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# APPENDIX 1.1

PRESCRIBED BODIES CONSULTATION AND FEEDBACK





11 June 2025

**Re: Consultation on the preparation of an Environmental Impact Assessment Report for a proposed Large Scale Residential Development at Knockbrogan, Bandon, Co. Cork.**

A Chara,

We are acting on behalf of Castle Rock Homes (Bandon) Ltd in the preparation of an Environmental Impact Assessment Report (EIAR) for a proposed Large Scale Residential Development (LRD) at Knockbrogan, Bandon, Co. Cork.

Research and baseline analysis for the EIAR has commenced and an impact assessment will be carried out following completion of the design of the proposed development.

If you have any comments in relation to the potential environmental impacts of the proposed development, I would be grateful if you would forward them to me as soon as is convenient. The details of the site location, project description, and proposed works are outlined further below.

**Proposed Development**

Castle Rock Homes (Bandon) Ltd are seeking permission for the construction of the following:

- the construction of c. 214 no. residential units comprising a mixture of 2, 3 and 4-bedroom dwelling units, and
- The provision of landscaping and amenity areas and all associated infrastructure and services including access, footpaths, cycle paths, parking, drainage and lighting.

Please find enclosed a Site Location Map and the proposed draft Site Layout Plan which includes detail on the current proposed unit mix.

Please note that the details provided in the enclosed drawing are subject to change as the scheme progresses and feedback from the council and other statutory consultees are incorporated.

**Site Location and Description**

The site, which is 7.79 hectares in area, with a net developable area of 6.73 hectares, is located within the townland of Knockbrogan, approximately 1km northeast of Bandon town centre. The subject site is accessed via the existing Cork Road, located to the west as part of the permitted Phase 1 development

Also in DUBLIN  
Kreston House,  
Arran Court  
Arran Quay, Dublin 7  
D07 K271  
T. +353 (0) 1 804 4477  
E. info@mhplanning.ie

[www.mhplanning.ie](http://www.mhplanning.ie)

CORK  
6 Joyce House,  
Barrack Square  
Ballincollig, Co. Cork  
P31 YX97  
T. +353 (0)21 420 8710  
E. info@mhplanning.ie

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currently under construction. Further north of the site are the residential developments of Ard an Chuillin and The Hawthorns. The residential development of Radharc an Bhaile is located to the southwest of the development, and an agricultural greenfield site bounds the lands to the east, south and north of the site. The character of dwellings surrounding the site ranges in size and house types, comprising detached, semi-detached and terraced houses.

To the west of the subject site, construction works are currently underway for the 59 units permitted in Phase 1. Some units are being occupied, and the entrance to the site has been completed.

The subject site lies north of Bandon town centre, which hosts a variety of facilities and amenities. The town centre is a two-minute walk away. Some of the amenities that can be found include a range of cafes and restaurants, retail, doctors, dentists, and the Garda station.

**EIAR Structure and Content**

The EIAR is divided into three volumes as follows:

- Volume 1: Non-Technical Summary
- Volume 2: Main Environmental Impact Assessment Report
- Volume 3: Appendices

The overall structure of Volume 2 of the EIAR is as follows:

Chapter	Chapter Title
1.	Introduction
2.	Site Location and Project Description
3.	Alternatives Considered
4.	Population and Human Health
5.	Landscape and Visual
6.	Material Assets: Traffic and Transport
7.	Material Assets: Built Services
8.	Material Assets: Waste
9.	Land, Soils and Geology
10.	Water and Hydrology
11.	Biodiversity
12.	Noise and Vibration
13.	Air Quality
14.	Climate
15.	Cultural Heritage and Archaeology
16.	Risk of Major Accidents and Disasters
17.	Interactions of the Foregoing
18.	Summary of Mitigation Measures and Monitoring

Each chapter is to include the following elements:

- Introduction and Methodology
- Description of the Existing Environment
- Impact Assessment. Each discipline will consider impacts under the following headings:
  - Do-Nothing Scenario
  - Construction Phase
  - Operational Phase



In assessing impacts regard will be had to direct impacts, indirect impacts, and cumulative impacts. Where relevant, reference may also be made to 'synergistic impacts' or 'secondary impacts'. The assessment of impacts will have regard to the EPA guidelines and advice notes for preparing EIAR.

As the EIA progresses any relevant permitted or proposed projects will be included in the assessment.

The EIAR will also consider:

- Mitigation Measures
- Residual Impacts

**Summary**

In summary, this EIAR will consider the potential impact of the proposed development, in combination with the relevant planning applications in the vicinity.

The EIAR is being co-ordinated by McCutcheon Halley Chartered Planning Consultants. If you have any comments in relation to the potential environmental impacts of the proposed, I would be grateful if you would forward them to me as soon as is convenient.

You can email any comments to me at [cdineen@mhplanning.ie](mailto:cdineen@mhplanning.ie)

Yours sincerely,



Ciaran Dineen  
McCutcheon Halley



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For the attention Ciaran Dineen  
Planning consultant  
MH Planning  
6 Joyce House,  
Barrack Square  
Ballincollig, Co. Cork  
P31 YX97

11<sup>th</sup> July 2025

By Email: [cdineen@mhplanning.ie](mailto:cdineen@mhplanning.ie)



Uisce Éireann  
Bosca OP 448  
Oifig Sheachadta na  
Cathracha Theas  
Cathair Chorcaí

Uisce Éireann  
PO Box 448  
South City  
Delivery Office  
Cork City

**Planning Ref:** PN25000024961  
**Planning Authority:** Cork County Council  
**Issue Date:** 11 July 2025  
**Development Location:** Knockbrogan, Bandon, Co. Cork.

A Chara,

Uisce Éireann has the following comments for your consideration in regard to EIA scoping document relating to the proposed large residential development at Knockbrogan, Bandon, Co. Cork.

Uisce Éireann has reviewed the development site and it appears that there are no in situ assets that would need to be considered in a potential EIAR, or any potential risk to Uisce Éireann water abstraction operations.

In addition to the above, following aspects of water & wastewater services which should be considered in the scope of an EIAR where relevant.

- a) Protection of drinking water source(s) from potentially adverse impacts is a priority for Uisce Éireann. It is Uisce Éireann's current policy to maintain safe and secure drinking water supplies and ensure that development will not give rise to any deterioration in water quality. Where the development proposal has the potential to impact an Uisce Éireann Drinking Water Source(s), the applicant shall provide details of measures to be taken to ensure that there will be no negative impact to Uisce Éireann's Drinking Water Source(s) during the construction and operational phases of the development. Hydrological /

Stiúrthóirí / Directors: Jerry Grant (Cathaoirleach / Chairperson), Niall Gleeson (POF / CEO), Gerard Britchfield, Douglas Milican, Michael Nolan, Patricia King, Eileen Maher, Cathy Mannion, Paul Reid, Michael Walsh.  
Oifig Chláraithe / Registered Office: Teach Colvill, 24-26 Sráid Thabóid, Baile Átha Cliath 1, D01 NP95 / Colvill House, 24-26 Talbot Street, Dublin, Ireland D01NP95  
Is cúideachta ghníomhaíochta ainmnithe atá faoi theorainn scaireanna é Uisce Éireann / Uisce Éireann is a designated activity company, limited by shares.  
Cláráilte in Éirinn Uimh.: 530363 / Registered in Ireland No.: 530363.

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VOLUME 3

VOLUME 3

hydrogeological pathways between the applicant's site and receiving waters should be identified as part of an EIAR and/or the planning application.

- b) Where the development proposes the backfilling of materials, the applicant is required to include a waste sampling strategy to ensure the material is inert.
- c) Potential impacts of the development on the capacity of water services (*i.e. do existing water services have the capacity to cater for the new development*) - If your proposals require a connection(s) to either a public water supply or sewage collection system, you are advised to submit a Pre-Connection Enquiry (PCE) enquiry to Uisce Éireann to determine the feasibility of connection to the Uisce Éireann network ahead of lodging your planning application. The PCE should be submitted to Uisce Éireann well in advance of lodging your planning application. Lodging a COF with your planning application helps avoid delays in the consenting process.
- d) In relation to a development that would discharge trade effluent – any upstream treatment or attenuation of discharges required prior to discharging to an Uisce Éireann collection network.
- e) In relation to the management of surface water; the potential impact of surface water discharges to combined sewer networks and potential measures to stop surface waters from combined sewers. Uisce Éireann does not permit surface waters into our sewer network.
- f) Any physical impact on Uisce Éireann assets – reservoir, drinking water source, treatment works, pipes, pumping stations, discharges outfalls etc. including any relocation of assets.
- g) When considering a development proposal, the applicant is advised to determine the location of public water services assets, possible connection points from the applicant's site / lands to the public network and any drinking water abstraction catchments to ensure these are included and fully assessed in any pre-planning proposals. Details, where known, can be obtained by emailing an Ordnance Survey map identifying the proposed location of the applicant's intended development to [datarequests@water.ie](mailto:datarequests@water.ie)
- h) Other indicators or methodologies for identifying infrastructure located within the applicant's lands are the presence of registered wayleave agreements, visible

manholes, vent stacks, valve chambers, marker posts etc. within the proposed site.

