level of treatment is satisfactorily achieved.

Conventional Roofs:

Runoff from conventional roofs will be directed to permeable paving that passes through the front of each dwelling. As such, only the Pollution Mitigation indices from permeable paving will be considered in the calculations:

- TSS: Pollution Mitigation Index= $0.7 \geq 0.2$
- Metals: Pollution Mitigation Index= $0.6 \geq 0.2$
- Hydrocarbons: Pollution Mitigation Index = $0.7 \geq 0.05$

Since all the pollution mitigation indices for each type of contaminant type are greater than the pollution hazard indices, the required level of treatment is satisfactorily achieved.

4.0 FOUL DRAINAGE

4.1 Existing Foul Drainage Infrastructure

Irish Water drainage records do not indicate any public foul sewer in the proximity to the subject site.

However, a topographical survey was carried out in and around the development site. The survey results indicate that there is an existing 225mm foul sewer to the south on the development site.

4.2 Foul Effluent Generation

The proposed development comprises of 18no. residential dwellings.

The Irish Water *Code of Practice for Wastewater Infrastructure* specifies an average foul effluent flow rate of 165 litres per person per day for domestic dwellings (150 litres per person per day, plus a 10% allowance for external infiltration) and an average occupancy of 2.7 persons per residential unit. The development's maximum design population is therefore 49 people (49 pe), and the maximum average effluent flow (dry weather flow or DWF) to be generated by the proposed development may be calculated as:

$$\text{DWF} = 49\text{pe} \times 165\text{l/day/pe} = 8,085\text{l/day} = 0.093\text{l/s}$$

The peak effluent flow (Design Flow) is calculated by applying a domestic peak factor (Pf_{DOM}) of 6;

$$\text{Design Flow} = \text{DWF} \times Pf_{DOM} = 0.093\text{l/s} \times 6 = 0.561\text{l/s}$$

4.3 Proposed Foul Drainage Arrangements and Outfall

All foul effluent generated from the proposed development shall be collected in a separate foul pipe of 150mm diameter and flow under gravity to the existing 225mm foul sewer to the south-west of the development site. A wayleave of 3m either side shall be maintained along the proposed foul sewer until the final outfall into the existing foul sewer.

The drainage network for the development shall be in accordance with Part H of the Building Regulations and to the requirements and specifications of Irish Water.

A Pre-Connection Enquiry has been made to Irish Water in relation to the proposed development and Confirmation of Feasibility has been received. Please refer to **Appendix B** for Confirmation of Feasibility from Irish Water and CS Consulting drawing **BRUF-CSC-ZZ-XX-DR-C-0002** for the proposed foul drainage layout for the development site.



5.0 POTABLE WATER SUPPLY

5.1 Existing Potable Water Infrastructure

Irish Water drainage records indicate an existing 100mm uPVC potable watermain to the south of the development site.

5.2 Potable Water Demand

The proposed development comprises of 18no. residential dwellings.

The Irish Water *Code of Practice for Water Infrastructure* specifies an average potable water demand of 150 litres per person per day for domestic dwellings, and an average occupancy of 2.7 persons per residential unit. The development's maximum design population is therefore 49 people (49 pe), and the average potable water demand of the proposed development may be calculated as;

$$\text{Avg. Demand} = 49pe \times 150l/day/pe = 7,350l/day = 0.085l/s$$

The peak potable water demand is calculated by applying a domestic peak factor (Pf_{DOM}) of 5, in accordance with the Irish Water *Code of Practice for Water Infrastructure*;

$$\text{Peak Demand} = \text{Avg. Demand} \times Pf_{DOM} = 0.085l/s \times 5 = 0.425l/s$$

5.3 Proposed Water Supply Arrangement

It is proposed to provide a new watermain for the development. It is proposed to take the supply of the existing 100mm uPVC watermain that runs along Brugh na Deise to the south of the development site.

The watermain network for the development shall be in accordance with the Building Regulations and to the requirements and specifications of Irish Water.

A Pre-Connection Enquiry has been made to Irish Water in relation to the proposed development and Confirmation of Feasibility has been received. Please refer to **Appendix B** for Confirmation of Feasibility from Irish Water and CS Consulting drawing **BRUF-CSC-ZZ-XX-DR-C-0003** for the proposed watermain layout for the development site.

6.0 ACCESS, LAYOUT, SERVICING, PEDESTRIANS & CYCLISTS, PARKING

6.1 Development Access

The proposed development's vehicular/ pedestrian access shall be located along the southern boundary of the site. All the residential units shall be directly accessed via the internal road network.

The development access shall connect in to the existing Brugh na Deise.

6.2 Internal Site Layout

The internal road network provides access to a total of 30no. car parking spaces. The car parking spaces shall be placed parallel and perpendicular to the internal road network.

The internal road network shall be 5.5m wide with 2.25m footpath present on either side of the carriageway. All the dwelling units shall be directly access via the internal road network.

Refer to CS Consulting Drawing no. **BRUF-CSC-ZZ-XX-DR-C-0001** for internal road layout of the proposed development.

6.3 Pedestrians & Cyclists

Pedestrian and cyclist access to the development shall be accommodated via the main access on Brugh na Deise, at the southern boundary of the development site. The internal road network shall also comprise of a cul-de-sac at the site northern boundary which shall accommodate for turning manoeuvres of service vehicles and fire tender.

Within the development, raised and segregated footpaths 2.25m in width shall be provided along both sides of the internal access road.

6.4 Swept Path Analysis

Swept path analyses have been carried out for both fire tenders and refuse vehicles accessing and manoeuvring within the proposed development. These analyses, provided on drawing **BRUF-CSC-ZZ-XX-DR-C-0008** within this planning application, indicate that the design of the development accesses and internal layout can accommodate these vehicle movements where required.

6.5 Car Parking Provision

The car parking provision for the proposed development has been assessed in accordance with the Limerick Development Plan 2022-2028, which defines the standard maximum car parking provision for new developments by land use type. **Table 3** shows the car parking standards applicable for the proposed development and illustrates that the proposed car parking provision does not exceed the maximum permitted by the Local Authority development plan.

Table 3 – Car Parking Provision

Land Use	Car Parking Maximum	Quantum	Max. Parking Provision	Proposed Provision
Dwelling <3 bedroom	1.5 spaces per unit	10 units	15 spaces	14 spaces
Dwelling 3 bedroom +	2 spaces per unit	8 units	16 spaces	16 spaces
Total			31 spaces	30 spaces

The proposed development shall include a total of 30no. car parking spaces, located along the internal road network of the proposed development.

6.6 Disabled-Accessible Car Parking

The *Limerick Development Plan 2022-2028* does not specify any minimum requirement for the provision of disabled-accessible parking in new developments, however, the development plan in section 7.10.4 mentions that 'A proportion of all parking spaces should be provided for parking for disabled people and the charging of electric vehicles'.

The proposed development shall include a total of 7no. disabled-accessible spaces which equates excess to 20% of the total car parking spaces provided within the proposed development.

6.7 Electric Vehicle Charging Provision

As per the *Limerick Development Plan 2022-2028* a minimum of 1no. car parking spaces for every 5no. car parking spaces provided should be equipped with one fully functional EV Charging Point.

Within the proposed development facilities for the charging of battery electric vehicles (BEVs) shall be provided at 10no. parking spaces, representing more than 20% of the development's car parking provision, therefore, satisfying the requirement set out in *Limerick Development Plan 2022-2028*. All remaining internal car parking spaces within the development shall be 'future-proofed' by the inclusion of ducting and/or cabling to permit the rapid future installation of BEV charging points, as defined in the ESB ecars specification document no. 18017 (*Public Charge Points*, last reviewed February 2012).

6.8 Bicycle Provision

The bicycle parking for the proposed development has been assessed in accordance with the *Limerick Development Plan 2022-2028*, which defines minimum standard bicycle parking provision for new developments by land

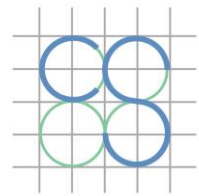
type. **Table 4** below shows the standards applicable for the proposed development.

Table 4 – Bicycle Parking Provision

Use	Cycle Parking Minimum	Quantum	Minimum Provision	Proposed Provision
Dwelling <3 bedroom (Long-term)	1 space per unit	10 units	10 spaces	10 spaces
Dwelling <3 bedroom (Short stay)	1 space per 2 units	10 units	5 spaces	14 spaces
Dwelling 3 bedroom + (Long-term)	2 spaces per unit	8 units	16 spaces	16 spaces
Dwelling 3 bedroom + (Short-stay)	1 space per 2 units	8 units	4 spaces	12 spaces
TOTALS			35 spaces	52 spaces


The proposed development shall comprise a total of 52no. bicycle parking spaces, of which 26no. spaces shall be long-term spaces.

Each 1-bedroom and 2 -bedroom units shall be provided with 1no. bicycle parking spaces within the curtilage of the house. Each 3-bedroom and 4-bedroom units shall be provided with 2no. cycle spaces within the curtilage of the house. In addition, the development shall also provide a total of 26no. short-stay bicycle spaces to facilitate for the visitors of the development.



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Appendix A: Attenuation Calculations

Cronin & Sutton Consulting		Page 1
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Innovyze	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm









Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	10	PIMP (%)	100
M5-60 (mm)	15.700	Add Flow / Climate Change (%)	0
Ratio R	0.300	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	5.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	250

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	40.381	0.808	50.0	0.189	4.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	39.507	0.617	64.0	0.150	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.000	29.750	0.496	60.0	0.021	4.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	8.145	0.033	250.0	0.037	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.003	31.449	0.126	250.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.004	84.095	0.336	250.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.005	59.272	0.237	250.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.006	59.662	0.239	250.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	4.36	100.000	0.189	0.0	0.0	0.0	1.85	73.7	25.5
S1.001	50.00	4.70	99.117	0.338	0.0	0.0	0.0	1.97	139.1	45.8
S2.000	50.00	4.29	98.950	0.021	0.0	0.0	0.0	1.69	67.3	2.8
S1.002	50.00	4.83	98.379	0.396	0.0	0.0	0.0	0.99	70.0	53.7
S1.003	50.00	5.36	98.347	0.396	0.0	0.0	0.0	0.99	70.0	53.7
S1.004	50.00	6.78	98.221	0.396	0.0	0.0	0.0	0.99	70.0	53.7
S1.005	50.00	7.78	97.884	0.396	0.0	0.0	0.0	0.99	70.0	53.7
S1.006	50.00	8.78	97.647	0.396	0.0	0.0	0.0	0.99	70.0	53.7

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.189	0.189	0.189
1.001	User	-	100	0.150	0.150	0.150
2.000	User	-	100	0.021	0.021	0.021
1.002	User	-	100	0.037	0.037	0.037
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.396	0.396	0.396

Free Flowing Outfall Details for Storm


Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.006	S	99.890	97.409	97.330	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	30.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	1	Number of Storage Structures	1
		Number of Time/Area Diagrams	0
		Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	10	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	15.700	Storm Duration (mins)	30
Ratio R	0.300		

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Innovyze	Network 2020.1.3	

Online Controls for Storm

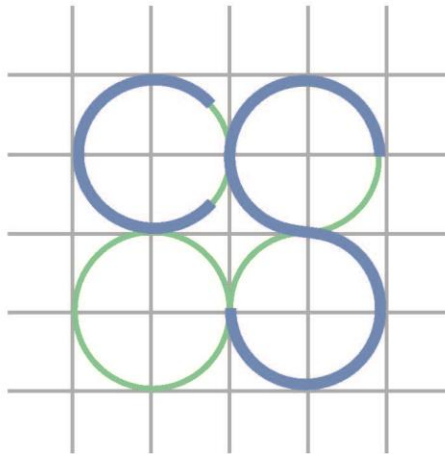
Hydro-Brake® Optimum Manhole: S4, DS/PN: S1.003, Volume (m³): 2.4

Unit Reference	MD-SHE-0067-2000-1000-2000
Design Head (m)	1.000
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	67
Invert Level (m)	98.347
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	2.0	Kick-Flo®	0.599	1.6
Flush-Flo™	0.296	1.9	Mean Flow over Head Range	-	1.7

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.6	1.200	2.2	3.000	3.3	7.000	4.9
0.200	1.9	1.400	2.3	3.500	3.5	7.500	5.1
0.300	1.9	1.600	2.5	4.000	3.8	8.000	5.2
0.400	1.9	1.800	2.6	4.500	4.0	8.500	5.4
0.500	1.8	2.000	2.7	5.000	4.2	9.000	5.5
0.600	1.6	2.200	2.9	5.500	4.4	9.500	5.7
0.800	1.8	2.400	3.0	6.000	4.6		
1.000	2.0	2.600	3.1	6.500	4.7		



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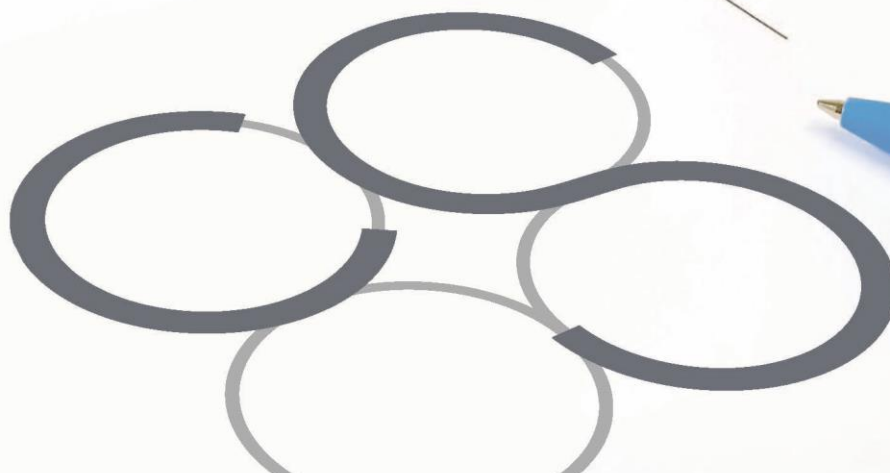
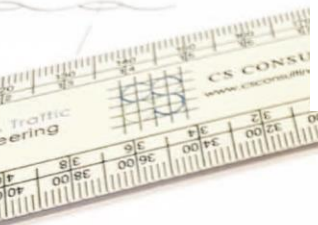
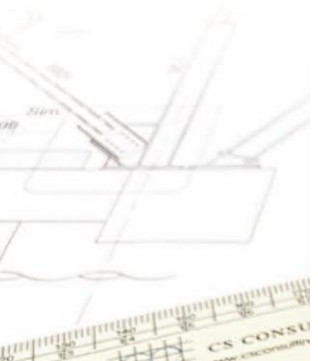
Proposed Residential Development

Bruff, Co. Limerick

Client: Limerick City and County Council

Job No. L105L

February 2024



ENGINEERING SERVICES REPORT

PROPOSED RESIDENTIAL DEVELOPMENT, BRUFF, CO. LIMERICK

CONTENTS

1.0	INTRODUCTION _____	1
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5.0	POTABLE WATER SUPPLY _____	12
6.0	ACCESS, LAYOUT, SERVICING, PEDESTRIANS & CYCLISTS, PARKING _____	14

Appendix A: Attenuation Calculations

Appendix B: Irish Water Confirmation of Feasibility

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File Location: Job-L105L\L105L LCCC Bruff Housing\B_DOCUMENTS\1.0 Planning\ESR

BS 1192 FIELD **BRUF-CSC-ZZ-XX-RP-C-0001-P2**

Job Ref.	Author	Reviewed By	Authorised By	Issue Date	Rev. No.
L105L	AC	FB	NB	20.02.2024	P2
L105L	FB	NB	NB	10.05.2023	P1
L105L	LJ	FB	NB	24.03.2023	P0

1.0 INTRODUCTION

Cronin & Sutton Consulting Engineers (CS Consulting) have been commissioned by Limerick City and County Council to prepare an Engineering Services Report for a proposed residential development at Bruff, Co. Limerick.

This report details the following aspects of the proposed development:

- Stormwater Drainage Infrastructure
- Foul Drainage Infrastructure
- Potable Water Infrastructure
- Development Access
- Internal Road Layout
- Car Parking and Bicycle parking Provisions

In preparing this report, CS Consulting has made reference to the following:

- Limerick City and County Development Plan 2022-2028;
- Irish Water Drainage and Water Supply Records;
- CIRIA C753 - The SuDS Manual.

The Engineering Services Report is to be read in conjunction with the engineering drawings and documents submitted by CS Consulting and with all other relevant documentation submitted by other members of the project design team.

2.0 SITE LOCATION AND PROPOSED DEVELOPMENT

2.1 Site Location

The proposed development site is located in Ardykeohane, Bruff, Co Limerick. The site is in the administrative jurisdiction of Limerick City and County Council (LCCC) and has a total area of circa 0.82ha.

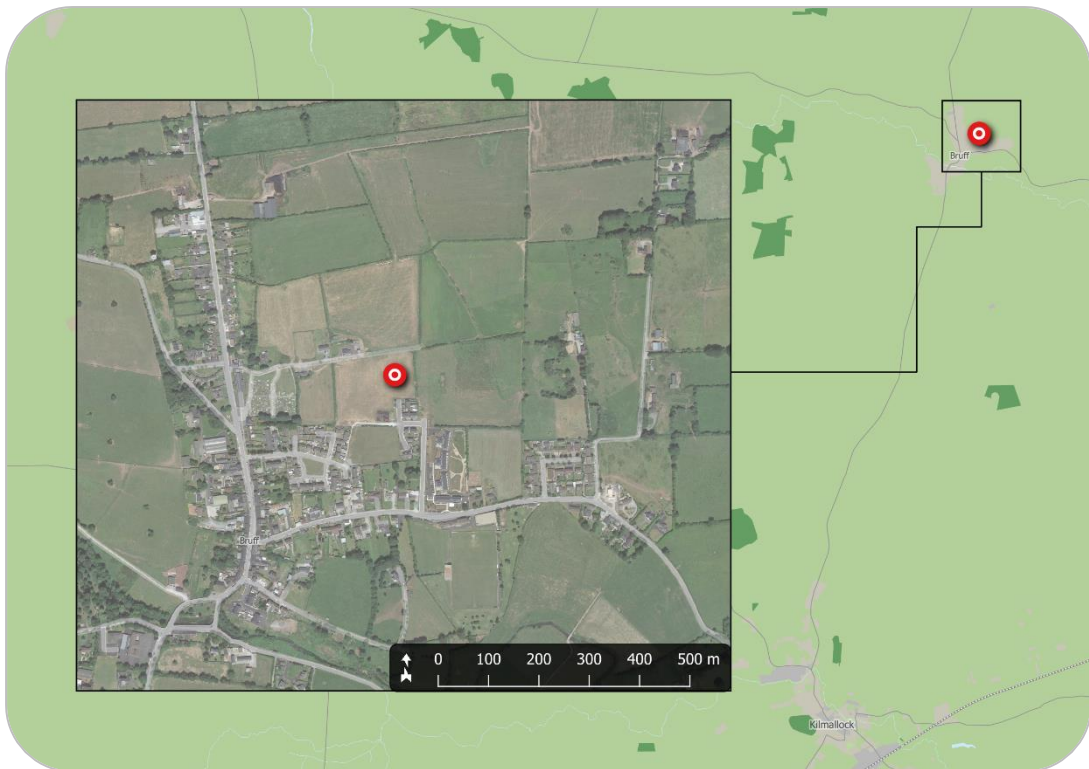


Figure 1 – Location of proposed development site
(map data & imagery: EPA, OSi, OSM Contributors, Google)

The location of the proposed development site is shown in Figure 1 above; the indicative extents of the development site, as well as relevant elements of the surrounding road network, are shown in more detail in Figure 2.



Figure 2 – Indicative site extents
(map data & imagery: OSM Contributors, Google)

The proposed development site is bound by existing single dwelling residential property to the north-west, existing residential buildings to the south-east, and on all other sides by greenfield.

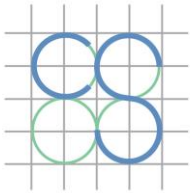
In the Limerick Development Plan 2022-2028, the development site is zoned as 'New Residential Zone'.

2.2 Existing Site Condition

The subject development site is currently greenfield. River Morningstar is located approx. 580m to the south of the development site.

2.3 Description of the Proposed Development

The proposed development primarily consists of:



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The construction of 18no. dwellings, provision of an access road connecting to Brugh na nDeise, 30no. car parking spaces, bicycle parking, infrastructural works, hard and soft landscaping and ancillary works.

3.0 SURFACE WATER DRAINAGE

3.1 Existing Storm Water Drainage

Irish Water Drainage Records do not indicate any public storm water sewers in the vicinity of the development site.

However, a topographical survey was carried out in and around the development site. The survey indicates that there is an existing 300mm storm sewer to the south on the development site.

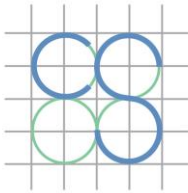
3.2 Proposed Stormwater Drainage Arrangement

The storm water drainage for the proposed development shall be managed in two phases.

The first phase is to restrict storm water runoff from the proposed development to greenfield runoff rates or 2.0l/sec, whichever is greater. The development is to retain storm water volumes predicted to be experienced during extreme rainfall events. This is defined as the volume of storm water generated during a 1-in-100-year storm event, increased by 20% for predicted climate change factors.