- i) Any potential impacts on the assimilative capacity of receiving waters in relation to Uisce Éireann discharge outfalls including changes in dispersion / circulation characterises. Hydrological / hydrogeological pathways between the applicant's site and receiving waters should be identified within the report.
- j) Any potential impact on the contributing catchment of water sources either in terms of water abstraction for the development (*and resultant potential impact on the capacity of the source*) or the potential of the development to influence / present a risk to the quality of the water abstracted by Uisce Éireann for public supply should be identified within the report.
- k) Where a development proposes to connect to an Uisce Éireann network and that network either abstracts water from or discharges wastewater to a "protected"/ sensitive area, consideration as to whether the integrity of the site / conservation objectives of the site would be compromised should be identified within the report.
- l) Uisce Éireann does not permit build over of its assets. Separation distances from public infrastructure, as per Uisce Éireann's Standards, Codes and Practices must be achieved. It is the applicant's responsibility to submit a diversion enquiry to Uisce Éireann Diversions Section ([diversions@water.ie](mailto:diversions@water.ie)) prior to construction, where a potential build over of public assets is in question and/or where the applicants proposals cannot achieve separation distances from public infrastructure as per Uisce Éireann Standards & Codes of Practice. As an applicant you are required to;
  - survey the site to determine the exact location of the public assets. Any trial investigations should be carried out with the agreement and in the presence of Uisce Éireann. All queries relating to in situ public infrastructure should be directed to [diversions@water.ie](mailto:diversions@water.ie)
  - Provide evidence of separation distances between the existing Uisce Éireann assets and proposed structures, other services, trees, etc. have to be in accordance with Uisce Éireann Standards & Codes of Practice
- m) Where an existing connection is on place, the applicant or developer may be required to enter into a new or revised water and/or wastewater connection

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agreement(s) with Uisce Éireann prior to the commencement of this development.

- n) Where new connection(s) are sought, the applicant shall enter into water and/or wastewater connection agreement(s) with Uisce Éireann prior to the commencement of this development.

Queries relating to the comments above should be directed to [planning@water.ie](mailto:planning@water.ie). Queries for the Uisce Éireann Development Management Planning Team and EIAR Scoping Requests should be sent to [planning@water.ie](mailto:planning@water.ie)

Dermot Phelan,  
Connections Delivery Manager

**Ciaran Dineen**

**From:** INFO <Information@tii.ie>

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**NOTE:** This email originated from outside the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

**Dear Mr. Dineen,**

Thank you for your correspondence of 11 June 2025 regarding the above. Transport Infrastructure Ireland's (TII's) position in relation to your enquiry is as follows.

TII wishes to advise that it is not in a position to engage directly with planning applicants with respect to proposed developments. TII will endeavour to consider and respond to planning applications referred to it, given its status and duties as a statutory consultee under the Planning Acts. The approach to be adopted by TII in making such submissions or comments will seek to uphold official policy and guidelines, as outlined in the Section 28 Ministerial Guidelines 'Spatial Planning and National Roads Guidelines for Planning Authorities' (DoECLG, 2012) and TII publications.

Regard should also be had to other relevant guidance available at [www.tii.ie](http://www.tii.ie).

The issuing of this correspondence is provided as best practice guidance only and does not prejudice TII's statutory right to make any observations, requests for further information, objections or appeals, following the examination of any valid planning application referred.

With respect to EIAR Scoping issues, the recommendations indicated below provide only general guidance for the preparation of an EIAR, which may affect the national road network. No part of this submission shall be construed as TII giving consent to access or alter any national road infrastructure assets including drainage regimes, structures, safety etc. In the event that any damage is caused by any development works to the national road or associated assets, overground or underground, costs arising to fully remediate all impacted infrastructure assets to TII Publications standards and requirements will be pursued.

The project promoter should have regard, *inter alia*, to the following:

Having regard to the EPA *Guidelines on the information to be contained in Environmental Impact Assessment Reports, 2022*, it is recommended as appropriate that the national road and light rail networks are recognised as strategic transport assets under "material assets". EIAR assessment and mitigation should have regard to the following:

- National Roads: Official policy for development at or near national roads is set out in in the DoECLG Spatial Planning and National Roads Guidelines for Planning Authorities (2012), available at <https://www.gov.ie/en/collection/85b83-planning-guidelines-standards/>
- TII Publications: In addition, as part of TII's responsibilities for managing and improving the Country's national road and light rail networks, the Authority sets development guidance and standards for traffic and road assessments and construction, which may be necessary by reason of proposed development location, scale or typology, to be prepared to accompany applications for developments or works. Technical guidance and standards are contained in TII Publications, available at <https://www.tiipublications.ie/>.

In addition, the EIAR should have regard to, *inter alia*, to the following:

National Road Network:

- TII would be specifically concerned as to potential significant impacts the development would have on the national road network (and junctions with national roads), in the proximity of the proposed development.
- Consultations should be had with the relevant Local Authority/National Roads Design Office (RDO), with regard to the locations of existing and future national road schemes.
- The E IAR should have regard to any prior Environmental Impact Statement or Assessment Report and all conditions and/or modifications imposed by An Bord Pleanála regarding road schemes in the area. The developer should, in particular, have regard to any potential cumulative impacts.
- The E IAR should have regard to the provisions of Chapter 3 of the DoECLG 's 'Spatial Planning and National Roads Guidelines for Planning Authorities', in the assessment, in particular, the E IAR and associated design:
  - Should be cognisant of Environmental Noise Regulations 2006 (SI 140 of 2006) and how the development will affect and interact with action plans by the relevant competent authority as well as the Guidelines for the Treatment of Noise and Vibration in National Road Schemes (1st Rev., National Roads Authority, 2004)). Any additional works/structures required shall be funded by the developer.
  - With respect to the extent of the landscaping and boundary treatments, details of proposed management of this area and also measures to ensure the protection of the national road network at this location shall be required as part of a future planning application. Any additional works/structures required should be funded by the developer.
  - The E IAR should identify structures (lighting, gantries etc) associated with national road management located in close vicinity to the proposed development site. There is a need to address these matters of interactions for future residents. Any additional works/structures required should be funded by the developer.
  - With respect to the extent of the lands, it should be noted that national road surface water drainage regimes are constructed with the objective of disposing of national road surface water only. It is important that capacity in the national roads surface water drainage regime is retained to address this essential function. TII advises it would not support any private development application accessing the national road drainage regime and the Council should ensure that this does not occur. TII expects that this will be demonstrated by the future applicant.

TII Publications:

- It would be important that, where appropriate, subject to meeting the appropriate thresholds and criteria and having regard to best practice, a Traffic and Transport Assessment (TTA) be carried out in accordance with relevant guidelines, noting traffic volumes attending the site and traffic routes to/from the site, with reference to impacts on the national road network and junctions of lower category roads with national roads. In relation to national roads, TII's 'Traffic and Transport Assessment Guidelines' (2014) should be referred to in relation to proposed development, with potential impacts on the national road network. The scheme promoter is also advised to have regard to Section 2.2 of TII's TTA Guidelines, which addresses requirements for sub-threshold TTA.
- The designers and assessors are asked to consult TII Publications to determine whether a Road Safety Audit is required.

TII environmental assessment guidance:

- The E IAR should have regard to TII's Environmental Assessment and Construction Guidelines, including the 'Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes' (National Road Authority (NRA), 2014).
- The E IAR should consider the European Communities '(Environmental Noise) Regulations 2018' (S.I. No. 549 of 2018)) and, in particular, how the development will affect future action plans by the relevant competent

authority. The developer may need to consider the incorporation of noise barriers to reduce noise impacts (see 'Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes' (NRA, 2014)).