These parameters allow the Q-Bar greenfield runoff rate to be calculated. The calculated Q-Bar rate was determined to be 2.51l/sec. Therefore, the allowable discharge rate off site for any given storm event will be limited to 2l/sec by way of using an approved flow control device.

The proposed development is to retain storm water volumes predicted to be experienced during extreme rainfall events. This is defined as the volume of storm water generated during a 1-in-100-year storm event increased by 30% for predicted climate change factors. No additional storage has been provided to account for urban creep as it is not anticipated. It is proposed to provide an attenuation tank of volume 200m³ for the 1-in-100-year storm



event. This attenuation tank shall be located beneath the open space to the north-west of the development site.

The proposed new storm water drainage arrangements shall be designed and carried out in accordance with:

- a) BS EN – 752:2008, Drains & Sewer Systems Outside Buildings.
- b) Part H, Building Drainage of The Building Regulation.

All the storm water collected in the attenuation tank shall be discharged into the existing 300mm storm sewer to the south-west of the development site by gravity via a flow control mechanism. The proposed discharge rate shall be 2.0l/s. Separate sewers and manholes for foul and storm water shall be maintained within the development site boundary. A wayleave of 3m shall be maintained along the proposed storm sewer until the final outfall into the existing storm sewer.

Refer to CS Consulting drawing **BRUF-CSC-ZZ-XX-DR-C-0002** for the proposed stormwater drainage layout for the development and **Appendix A** for Attenuation Calculations.

3.3 Proposed Sustainable Drainage Systems

The second phase is to include Sustainable Drainage Systems (SuDS) within the proposed development, these proposed SuDS features are listed below;

- i) Permeable Paving: Car parking spaces shall be constructed of permeable paving to allow for local infiltration.
- ii) Tree Pits: SuDS Tree pits shall be incorporated to increase biodiversity and amenity. Tree pits shall collect and attenuate water runoff and provide improvements to water quality.

- iii) The use of low water usage sanitary appliances to reduce the reliance on potable water supplies.
- iv) Attenuation storage with flow control, sized to contain a 1-in-100-year storm event and increased by 20% for predicted climate change effects, to limit discharge from the site during extreme rainfall events.

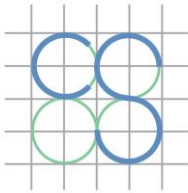
3.4 Stormwater Treatment

Land use is the primary influencing factor in the quality of urban surface water runoff and can therefore be used to represent the likely significance of the expected pollutant concentrations generated during rainfall events.

Considering the nature of the scheme, which is a small-sized residential area with low traffic roads, it does not pose a significant threat to the receiving water bodies. Therefore, the Simple Index Approach (SIA) described in chapter 26 of C753 -The SuDS Manual will be applied in this case.

To implement this method effectively, the steps described below will be followed.

- **Step 1:** Allocate suitable pollution hazard indices to the proposed land use.
- **Step 2:** Select SuDS with a total pollution mitigation index that equals or exceeds the pollution hazard index determined in Step 1.
- **Step 3:** Where the discharge is to protected surface waters or groundwater, a more precautionary approach is needed – not applicable in this case.



STEP 1: The following pollution hazard indices are anticipated for the subject development site. Refer to **Table 1**.

Table 1 - Pollution Hazard Indices (Extract from Table 26.2 of CIRIA C753 The SuDS Manual)				
Land Use	Pollution Hazard Level	Total Suspended Solids	Metals	Hydro-carbons
Residential Roofs	Very Low	0.2	0.2	0.05
Individual property driveways, low traffic roads.	Low	0.5	0.4	0.4

STEP 2: In order to ensure adequate treatment, the selected SuDS components must have a total pollution mitigation index that is equal to or greater than the pollution hazard index for each contaminant type.

Total SuDS mitigation index \geq Pollution Hazard Index

As the principal destination of the runoff is to a surface water, but small amounts of infiltration may occur from the permeable pavement areas and the tree pits, then the groundwater indices should be used for the discharge to groundwater (as provided in Table 26.4 of The SuDS Manual). These indices are more stringent than the ones applicable to discharging to a surface water body. Refer to **Table 2**.

Table 2 - Pollution Mitigation Indices for discharges to groundwater Extract from Table 26.4 of CIRIA C753 The SuDS Manual			
SuDS Component	Total Suspended Solids	Metals	Hydro-carbons
Tree Pit (Bioretention system)	0.8	0.8	0.8
Permeable Pavement	0.7	0.6	0.7

If the mitigation index of an individual component is insufficient, additional components arranged in series will be required, where:

Total SuDS mitigation index = mitigation index₁ + 0.5 (mitigation index₂)

Driveways and low traffic roads

Run-off from the development driveways and low-traffic roads shall be treated by the proposed permeable pavement and tree pits. The pollution mitigation index for each contaminant is as follows:

- TSS: Pollution Mitigation Index= $0.7 + 0.5 * 0.8 = 1.1 \geq 0.5$
- Metals: Pollution Mitigation Index= $0.6+0.5 * 0.8 = 1.0 \geq 0.4$
- Hydrocarbons: Pollution Mitigation Index = $0.7 + 0.5 *0.8 = 1.1 \geq 0.4$

Since all the pollution mitigation indices for each type of contaminant are greater than the pollution hazard indices, the required level of treatment is satisfactorily achieved.

Conventional Roofs:

Runoff from conventional roofs will be directed to permeable paving that passes through the front of each dwelling. As such, only the Pollution Mitigation indices from permeable paving will be considered in the calculations:

- TSS: Pollution Mitigation Index= $0.7 \geq 0.2$
- Metals: Pollution Mitigation Index= $0.6 \geq 0.2$
- Hydrocarbons: Pollution Mitigation Index = $0.7 \geq 0.05$

Since all the pollution mitigation indices for each type of contaminant type are greater than the pollution hazard indices, the required level of treatment is satisfactorily achieved.

4.0 FOUL DRAINAGE

4.1 Existing Foul Drainage Infrastructure

Irish Water drainage records do not indicate any public foul sewer in the proximity to the subject site.

However, a topographical survey was carried out in and around the development site. The survey results indicate that there is an existing 225mm foul sewer to the south on the development site.

4.2 Foul Effluent Generation

The proposed development comprises of 18no. residential dwellings.

The Irish Water *Code of Practice for Wastewater Infrastructure* specifies an average foul effluent flow rate of 165 litres per person per day for domestic dwellings (150 litres per person per day, plus a 10% allowance for external infiltration) and an average occupancy of 2.7 persons per residential unit. The development's maximum design population is therefore 49 people (49 pe), and the maximum average effluent flow (dry weather flow or DWF) to be generated by the proposed development may be calculated as:

$$\text{DWF} = 49\text{pe} \times 165\text{l/day/pe} = 8,085\text{l/day} = 0.093\text{l/s}$$

The peak effluent flow (Design Flow) is calculated by applying a domestic peak factor (Pf_{DOM}) of 6;

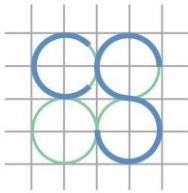
$$\text{Design Flow} = \text{DWF} \times Pf_{DOM} = 0.093\text{l/s} \times 6 = 0.561\text{l/s}$$

4.3 Proposed Foul Drainage Arrangements and Outfall

All foul effluent generated from the proposed development shall be collected in a separate foul pipe of 150mm diameter and flow under gravity to the existing 225mm foul sewer to the south-west of the development site. A wayleave of 3m either side shall be maintained along the proposed foul sewer until the final outfall into the existing foul sewer.

The drainage network for the development shall be in accordance with Part H of the Building Regulations and to the requirements and specifications of Irish Water.

A Pre-Connection Enquiry has been made to Irish Water in relation to the proposed development and Confirmation of Feasibility has been received. Please refer to **Appendix B** for Confirmation of Feasibility from Irish Water and CS Consulting drawing **BRUF-CSC-ZZ-XX-DR-C-0002** for the proposed foul drainage layout for the development site.



5.0 POTABLE WATER SUPPLY

5.1 Existing Potable Water Infrastructure

Irish Water drainage records indicate an existing 100mm uPVC potable watermain to the south of the development site.

5.2 Potable Water Demand

The proposed development comprises of 18no. residential dwellings.

The Irish Water *Code of Practice for Water Infrastructure* specifies an average potable water demand of 150 litres per person per day for domestic dwellings, and an average occupancy of 2.7 persons per residential unit. The development's maximum design population is therefore 49 people (49 pe), and the average potable water demand of the proposed development may be calculated as;

$$\text{Avg. Demand} = 49pe \times 150l/day/pe = 7,350l/day = 0.085l/s$$

The peak potable water demand is calculated by applying a domestic peak factor (Pf_{DOM}) of 5, in accordance with the Irish Water *Code of Practice for Water Infrastructure*;

$$\text{Peak Demand} = \text{Avg. Demand} \times Pf_{DOM} = 0.085l/s \times 5 = 0.425l/s$$

5.3 Proposed Water Supply Arrangement

It is proposed to provide a new watermain for the development. It is proposed to take the supply of the existing 100mm uPVC watermain that runs along Brugh na Deise to the south of the development site.

The watermain network for the development shall be in accordance with the Building Regulations and to the requirements and specifications of Irish Water.

A Pre-Connection Enquiry has been made to Irish Water in relation to the proposed development and Confirmation of Feasibility has been received. Please refer to **Appendix B** for Confirmation of Feasibility from Irish Water and CS Consulting drawing **BRUF-CSC-ZZ-XX-DR-C-0003** for the proposed watermain layout for the development site.

6.0 ACCESS, LAYOUT, SERVICING, PEDESTRIANS & CYCLISTS, PARKING

6.1 Development Access

The proposed development's vehicular/ pedestrian access shall be located along the southern boundary of the site. All the residential units shall be directly accessed via the internal road network.

The development access shall connect in to the existing Brugh na Deise.

6.2 Internal Site Layout

The internal road network provides access to a total of 30no. car parking spaces. The car parking spaces shall be placed parallel and perpendicular to the internal road network.

The internal road network shall be 5.5m wide with 2.25m footpath present on either side of the carriageway. All the dwelling units shall be directly access via the internal road network.

Refer to CS Consulting Drawing no. **BRUF-CSC-ZZ-XX-DR-C-0001** for internal road layout of the proposed development.

6.3 Pedestrians & Cyclists

Pedestrian and cyclist access to the development shall be accommodated via the main access on Brugh na Deise, at the southern boundary of the development site. The internal road network shall also comprise of a cul-de-sac at the site northern boundary which shall accommodate for turning manoeuvres of service vehicles and fire tender.

Within the development, raised and segregated footpaths 2.25m in width shall be provided along both sides of the internal access road.

6.4 Swept Path Analysis

Swept path analyses have been carried out for both fire tenders and refuse vehicles accessing and manoeuvring within the proposed development. These analyses, provided on drawing **BRUF-CSC-ZZ-XX-DR-C-0008** within this planning application, indicate that the design of the development accesses and internal layout can accommodate these vehicle movements where required.

6.5 Car Parking Provision

The car parking provision for the proposed development has been assessed in accordance with the Limerick Development Plan 2022-2028, which defines the standard maximum car parking provision for new developments by land use type. **Table 3** shows the car parking standards applicable for the proposed development and illustrates that the proposed car parking provision does not exceed the maximum permitted by the Local Authority development plan.

Table 3 – Car Parking Provision

Land Use	Car Parking Maximum	Quantum	Max. Parking Provision	Proposed Provision
Dwelling <3 bedroom	1.5 spaces per unit	10 units	15 spaces	14 spaces
Dwelling 3 bedroom +	2 spaces per unit	8 units	16 spaces	16 spaces
Total			31 spaces	30 spaces

The proposed development shall include a total of 30no. car parking spaces, located along the internal road network of the proposed development.

6.6 Disabled-Accessible Car Parking

The *Limerick Development Plan 2022-2028* does not specify any minimum requirement for the provision of disabled-accessible parking in new developments, however, the development plan in section 7.10.4 mentions that 'A proportion of all parking spaces should be provided for parking for disabled people and the charging of electric vehicles'.

The proposed development shall include a total of 7no. disabled-accessible spaces which equates excess to 20% of the total car parking spaces provided within the proposed development.

6.7 Electric Vehicle Charging Provision

As per the *Limerick Development Plan 2022-2028* a minimum of 1no. car parking spaces for every 5no. car parking spaces provided should be equipped with one fully functional EV Charging Point.

Within the proposed development facilities for the charging of battery electric vehicles (BEVs) shall be provided at 10no. parking spaces, representing more than 20% of the development's car parking provision, therefore, satisfying the requirement set out in *Limerick Development Plan 2022-2028*. All remaining internal car parking spaces within the development shall be 'future-proofed' by the inclusion of ducting and/or cabling to permit the rapid future installation of BEV charging points, as defined in the ESB ecars specification document no. 18017 (*Public Charge Points*, last reviewed February 2012).

6.8 Bicycle Provision

The bicycle parking for the proposed development has been assessed in accordance with the *Limerick Development Plan 2022-2028*, which defines minimum standard bicycle parking provision for new developments by land

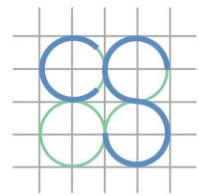
type. **Table 4** below shows the standards applicable for the proposed development.

Table 4 – Bicycle Parking Provision

Use	Cycle Parking Minimum	Quantum	Minimum Provision	Proposed Provision
Dwelling <3 bedroom (Long-term)	1 space per unit	10 units	10 spaces	10 spaces
Dwelling <3 bedroom (Short stay)	1 space per 2 units	10 units	5 spaces	14 spaces
Dwelling 3 bedroom + (Long-term)	2 spaces per unit	8 units	16 spaces	16 spaces
Dwelling 3 bedroom + (Short-stay)	1 space per 2 units	8 units	4 spaces	12 spaces
TOTALS			35 spaces	52 spaces


The proposed development shall comprise a total of 52no. bicycle parking spaces, of which 26no. spaces shall be long-term spaces.

Each 1-bedroom and 2 -bedroom units shall be provided with 1no. bicycle parking spaces within the curtilage of the house. Each 3-bedroom and 4-bedroom units shall be provided with 2no. cycle spaces within the curtilage of the house. In addition, the development shall also provide a total of 26no. short-stay bicycle spaces to facilitate for the visitors of the development.



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Appendix A: Attenuation Calculations

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm









Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	10	PIMP (%)	100
M5-60 (mm)	15.700	Add Flow / Climate Change (%)	0
Ratio R	0.300	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	5.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	250

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	40.381	0.808	50.0	0.189	4.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	39.507	0.617	64.0	0.150	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.000	29.750	0.496	60.0	0.021	4.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	8.145	0.033	250.0	0.037	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.003	31.449	0.126	250.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.004	84.095	0.336	250.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.005	59.272	0.237	250.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.006	59.662	0.239	250.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	4.36	100.000	0.189	0.0	0.0	0.0	1.85	73.7	25.5
S1.001	50.00	4.70	99.117	0.338	0.0	0.0	0.0	1.97	139.1	45.8
S2.000	50.00	4.29	98.950	0.021	0.0	0.0	0.0	1.69	67.3	2.8
S1.002	50.00	4.83	98.379	0.396	0.0	0.0	0.0	0.99	70.0	53.7
S1.003	50.00	5.36	98.347	0.396	0.0	0.0	0.0	0.99	70.0	53.7
S1.004	50.00	6.78	98.221	0.396	0.0	0.0	0.0	0.99	70.0	53.7
S1.005	50.00	7.78	97.884	0.396	0.0	0.0	0.0	0.99	70.0	53.7
S1.006	50.00	8.78	97.647	0.396	0.0	0.0	0.0	0.99	70.0	53.7

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.189	0.189	0.189
1.001	User	-	100	0.150	0.150	0.150
2.000	User	-	100	0.021	0.021	0.021
1.002	User	-	100	0.037	0.037	0.037
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.396	0.396	0.396

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.006	S	99.890	97.409	97.330	0	0


Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	30.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	10	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	15.700	Storm Duration (mins)	30
Ratio R	0.300		

Cronin & Sutton Consulting		Page 3
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Date 10/05/2023 14:06 File L105L MICRODRAINAGE P02.MDX	Designed by Joe.Fryers Checked by	
Innovyze	Network 2020.1.3	

Online Controls for Storm


Hydro-Brake® Optimum Manhole: S4, DS/PN: S1.003, Volume (m³): 2.4

Unit Reference	MD-SHE-0067-2000-1000-2000
Design Head (m)	1.000
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	67
Invert Level (m)	98.347
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	2.0	Kick-Flo®	0.599	1.6
Flush-Flo™	0.296	1.9	Mean Flow over Head Range	-	1.7

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.6	1.200	2.2	3.000	3.3	7.000	4.9
0.200	1.9	1.400	2.3	3.500	3.5	7.500	5.1
0.300	1.9	1.600	2.5	4.000	3.8	8.000	5.2
0.400	1.9	1.800	2.6	4.500	4.0	8.500	5.4
0.500	1.8	2.000	2.7	5.000	4.2	9.000	5.5
0.600	1.6	2.200	2.9	5.500	4.4	9.500	5.7
0.800	1.8	2.400	3.0	6.000	4.6		
1.000	2.0	2.600	3.1	6.500	4.7		


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Innovyze	Network 2020.1.3	

Storage Structures for Storm

Tank or Pond Manhole: S4, DS/PN: S1.003

Invert Level (m) 98.347

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	200.0	1.000	200.0	1.001	0.0

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Date 10/05/2023 14:06 File L105L MICRODRAINAGE P02.MDX	Designed by Joe.Fryers Checked by	
Innovyze	Network 2020.1.3	

Storage Structures for Storm

Tank or Pond Manhole: S4, DS/PN: S1.003

Invert Level (m) 98.347

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	200.0	1.000	200.0	1.001	0.0

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	30.000
Hot Start (mins)	0	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.300
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.700	Cv (Winter)	0.840
Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

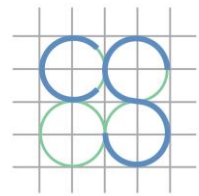
Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	100	+0%	100/15 Summer				100.499
S1.001	S2	15 Winter	100	+0%	100/15 Summer				99.624
S2.000	S3	960 Winter	100	+0%	100/180 Winter				99.577
S1.002	S3	960 Winter	100	+0%	30/15 Summer				99.647
S1.003	S4	960 Winter	100	+0%	1/480 Winter				99.561
S1.004	S5	720 Winter	100	+0%					98.256
S1.005	S6	720 Winter	100	+0%					97.919
S1.006	S7	720 Winter	100	+0%					97.682

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.274	0.000	1.04		72.5	SURCHARGED	
S1.001	S2	0.207	0.000	1.00		129.6	SURCHARGED	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged		Flooded		Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)				
S2.000	S3	0.402	0.000	0.01			0.7	SURCHARGED	
S1.002	S3	0.968	0.000	0.24			12.7	SURCHARGED	
S1.003	S4	0.915	0.000	0.03			2.1	SURCHARGED	
S1.004	S5	-0.265	0.000	0.03			2.1	OK	
S1.005	S6	-0.265	0.000	0.03			2.1	OK	
S1.006	S7	-0.265	0.000	0.03			2.1	OK	



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Appendix B: Irish Water Confirmation of Feasibility

CONFIRMATION OF FEASIBILITY

Fionnán De Búrca
19-22 Dame Street
Dublin
D02E267

3 April 2023

Uisce Éireann
Bosca OP448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office
Cork City.

www.water.ie

**Our Ref: CDS23002162 Pre-Connection Enquiry
Brugh na nDeise, Ardykeohane, Bruff, Limerick**

Dear Applicant/Agent,

We have completed the review of the Pre-Connection Enquiry.

Irish Water has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Housing Development of 18 unit(s) at Brugh na nDeise, Ardykeohane, Bruff, Co. Limerick, (the **Development**).

Based upon the details provided we can advise the following regarding connecting to the networks;

- **Water Connection** - Feasible without infrastructure upgrade by Irish Water
-
- **Wastewater Connection** - Feasible Subject to upgrades
- In order to complete the proposed connection at the Premises, the Uisce Éireann wastewater network will have to be extended by approximately 125m. Uisce Éireann currently does not have any plans to extend its network in this area. Should you wish to consider extending the wastewater network infrastructure to a point to connect to the Uisce Éireann network, please contact Irish Water.
-
- Where it is proposed to connect to the public wastewater network by traversing third party lands, a wayleave shall be required in the interest of Uisce Éireann along the length of the proposed network,

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before the Development can be connected to our network(s) you must submit a connection application and be granted and sign a connection agreement with Irish Water.

As the network capacity changes constantly, this review is only valid at the time of its completion. As soon as planning permission has been granted for the Development, a completed connection application should be submitted. The connection application is available at www.water.ie/connections/get-connected/

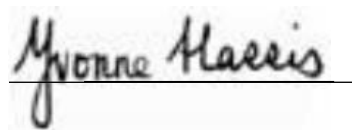
Where can you find more information?

- **Section A** - What is important to know?
- **Section B** - Details of Irish Water's Network(s)

This letter is issued to provide information about the current feasibility of the proposed connection(s) to Irish Water's network(s). This is not a connection offer and capacity in Irish Water's network(s) may only be secured by entering into a connection agreement with Irish Water.

For any further information, visit www.water.ie/connections, email newconnections@water.ie or contact 1800 278 278.

Yours sincerely,

A handwritten signature in black ink that reads "Yvonne Harris". The signature is written in a cursive style and is positioned above a thin horizontal line.