Haul routes utilising the national road network:

- Elements of the national road network are operated and managed by a combination of (Public Private Partnerships) PPP Concessions, Motorway Maintenance and Renewal Contracts (MMaRC) and local road authorities, in association with TII. In relation to haul route identification, the applicant/developer should clearly identify haul routes proposed and fully assess the network to be traversed to ascertain any operational requirements, including delivery timetabling, etc., to ensure that the strategic function of the national road network is safeguarded.
- Separate structure approvals/permits and other licences and works specific deeds of indemnity may be required in connection with the proposed haul route, including where temporary modification to the road network may be required. Consultation with all relevant local authorities, PPP Companies and MMaRC Contractors, may also be required.
- All structures on the haul route should be checked by the applicant/developer to confirm their capacity to accommodate any abnormal load proposed, including abnormal weight load. Additionally, any damage caused to the pavement on the existing national road arising from any temporary works due to the turning movement of abnormal loads (e.g. tearing of the surface course, etc.) shall be rectified in accordance with TII Pavement Standards and details in this regard shall be agreed with the Road Authority prior to the commencement of any development on site.

Notwithstanding any of the above, the developer should be aware that this list is non-exhaustive, thus site and development specific issues should be addressed in accordance with best practice.

I hope that this information is of assistance to you.

Yours sincerely,

\_\_\_\_\_  
**Suzanne Cahill**  
**Regulatory & Administration Executive**

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**Ciaran Dineen**

**From:** Michael McPartland <Michael.McPartland@fisheriesireland.ie>  
**Sent:** Tuesday 15 July 2025 12:11  
**To:** Ciaran Dineen  
**Subject:** EIAR Consultation Request at Knockbrogan, Bandon, Co. Cork  
**Attachments:** Site Location 1.2500.pdf; 25-7230-P1100 Site Layout Plan 1-1000.pdf; LTR\_250611\_Bandon\_Consultation\_CD.pdf

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Ciaran

Thank you for your recent email regarding the above-mentioned. It appears it may be proposed to dispose of septic effluent from the development to the public sewer. IFI would ask that Irish Water signifies there is sufficient capacity in existence so that it does not overload either hydraulically or organically existing treatment facilities or result in polluting matter entering waters. Should this not be the case then please forward proposals for alternative treatment and disposal options. IFI would ask that there be no interference with, bridging, draining, or culverting of any watercourse, their banks or bankside vegetation to facilitate this development, without the prior approval of IFI and that full cognisance is given to IFI "Guidelines on protection of fisheries during construction works in and adjacent to waters"

<https://www.fisheriesireland.ie/media/guidelines-on-protection-of-fisheries-during-construction-works-in-and-adjacent-to-waters>

Michael Mc Partland  
 Senior Fisheries Environmental Officer.

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 Iascach Intire Éireann  
 Inland Fisheries Ireland

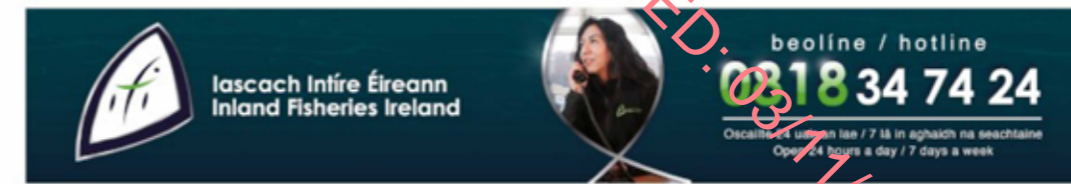
Tel + 353 (0)26 412 21/2  
 Fax + 353 (0)26 412 23  
 Email michael.mcpartland@fisheriesireland.ie  
 Web www.fisheriesireland.ie

Sunnyside House, Macroom, Co. Cork, Ireland. P12 X602

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 Help Protect Ireland's Inland Fisheries

**Michael McPartland**  
 Senior Fisheries Environmental Officer

✉ Michael.McPartland@fisheriesireland.ie • 📞 +353 (0)26 41222 • 🌐 www.fisheriesireland.ie • 🏠 P12 X602



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To read our Privacy Policy and Email Disclaimer Notice, Please visit [www.fisheriesireland.ie](http://www.fisheriesireland.ie)

**From:** Ciaran Dineen <cdineen@mhplanning.ie>  
**Sent:** Wednesday 11 June 2025 10:31  
**To:** Ciaran Dineen <cdineen@mhplanning.ie>  
**Cc:** Andrea McAuliffe <amcauliffe@mhplanning.ie>  
**Subject:** EIAR Consultation Request

A Chara,

We are acting on behalf of Castle Rock Homes (Bandon) Ltd in the preparation of an Environmental Impact Assessment Report (EIAR) for a proposed Large Scale Residential Development (LRD) at Knockbrogan, Bandon, Co. Cork.

Research and baseline analysis for the EIAR has commenced and an impact assessment will be carried out following completion of the design of the proposed development.

Please find attached a Site Location Map and the proposed draft Site Layout Plan which includes detail on the current proposed unit mix.

Please note that the details provided in the enclosed drawing are subject to change as the scheme progresses and feedback from the council and other statutory consultees are incorporated.

Also included are further details relating to the Project, including a description of the development.

If you have any comments in relation to the potential environmental impacts of the proposed development, I would be grateful if you would forward them to me as soon as is convenient.

Many thanks

**Ciaran Dineen**  
 Planning Consultant  
 McCutcheon Halley  
 CHARTERED PLANNING CONSULTANTS

**Cork**  
 6 Joyce House, Barrack Square,  
 Ballincollig, Cork,  
 P31 YX97  
**Tel:** +353 (0)21 420 8710

**Dublin**  
 4<sup>th</sup> Floor, Kreston House,  
 Arran Court, Arran Quay,  
 Dublin 7, D07 K271  
**Tel:** +353 (0)1 804 4477



[www.mhplanning.ie](http://www.mhplanning.ie)

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Ciaran Dineen  
 McCutcheon Halley  
 6 Joyce House  
 Barrack Square  
 Ballincollig, Cork, P31 YX97

12 June 2025

**Re: Consultation on the preparation of an E IAR for a proposed LRD at Knockbrogan, Bandon, Co. Cork**  
**Your Ref: n/a**  
**Our Ref: 25/90**

Dear Ciaran,  
 Geological Survey Ireland is the national earth science agency and is a division of the Department of the Environment, Climate and Communications. We provide independent geological information and interpretation and gather various data for that purpose. Please see our [website](#) for data availability.

With reference to your email received on the 11 June 2025, concerning the consultation on the preparation of an E IAR for a proposed LRD at Knockbrogan, Bandon, Co. Cork, we recommend using our various data sets when conducting the E IAR, SEA, planning and scoping processes for developments, plans and policies. For more detailed information on how to access this data please access 'Data and Maps' [Data & Maps \(gsi.ie\)](#) on our 'Geoscience for planning' webpage. Use of our data or maps should be attributed correctly (please refer to each individual dataset's metadata for correct attribution).

For specific data available for Environmental Assessment and Planning topics please follow this link [[Data by Environmental Assessment and Planning Topic \(gsi.ie\)](#)], where you will find our data arranged by environmental assessment topic as illustrated below:

<b>Land and soils</b>	<b>Water</b>	<b>Climate Change</b>
<i>Soil</i> <ul style="list-style-type: none"> <li>Subsoils (Quaternary Geology)</li> <li>Tellus Geochemistry</li> <li>Geotechnical</li> </ul> <i>Geology</i> <ul style="list-style-type: none"> <li>Bedrock</li> <li>Geophysics</li> <li>Bedrock &amp; Quaternary 3D</li> </ul>	<i>Groundwater</i> <ul style="list-style-type: none"> <li>Aquifers GW vulnerability, GWPSs (GWPPs)</li> </ul> <i>Surface water</i> <ul style="list-style-type: none"> <li>Tellus Geochemistry</li> </ul> <i>Estuarine &amp; marine waters</i> <ul style="list-style-type: none"> <li>Marine and coastal</li> </ul> <i>Flooding</i> <ul style="list-style-type: none"> <li>GWClimate</li> <li>Karst</li> </ul>	<i>Carbon accounting / Carbon balance</i> <ul style="list-style-type: none"> <li>Geothermal</li> <li>Carbon capture and storage</li> </ul> <i>Climate change trends</i> <ul style="list-style-type: none"> <li>National coastal change assessment</li> </ul>
<b>Cultural Heritage</b>	<b>Material Assets</b>	<b>The Landscape</b>
<i>Archaeology</i> <ul style="list-style-type: none"> <li>Cherish</li> </ul> <i>Underwater Archaeology</i> <ul style="list-style-type: none"> <li>Shipwrecks</li> </ul>	<i>Built Services</i> <ul style="list-style-type: none"> <li>Natural resources (Minerals &amp; Aggregates)</li> <li>Active quarries</li> </ul>	<i>Landscape Appearance &amp; Character</i> <ul style="list-style-type: none"> <li>Physiographic units</li> </ul> <i>Historical landscapes</i> <ul style="list-style-type: none"> <li>Historic mines</li> </ul>
<b>Other Relevant Data</b>		
<i>Natural (Geo) hazards</i> <ul style="list-style-type: none"> <li>Landslide Susceptibility Mapping</li> <li>Groundwater flooding</li> <li>Coastal vulnerability</li> <li>Subsidence</li> <li>Radon</li> </ul>	<i>Natural heritage</i> <ul style="list-style-type: none"> <li>Geoheritage (County Geological Sites)</li> <li>Dimension Stone/Stone Built Ireland</li> </ul>	

Geological Survey Ireland, Block 1, Booterstown Hall, Booterstown, Blackrock, Co Dublin, A94 N2R6  
 Bloc 1, Halla Bhaile an Bhóthair, Baile an Bhóthair, An Charraig Dhubh, Baile Átha Cliath, A94 N2R6  
 T +353 (0)1 678 2000 [www.gsi.ie](http://www.gsi.ie) *Fóiltítear roimh comhfhreagras i nGaeilge*



#### **Other Comments**

Should development go ahead, all other factors considered, Geological Survey Ireland would much appreciate a copy of reports detailing any site investigations carried out. The data would be redacted for confidentiality and added to Geological Survey Ireland's national database of site investigation boreholes, implemented to provide a better service to the civil engineering sector. Data can be sent to the Geological Mapping Unit, at <mailto:GeologicalMappingInfo@gsi.ie>.

If we can be of any further help, please do not hesitate to contact me Clare Glanville, or my colleague Trish Smullen at [GSIPlanning@gsi.ie](mailto:GSIPlanning@gsi.ie).

Yours sincerely,

Dr. Clare Glanville  
Senior Geologist

Geoheritage and Planning Programme  
Geological Survey Ireland

Trish Smullen  
Geologist

Geoheritage and Planning Programme  
Geological Survey Ireland

The publicly available data referenced/presented here, should in no way be construed as Geological Survey Ireland support for or objection to the proposed development or plan. The data are made freely available to all and can be used as independent scientific data in assessments, plans or policies. It should be noted that in many cases these data are a baseline or starting point for further site specific assessments.

Geological Survey Ireland, Block 1, Booterstown Hall, Booterstown, Blackrock, Co Dublin, A94 N2R6  
Bloc 1, Halla Bhaile an Bhóthair, Baile an Bhóthair, An Charraig Dhubh, Baile Átha Cliath, A94 N2R6  
T +353 (0)1 678 2000 [www.gsi.ie](http://www.gsi.ie) *Fáiltear roimh comhfhreagras i nGaeilge*

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# APPENDIX 6.1

TRAFFIC SURVEY AND AADT

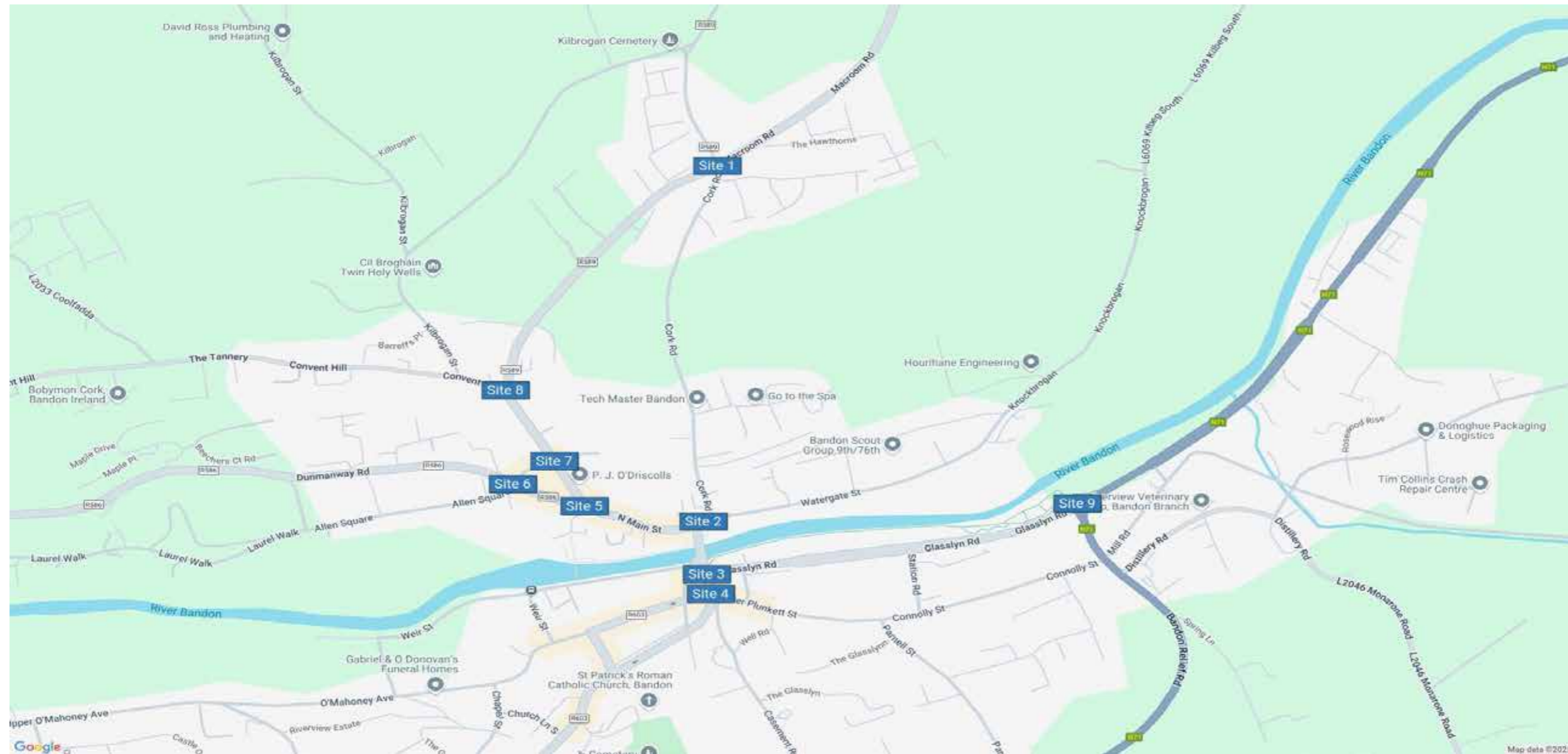
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**Name:** HDC1308 - Castlerock Bandon - Bandon Co Cork Junction Traffic Counts  
**Date of Traffic Surveys:** Tuesday 29 April 2025



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SITE 1 : Summary of Peak Hour and AADT Volumes									
Year	Without Development		With Development			Without Development	With Development	AADT	
	AM Peak	PM Peak	AM Peak	PM Peak	% HGVs	AADT	AADT	Difference	Difference %
2025	1,017	944			5.0%	10,852			
2028	1,149	1,089	1,160	1,104	5.0%	12,388	12,529	141	1.1%
2031	1,192	1,129	1,242	1,193	5.0%	12,844	13,478	634	4.9%
2038	1,256	1,189	1,301	1,246	5.0%	13,533	14,096	563	4.2%
2043	1,312	1,241	1,356	1,298	5.0%	14,125	14,688	563	4.0%

SITE 2 : Summary of Peak Hour and AADT Volumes									
Year	Without Development		With Development			Without Development	With Development	AADT	
	AM Peak	PM Peak	AM Peak	PM Peak	% HGVs	AADT	AADT	Difference	% Difference
2025	1,510	1,431			6.0%	16,276			
2028	1,763	1,727	1,789	1,762	6.0%	19,317	19,653	336	1.7%
2031	1,827	1,788	1,943	1,945	6.0%	20,007	21,518	1511	7.6%
2038	1,924	1,880	2,027	2,020	6.0%	21,052	22,395	1343	6.4%
2043	2,008	1,959	2,111	2,099	6.0%	21,954	23,297	1343	6.1%