Yvonne Harris
Head of Customer Operations

Section A - What is important to know?

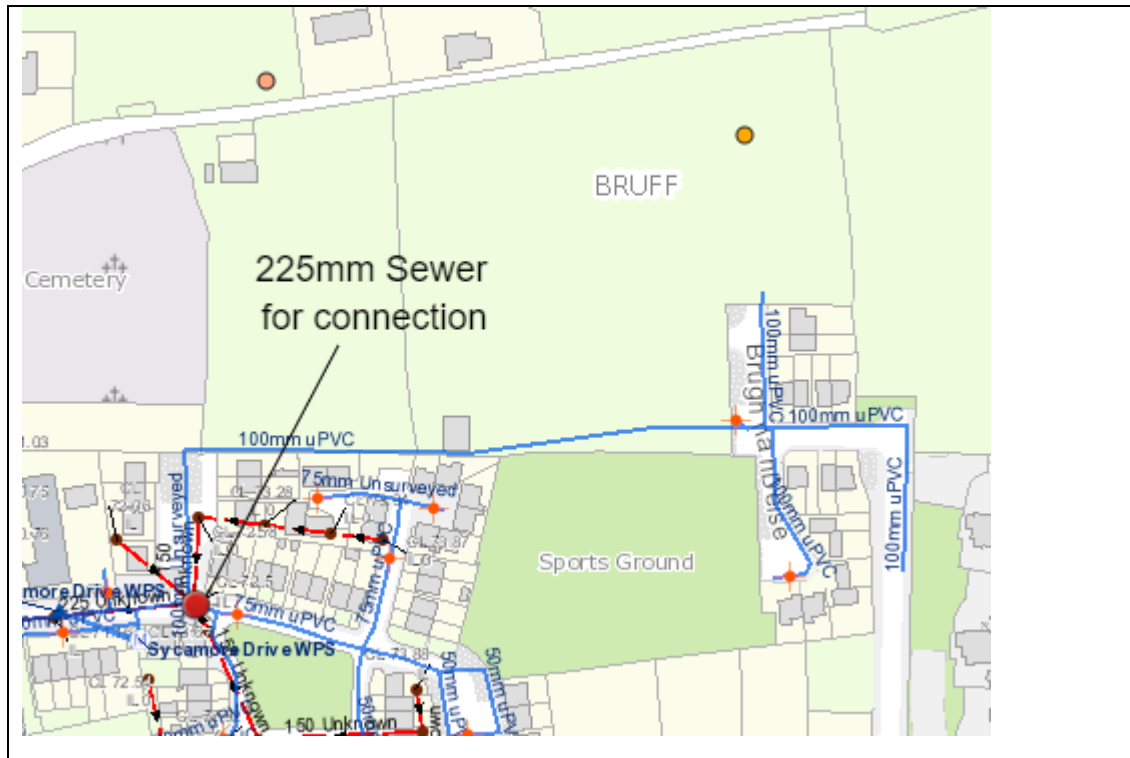
What is important to know?	Why is this important?
<p>Do you need a contract to connect?</p>	<ul style="list-style-type: none"> • Yes, a contract is required to connect. This letter does not constitute a contract or an offer in whole or in part to provide a connection to Irish Water's network(s). • Before the Development can connect to Irish Water's network(s), you must submit a connection application <u>and be granted and sign</u> a connection agreement with Irish Water.
<p>When should I submit a Connection Application?</p>	<ul style="list-style-type: none"> • A connection application should only be submitted after planning permission has been granted.
<p>Where can I find information on connection charges?</p>	<ul style="list-style-type: none"> • Irish Water connection charges can be found at: https://www.water.ie/connections/information/charges/
<p>Who will carry out the connection work?</p>	<ul style="list-style-type: none"> • All works to Irish Water's network(s), including works in the public space, must be carried out by Irish Water*. <p>*Where a Developer has been granted specific permission and has been issued a connection offer for Self-Lay in the Public Road/Area, they may complete the relevant connection works</p>
<p>Fire flow Requirements</p>	<ul style="list-style-type: none"> • The Confirmation of Feasibility does not extend to fire flow requirements for the Development. Fire flow requirements are a matter for the Developer to determine. • What to do? - Contact the relevant Local Fire Authority
<p>Plan for disposal of storm water</p>	<ul style="list-style-type: none"> • The Confirmation of Feasibility does not extend to the management or disposal of storm water or ground waters. • What to do? - Contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges.
<p>Where do I find details of Irish Water's network(s)?</p>	<ul style="list-style-type: none"> • Requests for maps showing Irish Water's network(s) can be submitted to: datarequests@water.ie

<p>What are the design requirements for the connection(s)?</p>	<ul style="list-style-type: none"> The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this Development shall comply with <i>the Irish Water Connections and Developer Services Standard Details and Codes of Practice</i>, available at www.water.ie/connections
<p>Trade Effluent Licensing</p>	<ul style="list-style-type: none"> Any person discharging trade effluent** to a sewer, must have a Trade Effluent Licence issued pursuant to section 16 of the Local Government (Water Pollution) Act, 1977 (as amended). More information and an application form for a Trade Effluent License can be found at the following link: https://www.water.ie/business/trade-effluent/about/ <p>**trade effluent is defined in the Local Government (Water Pollution) Act, 1977 (as amended)</p>

Section B – Details of Irish Water’s Network(s)

The map included below outlines the current Irish Water infrastructure adjacent the Development: To access Irish Water Maps email

datarequests@water.ie



Reproduced from the Ordnance Survey of Ireland by Permission of the Government. License No. 3-3-34

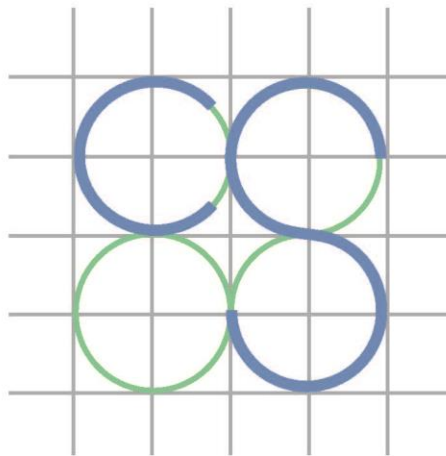
Note: The information provided on the included maps as to the position of Irish Water’s underground network(s) is provided as a general guide only. The information is based on the best available information provided by each Local Authority in Ireland to Irish Water.

Whilst every care has been taken in respect of the information on Irish Water’s network(s), Irish Water assumes no responsibility for and gives no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided, nor does it accept any liability whatsoever arising from or out of any errors or omissions. This information should not be solely relied upon in the event of excavations or any other works being carried out in the vicinity of Irish Water’s underground network(s). The onus is on the parties carrying out excavations or any other works to ensure the exact location of Irish Water’s underground network(s) is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.



APPENDIX 2

SITE SPECIFIC FLOOD RISK ASSESSMENT



CRONIN SUTTON
COTTER

LIMERICK

LONDON

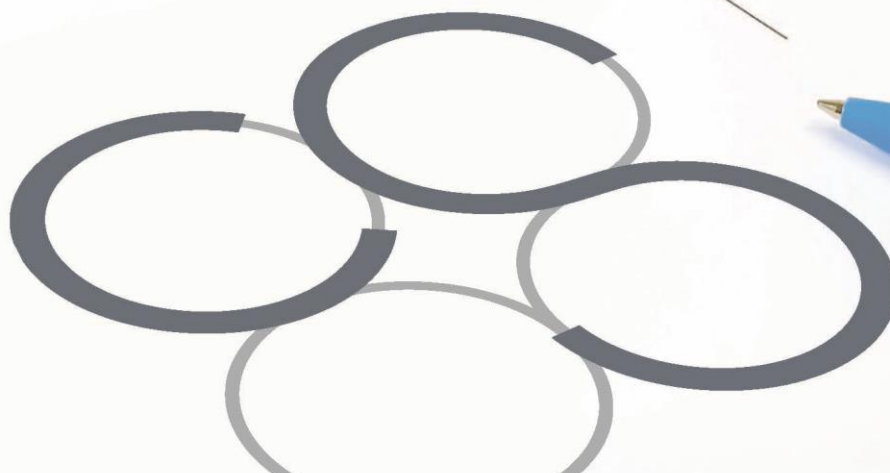
DUBLIN

**Site Specific Flood Risk Assessment
Proposed Residential Development
Bruff, Co. Limerick**

Client: Limerick City and County Council

Job No. L105L

May 2023



SITE SPECIFIC FLOOD RISK ASSESSMENT

PROPOSED RESIDENTIAL DEVELOPMENT, BRUFF, CO. LIMERICK

CONTENTS

1.0	INTRODUCTION	1
2.0	SITE LOCATION AND PROPOSED DEVELOPMENT	2
3.0	LEVEL OF SERVICE	3
4.0	FLOOD RISK AND MITIGATION MEASURES	9
5.0	CONCLUSION	11

Appendix A: Limerick City and County Council Flood Risk Maps

Appendix B: OPW Historic Flood Report

Appendix C: GSI Maps

This Report has been prepared by CS Consulting for the benefit of its Client only. The contents of this Report are shared with interested parties for information only and without any warranty or guarantee, express or implied, as to their accuracy, reliability or completeness. This Report cannot be relied on by any party other than the party who commissioned it.

File Location: Job-L105L\L105L LCCC Bruff Housing\B_DOCUMENTS\1.0 Planning\FRA

BS 1192 FIELD **BRUF-CSC-ZZ-XX-RP-C-0002**

Job Ref.	Author	Reviewed By	Authorised By	Issue Date	Rev. No.
L105L	FB	NB	NB	10.05.2023	P1
L105L	LJ	FB	NB	29.03.2023	P0

1.0 INTRODUCTION

Cronin & Sutton Consulting Engineers (CS Consulting) have been commissioned by Limerick City and County Council to prepare Site Specific Flood Risk Assessment for a proposed residential development at Bruff, Co. Limerick.

In preparing this report, CS Consulting has referred to the following:

- Limerick Development Plan 2022–2028;
(including Strategic Flood Risk Assessments)
- Office of Public Works Flood Maps;
- Department of the Environment Flooding Guidelines;
- Geological Survey of Ireland Maps;
- Local Authority Drainage Records.

The Site Specific Flood Risk Assessment is to be read in conjunction with the engineering drawings and documents submitted by CS Consulting and with the various additional information submitted by the other members of the design team, as part of the Planning Submission.

2.0 SITE LOCATION AND PROPOSED DEVELOPMENT

2.1 Site Location

The proposed development site is located in Ardykeohane, Bruff, Co Limerick. The site is in the administrative jurisdiction of Limerick City and County Council (LCCC) and has a total area of circa 0.82ha.

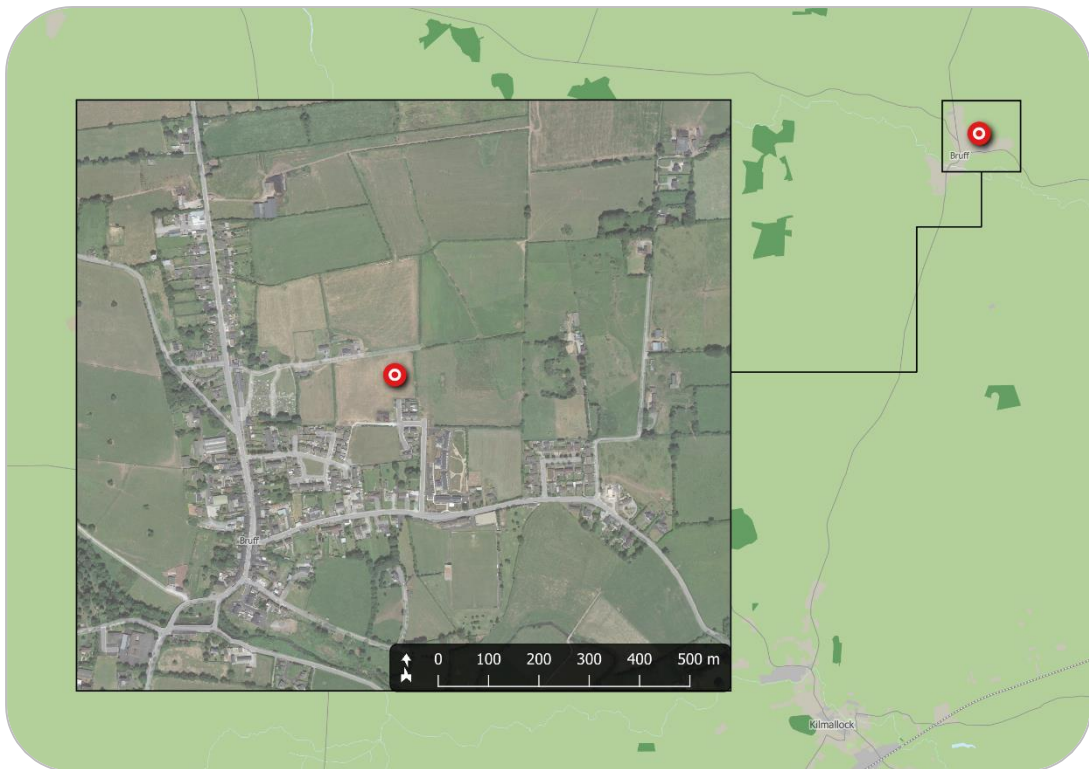


Figure 1 – Location of proposed development site
(map data & imagery: EPA, OSi, OSM Contributors, Google)

The location of the proposed development site is shown in Figure 1 above; the indicative extents of the development site, as well as relevant elements of the surrounding road network, are shown in more detail in Figure 2.



Figure 2 – Indicative site extents
(map data & imagery: OSM Contributors, Google)

The proposed development site is bound by existing single dwelling residential property to the north-west, existing residential buildings to the south-east, and on all other sides by greenfield.

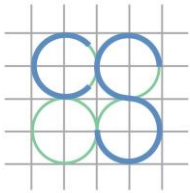
In the Limerick Development Plan 2022-2028, the development site is zones as 'New Residential Zone'.

2.2 Existing Site Condition

The subject development site is currently greenfield. River Morningstar is located approx. 580m to the south of the development site.

2.3 Description of the Proposed Development

The proposed development primarily consists of:



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The construction of 18no. dwellings, provision of an access road connecting to Brugh na nDeise, 30no. car parking spaces, bicycle parking, infrastructural works, hard and soft landscaping and ancillary works.

3.0 LEVEL OF SERVICE

There is an existing inherent risk of any flood event occurring during any given year. Typically, this likelihood of occurrence was traditionally expressed as a 1-in-100 chance of a 100-year storm event happening in any given year.

A less ambiguous expression of probability is the Annual Exceedance Probability (AEP), which may be defined as the probability of a flood event being exceeded in any given year. Therefore a 1-in-100-year event has a return period of 1% AEP flood event, similarly a 100% AEP can be expressed as a 1-in-1-year event.

The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Flood Risk Management Guidelines), published in 2009 set out the best practice standards for flood risk assessment in Ireland. These are summarised in Table 1 below (Table 8.1 from Flood Risk Management Guidelines document).

Table 1 – Summary of Level of Service: Flooding Source

Development Category	Flooding Source		
	Drainage	River	Tidal/Coastal
Residential	1% AEP	0.1% AEP	0.1% AEP
Commercial	1% AEP	1% AEP	0.5% AEP
Water-compatible (docks, marinas)	-	>1% AEP	>0.5% AEP

Under these guidelines a proposed development site has first to be assessed to determine the flood zone category it falls under.

It is a requirement of Limerick City and County Council, and the Flood Risk Management Guidelines that the predicted effects of climate change are

incorporated into any proposed design. Table 2 below indicates the predicted climate change variations.

Table 2 – Predicted climate change variations

Design Category	Predicted Impact of Climate Change
Drainage	20% Increase in rainfall
Fluvial (river flows)	20% Increase in flood flow
Tidal / Coastal	Minimum Finished Floor Level 4.0 – 4.15m AOD

The flooding guidelines categorise the risks associated with flooding into three areas, Zone A, B & C. This categorisation is indicated below.

- **Zone A** – High Probability of Flooding. Where the average probability of flooding from rivers and sea is highest (greater than 1% annually or 1 in 100 for river flooding or 0.5% annually or 1 in 200 for coastal flooding).
- **Zone B** – Moderate Probability of Flooding. Where the average probability of flooding from rivers and sea is moderate (risk between 0.1% annually or 1 in 1000 years and 1% annually or 1 in 100 years for river flooding, and between 0.1% or 1 in 1000 years and 0.5% annually or 1 in 200 for coastal flooding).
- **Zone C** – Low Probability of Flooding. Where the probability of flooding from rivers and sea is moderate (risk is less than 0.1% annually or 1 in 1000 years for both rivers and coastal flooding).

In accordance with the Flood Risk Management Guidelines, dwellings are classified as 'highly vulnerable developments' and commercial developments are classified as 'less vulnerable developments'. The proposed development is within the **Zone C** designation. See **Figure 3** and **Appendix A**.

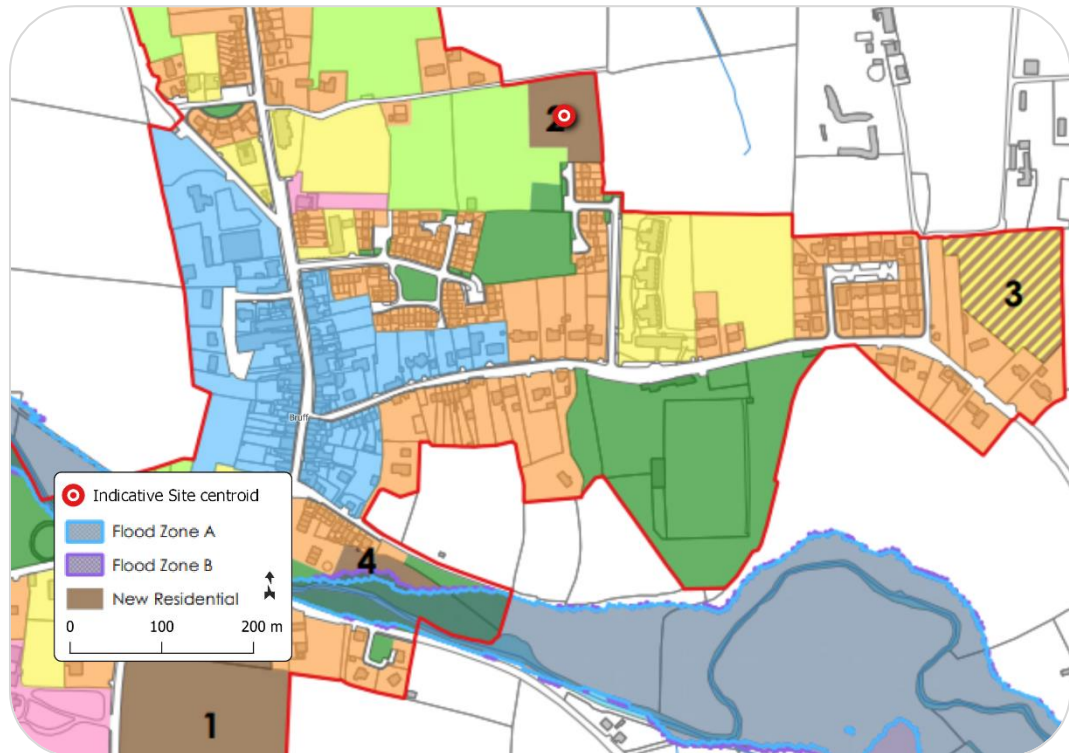


Figure 3 – Extract from LCCC Flood Zone Mapping
(background image source: Limerick City and County Council)

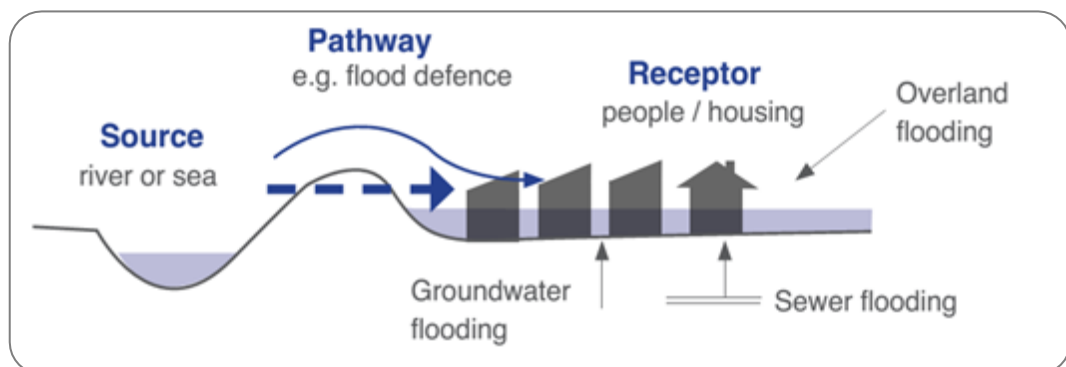


Figure 4 – Source-pathway-receptor model
(The Planning System and Flood Risk Management Guidelines)

The Flood Risk Management Guidelines have developed an 'appropriateness' matrix for various developments and their potential risk factor. The table indicates if further analysis is required in the form of a justification test. Table 3 below outlines the conditions that require a justification test.