SITE 3 : Summary of Peak Hour and AADT Volumes									
Year	Without Development		With Development			Without Development	With Development	AADT	
	AM Peak	PM Peak	AM Peak	PM Peak	% HGVs	AADT	AADT	Difference	% Difference
2025	1,775	1,807			6%	19,823			
2028	2,008	2,064	2,030	2,090	6%	22,532	22,805	272	1.2%
2031	2,083	2,140	2,184	2,261	6%	23,373	24,598	1226	5.2%
2038	2,197	2,256	2,287	2,363	6%	24,645	25,735	1089	4.4%
2043	2,295	2,356	2,385	2,464	6%	25,744	26,833	1089	4.2%

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SITE 4: Summary of Peak Hour and AADT Volumes									
Year	Without Development		With Development			Without Development	With Development	AADT	
	AM Peak	PM Peak	AM Peak	PM Peak	% HGVs	AADT	AADT	Difference	Difference %
2025	1,107	1,169			3.0%	12,596			
2028	1,226	1,305	1,237	1,319	3.0%	14,010	14,142	133	0.9%
2031	1,272	1,353	1,319	1,414	3.0%	14,528	15,126	597	4.1%
2038	1,341	1,426	1,382	1,480	3.0%	15,311	15,841	531	3.5%
2043	1,399	1,487	1,441	1,542	3.0%	15,974	16,505	531	3.3%

SITE 5: Summary of Peak Hour and AADT Volumes									
Year	Without Development		With Development			Without Development	With Development	AADT	
	AM Peak	PM Peak	AM Peak	PM Peak	% HGVs	AADT	AADT	Difference	% Difference
2025	1,067	1,054			7.5%	11,738			
2028	1,145	1,132	1,146	1,133	7.5%	12,598	12,615	17	0.1%
2031	1,191	1,177	1,197	1,184	7.5%	13,102	13,179	76	0.6%
2038	1,260	1,246	1,266	1,252	7.5%	13,868	13,936	68	0.5%
2043	1,321	1,305	1,327	1,312	7.5%	14,534	14,602	68	0.5%

SITE 6 : Summary of Peak Hour and AADT Volumes									
Year	Without Development		With Development			Without Development	With Development	AADT	
	AM Peak	PM Peak	AM Peak	PM Peak	% HGVs	AADT	AADT	Difference	% Difference
2025	787	652			10.0%	7,964			
2028	866	734	870	738	10.0%	8,853	8,897	45	0.5%
2031	901	762	917	782	10.0%	9,203	9,404	201	2.2%
2038	953	806	968	824	10.0%	9,737	9,915	179	1.8%
2043	1,000	845	1,015	862	10.0%	10,206	10,385	179	1.8%

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SITE 7: Summary of Peak Hour and AADT Volumes									
Year	Without Development		With Development			Without Development	With Development	AADT	
	AM Peak	PM Peak	AM Peak	PM Peak	% HGVs	AADT	AADT	Difference	% Difference
2025	934	893			6.0%	10,111			
2028	1,014	960	1,020	967	6.0%	10,922	10,995	73	0.7%
2031	1,054	997	1,081	1,029	6.0%	11,351	11,680	329	2.9%
2038	1,114	1,055	1,138	1,083	6.0%	12,000	12,292	292	2.4%
2043	1,165	1,104	1,190	1,132	6.0%	12,560	12,852	292	2.3%

SITE 8: Summary of Peak Hour and AADT Volumes									
Year	Without Development		With Development			Without Development	With Development	AADT	
	AM Peak	PM Peak	AM Peak	PM Peak	% HGVs	AADT	AADT	Difference	% Difference
2025	1,020	970			6.0%	11,013			
2028	1,112	1,046	1,118	1,048	6.0%	11,940	11,985	45	0.4%
2031	1,155	1,087	1,181	1,098	6.0%	12,407	12,609	202	1.6%
2038	1,221	1,149	1,243	1,159	6.0%	13,114	13,293	179	1.4%
2043	1,277	1,203	1,300	1,212	6.0%	13,724	13,903	179	1.3%

SITE 9: Summary of Peak Hour and AADT Volumes									
Year	Without Development		With Development			Without Development	With Development	AADT	
	AM Peak	PM Peak	AM Peak	PM Peak	% HGVs	AADT	AADT	Difference	% Difference
2025	1,356	1,599			8.0%	16,353			
2028	1,490	1,750	1,498	1,758	8.0%	17,928	18,021	93	0.5%
2031	1,548	1,819	1,587	1,856	8.0%	18,634	19,053	418	2.2%
2038	1,637	1,924	1,672	1,956	8.0%	19,707	20,079	372	1.9%

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# APPENDIX 9.1

TII CRITERIA



Appendix 9.1 – TII Impact Ratings and Assessment Criteria (Lands, Soils and Geology)

Table 1 Criteria for rating site Attributes – Estimation of Importance of Soil and Geology Attributes (NRA)

Importance	Criteria	Typical Examples
Very High	Attribute has a high quality, significance or value on a regional or national scale Degree or extent of soil contamination is significant on a national or regional scale Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale*	Geological feature rare on a regional or national scale (NHA) Large existing quarry or pit Proven economically extractable mineral resource
High	Attribute has a high quality, significance or value on a local scale. Degree or extent of soil contamination is significant on a local scale. Volume of peat and/or soft organic soil underlying route is significant on a local scale. *	Contaminated soil on site with previous heavy industrial usage Large recent landfill site for mixed wastes Geological feature of high value on a local scale (County Geological Site) Well drained and/or high fertility soils Moderately sized existing quarry or pit Marginally economic extractable mineral resource
Medium	Attribute has a medium quality, significance or value on a local scale Degree or extent of soil contamination is moderate on a local scale Volume of peat and/or soft organic soil underlying route is moderate on a local scale*	Contaminated soil on site with previous light industrial usage Small recent landfill site for mixed wastes Moderately drained and/or moderate fertility soils Small existing quarry or pit Sub-economic extractable mineral resource
Low	Attribute has a low quality, significance or value on a local scale Degree or extent of soil contamination is minor on a local scale. Volume of peat and/or soft organic soil underlying route is small on a local scale*	Large historical and/or recent site for construction and demolition wastes. Small historical and/or recent landfill site for construction and demolition wastes. Poorly drained and/or low fertility soils. Uneconomically extractable mineral resource.

\* relative to the total volume of inert soil disposed of and/or recovered

Source: Box 4.1: 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the National Roads Authority (NRA, 2009)

Table 2 Criteria for Rating Impact Significance at EIA Stage - Estimation Of Magnitude of Impact on Soil / Geology Attribute (NRA)

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute	Loss of high proportion of future quarry or pit reserves Irreversible loss of high proportion of local high fertility soils Removal of entirety of geological heritage feature Requirement to excavate / remediate entire waste site Requirement to excavate and replace high proportion of peat, organic soils and/or soft mineral soils beneath alignment
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Loss of moderate proportion of future quarry or pit reserves Removal of part of geological heritage feature Irreversible loss of moderate proportion of local high fertility soils Requirement to excavate / remediate significant proportion of waste site Requirement to excavate and replace moderate proportion of peat, organic soils and/or soft mineral soils beneath alignment
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Loss of small proportion of future quarry or pit reserves Removal of small part of geological heritage feature Irreversible loss of small proportion of local high fertility soils and/or high proportion of local low fertility soils Requirement to excavate / remediate small proportion of waste site Requirement to excavate and replace small proportion of peat, organic soils and/or soft mineral soils beneath alignment
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	No measurable changes in attributes
Minor Beneficial	Results in minor improvement of attribute quality	Minor enhancement of geological heritage feature
Moderate Beneficial	Results in moderate improvement of attribute quality	Moderate enhancement of geological heritage feature
Major Beneficial	Results in major improvement of attribute quality	Major enhancement of geological heritage feature

Source: Box 5.1: 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the National Roads Authority (NRA, 2009)

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**Table 3** Rating of Significant Environmental Impacts at EIA Stage (NRA)

Importance of Attribute	Magnitude of Importance			
	Negligible	Small Adverse	Moderate Adverse	Large Adverse
<b>Extremely High</b>	Imperceptible	Significant	Profound	Profound
<b>Very High</b>	Imperceptible	Significant/moderate	Profound/Significant	Profound
<b>High</b>	Imperceptible	Moderate/Slight	Significant/moderate	Profound/Significant
<b>Medium</b>	Imperceptible	Slight	Moderate	Significant
<b>Low</b>	Imperceptible	Imperceptible	Slight	Slight/Moderate

Source: Box 5.4: 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the National Roads Authority (NRA, 2009)

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# APPENDIX 10.1

TII CRITERIA\_SOURCE



Appendix 10.1 – TII Impact Ratings and Assessment Criteria (Hydrology and Hydrogeology)

**Table 1** Criteria for rating Site Attributes - Estimation of Importance of Hydrogeology Attributes (NRA)

Magnitude of Impact	Criteria	Typical Examples
Extremely High	Attribute has a high quality or value on an international scale	Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation e.g. SAC or SPA status
Very High	Attribute has a high quality or value on a regional or national scale	Regionally Important Aquifer with multiple well fields Groundwater supports river, wetland or surface water body ecosystem protected by national legislation – NHA status Regionally important potable water source supplying >2500 homes Inner source protection area for
High	Attribute has a high quality or value on a local scale	Regionally Important Aquifer Groundwater provides large proportion of baseflow to local rivers Locally important potable water source supplying >1000 homes Outer source protection area for regionally important water source Inner source protection area for locally important water source
Medium	Attribute has a medium quality or value on a local scale	Locally Important Aquifer Potable water source supplying >50 homes Outer source protection area for locally important water source
Low	Attribute has a low quality or value on a local scale	Poor Bedrock Aquifer Potable water source supplying <50 homes

Source: Box 4.3: 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the National Roads Authority (NRA, 2009)

**Table 2** Criteria for Rating Impact Significance at EIS Stage – Estimation of Magnitude of Impact on Hydrogeology Attribute (NRA)

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute and /or quality and integrity of attribute	Removal of large proportion of aquifer. Changes to aquifer or unsaturated zone resulting in extensive change to existing water supply springs and wells, river baseflow or ecosystems. Potential high risk of pollution to groundwater from routine run-off. <sup>1</sup> Calculated risk of serious pollution incident >2% annually. <sup>2</sup>
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Removal of moderate proportion of aquifer. Changes to aquifer or unsaturated zone resulting in moderate change to existing water supply springs and wells, river baseflow or ecosystems. Potential medium risk of pollution to groundwater from routine run-off. <sup>1</sup> Calculated risk of serious pollution incident >1% annually. <sup>2</sup>
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Removal of small proportion of aquifer. Changes to aquifer or unsaturated zone resulting in minor change to water supply springs and wells, river baseflow or ecosystems. Potential low risk of pollution to groundwater from routine run-off. <sup>1</sup> Calculated risk of serious pollution incident >0.5% annually. <sup>2</sup>
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Calculated risk of serious pollution incident <0.5% annually. <sup>2</sup>

Note 1 refer to Annex 1, Method C, Annex 1 of HA216/06

Note 2 refer to Appendix B3 / Annex 1, Method D, Annex 1 of HA216/06

Source: Box 5.3: 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the National Roads Authority (NRA, 2009)

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**Table 3** Rating of Significant Environmental Impacts at EIA Stage (NRA)

Importance of Attribute	Magnitude of Importance			
	Negligible	Small Adverse	Moderate Adverse	Large Adverse
<b>Extremely High</b>	Imperceptible	Significant	Profound	Profound
<b>Very High</b>	Imperceptible	Significant/moderate	Profound/Significant	Profound
<b>High</b>	Imperceptible	Moderate/Slight	Significant/moderate	Profound/Significant
<b>Medium</b>	Imperceptible	Slight	Moderate	Significant
<b>Low</b>	Imperceptible	Imperceptible	Slight	Slight/Moderate

Source: Box 5.4: 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the National Roads Authority (NRA, 2009)

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# APPENDIX 10.2

WFD ASSESSMENT



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REPORT

VOLUME 3

VOLUME 3



Water Framework Directive Assessment

Project Ref: DUB20 Phase 2 EIAR

CLIENT	DOCUMENT REFERENCE	DATE
McCutcheon Halley Planning	257501.5454WR01	17 September 2025

AWN Consulting Ltd, The Tecpro Building, IDA Business & Technology Park, Clonshaugh, Dublin 17, D17 XD90

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Details	Written by	Approved by
Signature		
Name	Marcelo Allende	Teri Hayes
Title	Principal Hydrological Consultant	Director (Water Services)
Date	17 September 2025	

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1. INTRODUCTION

1.1 Background

AWN Consulting Limited (AWN) has prepared this Water Framework Directive (WFD) Assessment to support the competent authority, in determining if there is a likelihood of significant effects on the Water Framework status of the receiving waterbodies as a result of the proposed development. A full description of the proposed development is provided in Chapter 2 of the EIAR, Project Description. Please. In summary, the subject application is for a large-scale Residential Development (LRD) comprising of the construction of 212 no. residential units and all ancillary development works including footpaths, car and bicycle parking, drainage, bicycle and bin stores, lighting and landscaping/amenity areas at Knockbrogan, Bandon, Co. Cork. Access will be provided via the existing access road onto the Cork Road permitted under reference 21/4059.

This WFD Assessment has been prepared in response to the requirements of the Water Framework Directive 2000/60/EC This WFD compliance document should be read in conjunction with Chapter 10 of the Environmental Impact Assessment Report (EIAR).

The objective of the assessment is to address the following:

- ▶ Does the development cause deterioration of a water body from its current status or potential for reaching "Good" status?
- ▶ Does the development impact on any water dependent protected areas, priority species, habitats etc.?
- ▶ Does the development support the achievement of water body objectives and programme of measures?

1.2 Experience of Authors

This report was prepared by Marcelo Allende. Marcelo Allende (BSc, BEng) is a Principal Environmental Consultant (Hydrologist) with AWN Consulting with over 20 years of experience in water resources technical studies, conceptual and numerical hydrological/hydrogeological modelling and environmental consultancy. Marcelo holds a degree in Water Resource Civil Engineering (BEng, Hons) from the University of Chile and a Bachelor of Science in Engineering (BSc, Hons). He has worked on a wide of range of projects including multi-aspect environmental investigations, geo-environmental impact assessments, surface and groundwater resource management, hydrological and hydrogeological conceptual and numerical modelling, strategic and site specific flood risk assessments (Stage 1,2 and 3), Due Diligence reporting, baselines studies, soils, surface water and groundwater monitoring and field sampling programmes on a variety of brownfield and greenfield sites throughout Ireland as well as overseas in Chile, Argentina, Peru and Panama. He is currently a member of the International Association of Hydrogeologists (IAH, Irish Group) and a member of Engineers Ireland (MIEI).

1.3 Source of Information

Desk-based hydrological and hydrogeological information in the vicinity of the site was obtained through accessing databases and other archives where available. Data was sourced from the following:

- ▶ Geological Survey of Ireland- online mapping (GSI, 2025).
- ▶ GSI - Geological Heritage Sites & Sites of Special Scientific Interest.
- ▶ Ordnance Survey of Ireland (OSI).
- ▶ Teagasc soil database.
- ▶ National Parks and Wildlife services (NPWS, 2025).
- ▶ Environmental Protection Agency (EPA) – website mapping and database information. Envision water quality monitoring data for watercourses in the area.

- ▶ WFD Cycle 2 – Bandon-Ilen Catchment Report – Sub-Catchment: Bandon\_SC\_050 (EPA, 2019).
- ▶ WFD Cycle 3 – HA20 Bandon-Ilen Catchment Report (EPA, 2024).
- ▶ Water Action Plan 2024 - A River Basin Management Plan for Ireland, (Department of Housing Local Government & Heritage, Sept 2024).
- ▶ Cork City and County Development Plan 2022-2028.
- ▶ The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW).
- ▶ Office of Public Works (OPW) flood mapping data ([www.floodmaps.ie](http://www.floodmaps.ie))

Site specific data was derived from the following sources:

- ▶ Various design site plans and drawings, as submitted with this planning application.
- ▶ Brian O’Kennedy & Associates Ltd. Engineers & Architects - Engineering Infrastructure Report for 214 dwellings for Castle Rock Homes (Bandon) Ltd. (2025).
- ▶ Various plans and drawings.