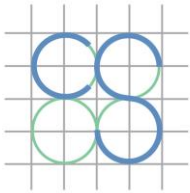


Table 3 – Flood Zone vs. Justification Test Matrix

Development Category	Flood Zone A	Flood Zone B	Flood Zone C
Highly Vulnerable Development	Justification Test Required	Justification Test Required	Appropriate
Less Vulnerable Development	Justification Test Required	Appropriate	Appropriate
Water-compatible Development	Appropriate	Appropriate	Appropriate

As noted above, the subject site is located within **Flood Zone C**. As such, no justification test is required.

4.0 FLOOD RISK AND MITIGATION MEASURES

4.1 Historic Flooding

A review of the Office of Public Works flood maps database, www.floodmaps.ie, for the area does not indicate historical flooding at the site. See the OPW Map-report in **Appendix B**.

4.2 Fluvial Flooding

Recent modelling of the area as part of Limerick City and County Council's Strategic Flood Risk Assessment, indicates that the subject lands are deemed to be located outside of the 0.1% AEP fluvial floodplain, based on the currently available maps. Therefore, the risk of fluvial flooding is not deemed to be significant. Refer to **Appendix A** for Flood Maps.

Therefore, the risk of fluvial flooding is not an issue and no mitigation measures are required.

4.3 Tidal Flooding

The sites elevated location indicates that the subject lands are not going to be affected by tidal flooding, the council's flood risk map does not indicate that the site is located in a tidal flood zone.

4.4 Pluvial Flooding

Pluvial flooding is flooding which has originated from overland flow resulting from high intensity rain fall. The historical flood mapping indicates a past flood event to the south (approx. 600m) of the development site. However, due to the topography of the surrounding area there shall be no potential effect on the proposed development lands. See the OPW Map-report in **Appendix B**.

Therefore, the risk of pluvial flooding is not an issue, and no mitigation measures are required.

4.5 Groundwater Flooding

According to the Geological Survey of Ireland interactive maps, the subject site is underlain with Dark muddy limestone, shale (Ballysteen Formation). The groundwater vulnerability assessment of the site shows that the vulnerability of groundwater in the area is high. The proposed development and the general geology of the subject lands means that the potential risk from groundwater is deemed acceptable. Please refer to **Appendix C** for GSI mapping information.

Therefore, the risk of groundwater flooding is not an issue, and no mitigation measures are required.

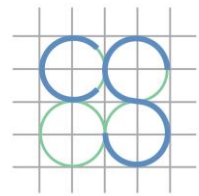
4.6 Potential for Site to Contribute to Off-Site Flooding

The site is currently developed but does not have any attenuation systems in place. As such the proposed redevelopment of the site shall require attenuation to be provided. The attenuation tank shall be sized for a 1-in-100-year storm event (including 20% increase for climate change) and shall release the storm water in a controlled manner after the peak storm duration has passed. By restricting the flow, the likelihood of the proposed development adversely affecting the public drainage system or contributing to downstream flooding is mitigated.

Therefore, the risk of off-site flooding is not an issue, and no mitigation measures are required.

5.0 CONCLUSION

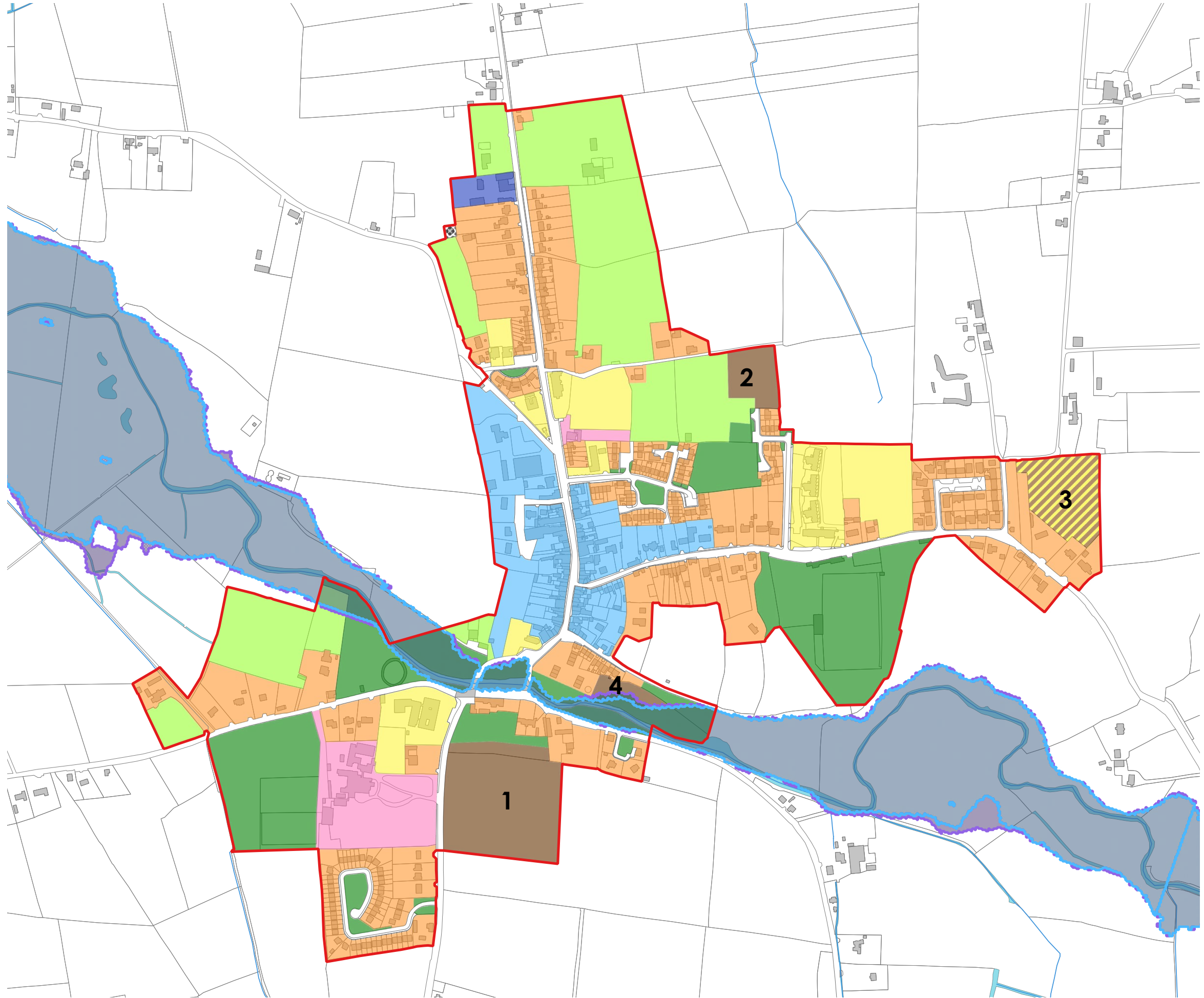
- The site historically has no recorded flood events as noted in the OPW's flood maps. The Limerick City and County Council Flood Risk Maps has indicated that the subject lands are located outside the 0.1% AEP Zone i.e., **Flood Zone C**.
- Predicted flood mapping for pluvial/tidal & fluvial flood events shall not affect the subject lands.
- The proposed development shall have a storm water attenuation system to address a 1-in-100-year extreme storm events increased by 20% for predicated climate change values. This shall significantly reduce the volume of storm water leaving the site during extreme storms which in turn shall have the effect of reducing the pressure on the existing public drainage system.
- The likelihood of onsite flooding from the hydrogeological ground conditions are deemed to be minor and within acceptable levels.



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Appendix A: Limerick City and County Council Flood Risk Maps

Bruff Flood Map



**Limerick
Development Plan
2022-2028**

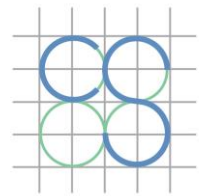
Bruff Flood Map

LEGEND

- Existing Residential
- New Residential
- Residential Serviced Sites
- Education & Community Facilities
- Village Centre
- Local Centre
- Enterprise & Employment
- Agriculture
- Open Space & Recreation
- Utilities
- Settlement boundary
- Flood Zone A
- Flood Zone B

DATE: Adopted June '22 | DWG. No.: CDP-V2-L4-BR-02
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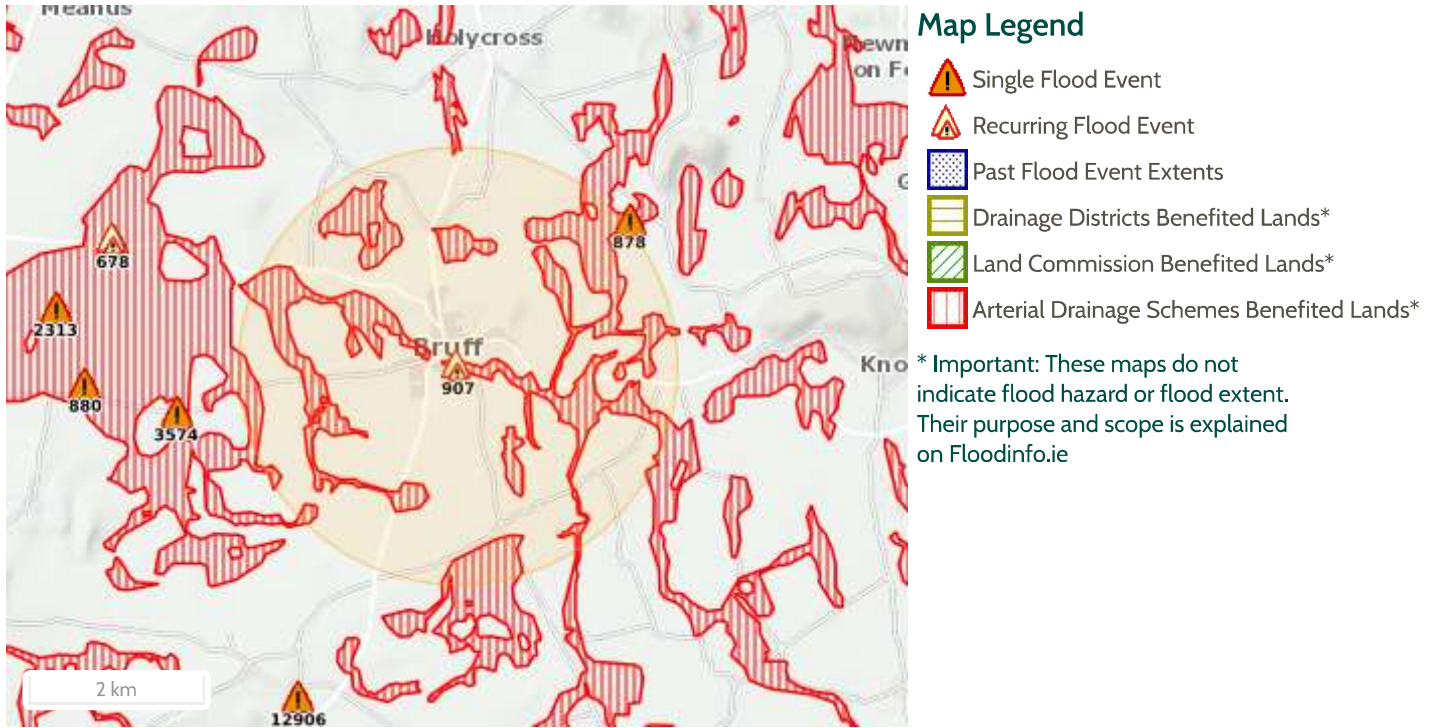
Appendix B: OPW Historic Flood Report



Report Produced: 20/3/2023 12:36

This Past Flood Event Summary Report summarises all past flood events within 2.5 kilometres of the map centre.