Relevant legislation and guidance is as follows:

- ▶ European Communities 920030, Common Implementation Strategy for the Water Framework Directives (2000/60/EC) Guidance Document No.2.
- ▶ EPA (May 2015), An approach to characterisation as part of the Water Framework Directive V2 revised.
- ▶ EPA (2010) Methodology for Establishing Groundwater Threshold Values, the Assessment of Chemical and Quantitative Status for Groundwater and Groundwater Trends.
- ▶ Common Implementation Strategy (CIS) (2017) Guidance Document No. 36 'Exemptions to the environmental objectives according to Article 4(7) provides comprehensive guidance on the application of Article 4(7).
- ▶ Joint Assistance to Support Projects in European Regions (JASPERS) (2018) Water Framework Directive Project assessment checklist tool.
- ▶ UKTAG (2012) Groundwater Chemical Classification for the Water Framework Directive. Paper 11b(i).
- ▶ UK Technical Advisory Group on the Water Framework Directive.
- ▶ UKTAG (2012) Groundwater Quantitative Classification for the Water Framework Directive. Paper 11b(ii), UK Technical Advisory Group on the Water Framework Directive.
- ▶ Inland Fisheries Ireland (IFI) – A Guideline on Planning for Watercourses in the Urban Environment.

This WFD assessment was based on desktop review of the Environmental Protection Agency (EPA) and Local Authority Waters Programme water quality records which were obtained from the portal [www.catchments.ie](http://www.catchments.ie) (accessed in September 2025). From the aforementioned source of information, the WFD Status classification and Risk score were obtained for the identified water bodies.

1.4 Site Setting and WFD General Screening

The Proposed Site Development is located in Knockbrogan, Bandon, Co Cork, covering a total area of approximately 7.844 hectares. It is c. 24km southwest of Cork city centre. The site is located within five joined fields and has been in long term agricultural use - being used annually for crop growing. The eastern boundary has low-level sod and stone mature ditch bordering further agricultural lands. The western boundary is a similar low-level ditch. The northern and southern boundaries are mature ditches mainly bounding farmland with an element of the south boundary adjacent to an existing housing estate.

The topography of the site is relatively flat on the northern portion of the site, however, the southern portion of the site is sloping approximately between 10% and 12%. The height of the site above ordnance datum (AOD) ranges from approximately 57.0 m AOD at its lowest point to 77.5 m AOD at the highest point. The site at present is a greenfield site unoccupied by any structures or buildings.

The proposed development site is located within the Bandon-Ilen WFD Catchment (Catchment ID: 20) and the Bandon\_SC\_050 WFD sub-catchment (EPA, 2025).

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This WFD Screening has identified three (3) no. WFD surface water bodies and one (1) no. WFD groundwater bodies of potential relevance due to the close proximity and connection of these waterbodies with the Proposed Development facilities.

The potential water bodies are listed in Table 1-1 below which also presents the most recent WFD Status and Risk Score for these waterbodies.

**Table 1-1. Current WFD Status and Risk Score of the relevant waterbodies**

Waterbody	Type	Location relative to development	EU Code	2016-2021 Status	3 <sup>rd</sup> Cycle Risk Score
Bandon_090	River	320 m d/s	IE_SW_20B020800	Good	Not at Risk
Bandon_100	River	2.8 km d/s	IE_SW_20B020900	Good	Not at Risk
Upper Bandon Estuary	Transitional	6.0 km d/s	IE_SW_080_0300	Poor	At Risk
Bandon	Groundwater	Underlying	IE_SW_G_086	Good	Not at Risk

**1.5 Legislation and Guidance**

The Water Framework Directive (WFD) 2000/60/EC aims to protect and enhance the quality of the water environment (both surface water and groundwater) across all European Union member states. The WFD was transposed into Irish law by the European Communities (Water Policy) regulations 2003 (S.I. No 722 of 2003). The WFD requires that EU Member States achieve at least "Good" status for all water bodies by the year of 2027 at the latest. Additionally, where Member States assign "High" status objectives to water bodies, the "High" status must be achieved or maintained by 2027.

The concept of 'deterioration of the status' of a body of surface water in Article 4(1)(a)(i) of Directive 2000/60 is interpreted as meaning that there is deterioration as soon as the status of at least one of the quality elements, within the meaning of Annex V to the directive, falls by one class, even if that fall does not result in a fall in classification of the body of the surface water as a whole. However, if the quality element concerned, within the meaning of that annex, is already in the lowest class, any deterioration of that element constitutes a 'deterioration of the status' of a body of surface water, within the meaning of Article 4(1)(a)(i).

As part of the WFD implementation process the EPA completes a risk assessment and the outcomes are implemented through River Basin Management Plans (RBMPs) in six-year cycles. Ireland is currently in WFD third cycle 2022-2027 i.e. Water Action Plan 2024 - A River Basin Management Plan for Ireland, (Department of Housing Local Government & Heritage, Sept 2024). Waterbodies are either "At Risk" or "Not at Risk" of meeting WFD environmental objectives. Where a waterbody is "At Risk", the EPA determines the significant pressures that are placing the water body at risk of meeting its status objective. This determination focuses the Programme of Measures for the relevant subcatchment(s).

The primary aim of the RBMP is that water bodies identified as being 'At Risk' of not achieving their WFD environmental objectives need to have targeted measures implemented to achieve objectives under this Plan. The EPA determines the significant pressures that are placing the water body at risk of meeting its status objective. This determination focuses the programme of Measures for the relevant subcatchment(s).

As part of its role, the EPA and other stakeholders such as local authorities must consider whether proposals for new developments (other than where exemptions apply Article 4.4 - 4.7 of the WFD) have the potential to:

- ▶ Cause a deterioration of a water body from its current status or potential; and/ or
- ▶ Prevent future attainment of good status or potential where not already achieved.

As a result, new developments that have the potential to impact on current or predicted WFD status are required to assess their compliance against the WFD objectives of the potentially affected water bodies.

**1.6 Methodology**

This WFD assessment is based on desktop review of the Environmental Protection Agency (EPA) dataset which was obtained from the portal [www.catchments.ie](http://www.catchments.ie) (accessed in September 2025).

The water bodies identified for this assessment are related to the vicinity of the proposed development and its direct or indirect hydrological or hydrogeological connection. From the aforementioned source of information, the WFD Status classification, and Risk score were obtained for the identified water bodies and are presented in Table 1-1 above.

Besides the status classification of water bodies, the WFD also requires that 'designated sites' meet their environmental requirements and conservation objectives. Designated sites are Natura 2000 sites (Special Areas of Conservation, SACs, with water-dependent habitats, and Special Protection Areas for species listed in the EU Habitats Directive); drinking water protected areas; bathing waters; shellfish waters; salmonid waters; and nutrient sensitive waters. Environmental requirements and conservation objectives for designated sites are stipulated in existing regulations or are being developed by the relevant public bodies (e.g., National Parks and Wildlife Service for SACs).

**1.6.1 WFD Risk Status**

The WFD Risk score is the risk for each waterbody of failing to meet their WFD objectives by 2027. The risk of not meeting WFD objectives has been determined by assessment of monitoring data, data on the pressures and data on the measures that have been implemented. Waterbodies that are At Risk are prioritised for implementation of measures. This assessment was completed in 2020 by the EPA Catchments Unit in conjunction with other public bodies and was primarily based on monitoring data up to the end of 2018.

The three risk categories are:

- ▶ Waterbodies that are 'At Risk' of not meeting their Water Framework Directive objectives. For these waterbodies an evidence-based process was undertaken to identify the significant pressures; once a pressure is designated as 'significant', measures and accompanying resources are needed to mitigate the impact(s) from this pressure. These 'At Risk' waterbodies require not only implementation of the existing measures described in the various regulations, e.g., the Good Agricultural Practices Regulations, but also in many instances more targeted supplementary measures.
- ▶ Waterbodies that are categorised as 'Review' either because additional information is needed to determine their status before resources and more targeted measures are initiated or the measures have been undertaken, e.g., a wastewater treatment plant upgrade, but the outcome hasn't yet been measured/monitored.
- ▶ Waterbodies that are 'Not at Risk' and therefore are meeting their Water Framework Directive objectives. These require maintenance of existing measures to protect the satisfactory status of the water bodies.

**1.6.2 WFD Water Body Status**

Surface water body status is classified by the EPA on the basis of chemical and ecological status or potential. This system is summarised in Appendix A Figure 1. Under the WFD, groundwater body status is classified on the basis of quantitative and chemical status. This system is summarised in Appendix A Figure 2.