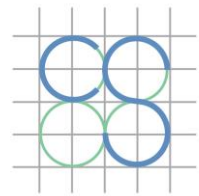
This report has been downloaded from www.floodinfo.ie (the "Website"). The users should take account of the restrictions and limitations relating to the content and use of the Website that are explained in the Terms and Conditions. It is a condition of use of the Website that you agree to be bound by the disclaimer and other terms and conditions set out on the Website and to the privacy policy on the Website.



1 Results

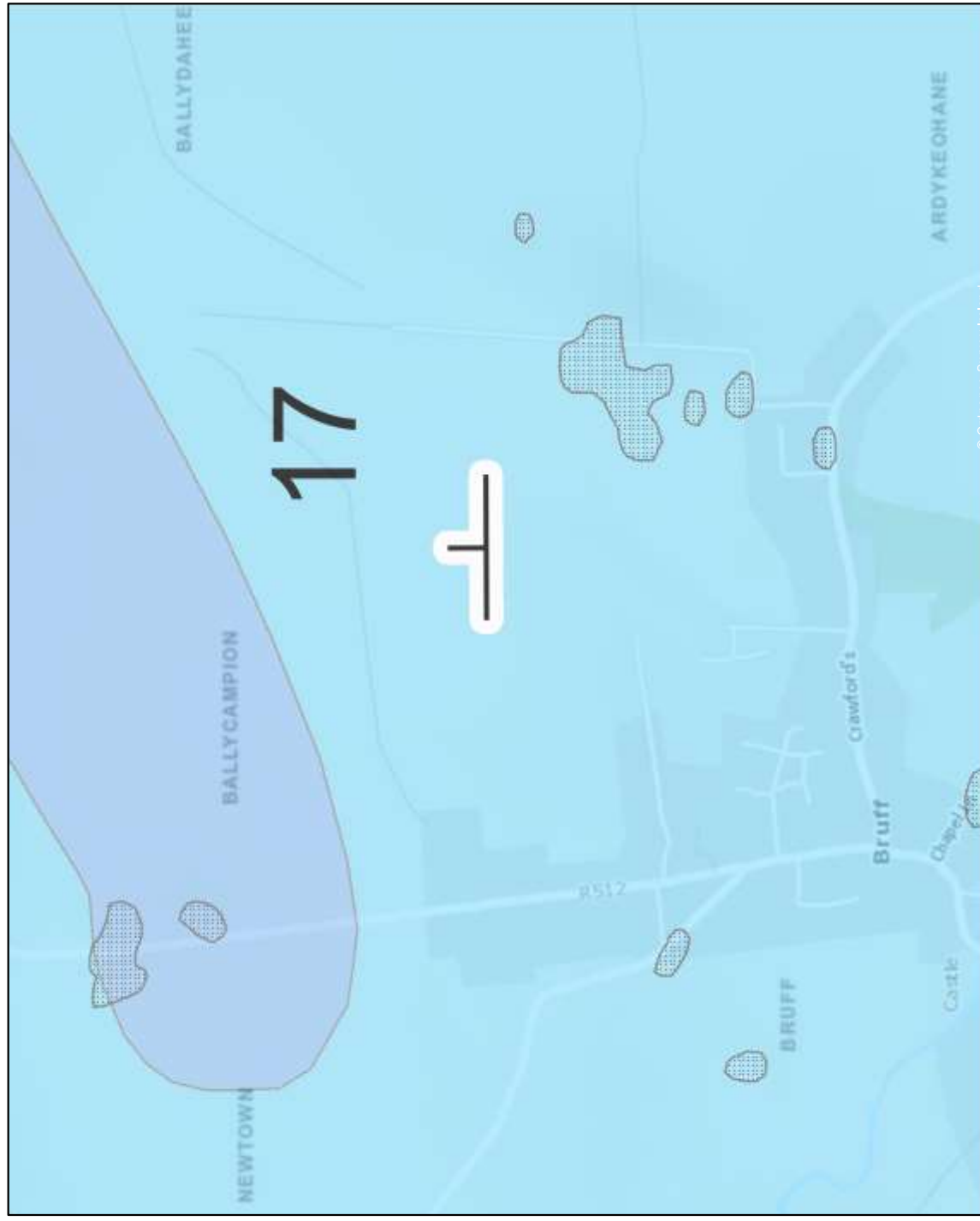
Name (Flood_ID)	Start Date	Event Location
1. Morningstar River Bruff - Limerick recurring (ID-907)	n/a	Exact Point

Additional Information: [Reports \(2\)](#) [Press Archive \(0\)](#)



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Appendix C: GSI Maps



Scale: 1:10,000

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Map Centre Coordinates (ITM) 563,183 636,753
3/20/2023, 12:45:15 PM

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Legend

Structural Symbols 100K ITM 2018

- Dip of bedding or main foliation, old
- GSI data First foliation parallel to bedding
- Foliation trend, Thorr and Rosses Granites
- Horizontal Bedding
- Strike and dip of bedding, right way up
- Strike and dip of bedding, way up
- unknown Strike and dip of first foliation
- Strike and dip of overturned bedding
- Strike and dip of second foliation
- Strike and dip of third foliation
- Strike and plunge of first generation fold
- Strike and plunge of second generation fold axis
- Strike and plunge of third generation fold axis
- Strike of vertical bedding/foliation
- Strike of vertical first foliation
- <all other values >

Bedrock Outcrops
100 ITM 2018

Bedrock Linework 100k ITM 2018

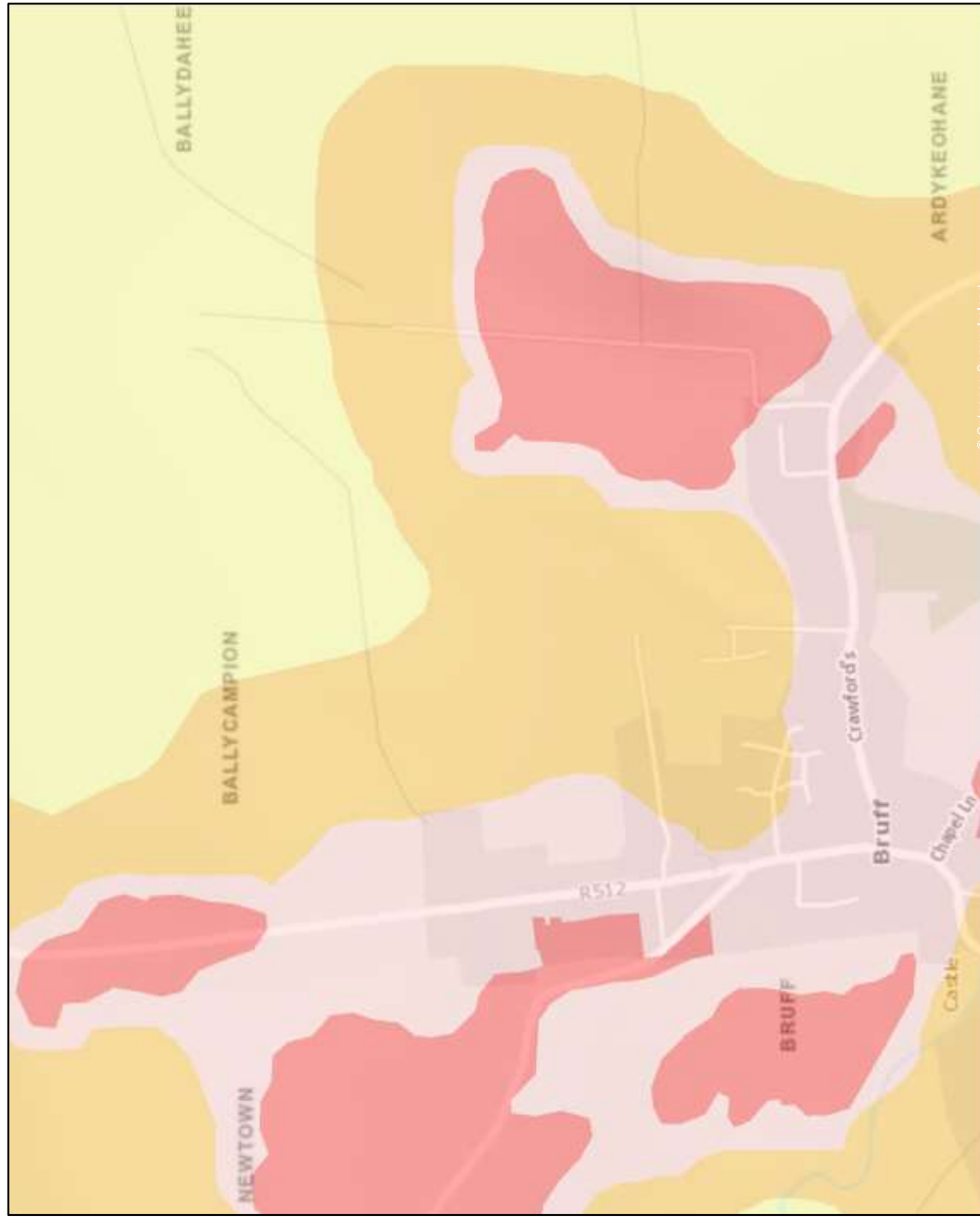
- Anticlinal Axis
- Antiformal axis
- Aquifer Boundary
- Area
- Coal seam
- Dyke
- Fault

- Ghost Line
- Goniatite marine band (R1-R4)
- Lithological boundary offshore
- Metacolerite sheet, mainly sills, Paleogene/ Tertiary
- Dyke
- Synclinal Axis
- Synformal axis
- Tectonic Slide, barbs on hanging-wall
- Thin stratigraphical unit, diagrammatic Thrust, barbs on hanging-wall side
- Tuff band
- Unconformity, dots on younger side
- X-Section

GSI Groundwater Vulnerability

Legend Groundwater Vulnerability

- Rock at or near Surface or Karst
- Extreme
- High
- Moderate
- Low
- Water



Scale: 1:10,000

Geological Survey Ireland

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