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1.6.3 Surface Water No Deterioration Assessment

Table 1-2 below presents the matrix used to assess the effect of the proposed development on surface water status or potential class. It ranges from a major beneficial effect (i.e., a positive change in overall WFD status) through no effect to deterioration in overall status class. The colour coding used in Table 1-2 is applied to the 'No Deterioration Assessment' spreadsheet provided in Appendix B of this report.

Table 1-2. Surface Water Assessment Matrix

Effect	Description/ Criteria	Outcome
Major Beneficial	Impacts that taken on their own or in combination with others have the potential to lead to the improvement in the ecological status or potential of a WFD quality element for the entire waterbody	Increase in status of one or more WFD element giving rise to a predicted rise in status class for that waterbody.
Minor/localised beneficial	Impacts when taken on their own or in combination with others have the potential to lead to a minor localised or temporary improvement that does not affect the overall WFD status of the waterbody or any quality elements	Localised improvement, no change in status of WFD element
No Impact	No measurable change to any quality elements.	No change
Localised / temporary adverse effect	Impacts when taken on their own or in combination with others have the potential to lead to a minor localised or temporary deterioration that does not affect the overall WFD status of the waterbody or any quality elements. Consideration will be given to habitat creation measures.	Localised deterioration, no change in status of WFD element when balanced against mitigation measures embedded in the project.
Adverse effect on class of WFD element	Impacts when taken on their own or in combination with others have the potential to lead to the deterioration in the WFD status class of one or more biological quality elements, but not in the overall status of the waterbody. Consideration will be given to habitat creation measures.	Decrease in status of WFD element when balanced against positive measures embedded in the project.
Adverse effect on overall WFD class of waterbody	Impacts when taken on their own or in combination with others have the potential to lead to the deterioration in the ecological status or potential of a WFD quality element, which then lead to a deterioration of status/potential of waterbody.	Decrease in status of overall WFD waterbody status when balanced against positive measures embedded in the project.

1.6.4 Groundwater No Deterioration Assessment

Table 1-3 below presents the matrix used to assess the effect of the proposed development on groundwater status class. It ranges from a beneficial effect but no change in status to deterioration in overall status class. The colour coding used in Table 1-3 is applied to the final 'No Deterioration Assessment' spreadsheet in Appendix B of this report.

Table 1-3. Groundwater Assessment Matrix

Magnitude of Impact of the proposed development on WFD Element	Effect on WFD Element within the assessment boundary	Effect on Status of WFD element at the Groundwater Body Scale
Impacts lead to beneficial effect	Combined impacts have the potential to have a beneficial effect on the WFD element.	Improvement but no change to status of WFD element
No measurable change to groundwater levels or quality.	No measurable change to WFD elements.	No change and no deterioration in status of WFD element
Impacts when taken on their own have the potential to lead to a minor localised or temporary effect	Combined impacts have the potential to lead to a minor localised or temporary adverse effect on the WFD element.	Combined impacts have the potential to lead to a minor localised or temporary effect on the WFD element. No change to status of WFD element and no significant deterioration at groundwater body scale.
Impacts when taken on their own have the potential to lead to a widespread or prolonged effect.	Combined impacts have the potential to have an adverse effect on the WFD element.	Combined impacts have the potential to have an adverse effect on the WFD element, resulting in significant deterioration but no change in status class at groundwater body scale.
Impacts when taken on their own have the potential to lead to a significant effect.	Combined impacts in combination with others have the potential to have a significant adverse effect on the WFD element.	Combined impacts in combination with others have the potential to have an adverse effect on the WFD element AND change its status at the groundwater body scale

1.6.5 Assessment against Future Status Objectives

River Basin Management Plans are used to outline water body pressures and the actions that are required to address them. The future status objective assessment considers the ecological and chemical potential of a surface water body and the mitigation measures stated in the River Basin Management plans that defined the ecological and chemical potential. Assessments are based on the project (including mitigation measures) risks (construction and operation) with regard to the objectives for achieving good status as set out in the 3<sup>rd</sup> Cycle RBMP 2022-2027 i.e. Water Action Plan 2024. The assessment considers whether the proposed development has the potential to prevent the implementation or impact the effectiveness of the defined measures in these plans.

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**2. DESCRIPTION OF HYDROLOGICAL AND HYDROGEOLOGICAL ENVIRONMENT**

**2.1 Hydrology**

**2.1.1 Regional Hydrological Environment**

The Proposed Development site is located within the former Southwestern River Basin District (ERBD) (now the Irish River Basin District), as defined under the European Communities Directive 2000/60/EC, establishing a framework for community action in the field of water policy – this is commonly known as the Water Framework Directive (WFD). The Proposed Development site is located within the Bandon-Ilen WFD Catchment (Catchment ID: 20) and the Bandon\_SC\_050 WFD sub-catchment (EPA, 2025). There are no existing drainage features evident on the lands. No water run-off channels are evident on any part of the lands.

The nearest waterbody to the Site Boundary is the Bandon River, located c. 320m south of the proposed development. Along with this, there is a stream located c. 325m northeast of the proposed site (EPA Name: KILBEG\_NORTH) and another stream located c. 320m west of the proposed site (EPA Name: KILBROGAN), both of which flow directly into the Bandon River to the south. All these streams are associated with Bandon\_090 WFD River Waterbody (EPA Code: IE\_SW\_20B020800).

The Kilbeg North originates just south of the Kilbrogan Business Park, c. 370m north of the proposed development. The Kilbrogan Stream rises in Kilbrogan, north of Convent Hill Road (L2011), c. 1 km west of the proposed development. Both streams flow into the Bandon River, which then flows east to the Upper Bandon Estuary (EPA Code: IE\_SW\_080\_0300), as shown in Figure 2-1 below. Figure 2-1 below presents the regional hydrological environment as per the latest EPA mapping.

Figure 2-1. Site Location Map with Hydrological Environment



**2.1.2 Local Hydrological Environment**

There are no existing drainage features evident on the lands. No water run-off channels are evident on any part of the lands (Brian O’Kennedy & Associates Ltd. Engineers & Architects, 2025).

The phase 3 development site has a high point at the west end. From here a ridge falls eastwards. The eastern boundary has a low-level sod and stone mature ditch bordering further agricultural lands. The western boundary is a similar low-level ditch bordering the phase 2 development. The northern and southern boundaries are nature ditches mainly bounding farmland with an element of the south boundary adjacent to existing housing estate.

Overland flow paths which run perpendicular to the contours are shown in Figure 2-2 below. All these paths are believed to flow towards Bandon River to the southeast of the subject site.

Figure 2-2. Overland Flow Paths (Source: Brian O’Kennedy and Associates, 2025)



**2.1.3 Surface Water Quality**

All the watercourses that drain the subject site are associated with the Bandon\_090 WFD river waterbody (European Code: IE\_EA\_10A031140). As mentioned above, this waterbody has a most recent WFD surface water status (WFD Period: 2016-2021) of ‘Good’ and its current WFD risk score (3<sup>rd</sup> risk cycle) of ‘Not at risk’ of not achieving good status.

The Upper Bandon Estuary located c. 6.0km downstream of the proposed development has a ‘Poor’ Status and is classified as being ‘At Risk’ of not achieving good status. According to the EPA (2025), the Upper Bandon Estuary failed to achieve good status due to poor fish status or potential in addition to moderate chemical and oxygenation conditions.

Surface water quality is monitored periodically by the EPA at various regional locations along with principal and other smaller watercourses. The EPA assess the water quality of rivers and streams across Ireland using a biological assessment method, which is regarded as a representative indicator of the status of

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such waters and reflects the overall trend in conditions of the watercourse. The biological indicators range from Q5 – Q1. Level Q5 denotes a watercourse with good water quality and high community diversity, whereas Level Q1 denotes very low community diversity and bad water quality.

In relation to the Proposed Development site, the nearest (active) surface river waterbody EPA monitoring station is '1.5km d/s Bandon Br' located slightly upstream of where the Kilbeg North Stream enters, in the Bandon\_090 river waterbody which outfalls into Upper Bandon Estuary. The water quality at this station was classified by the EPA as Q4 (unpolluted), based on survey carried out in 2024.

**2.1.4 Areas of Conservation**

The NPWS (2025) on-line database have been reviewed to determine the location of areas of conservation within proximity to the Proposed Development site, and there are no Special Protected Areas (SPA) established under the EU Birds Directive (79/409/EEC), or Special Areas of Conservation (SAC) established under the Habitats Directive on or within the boundary of the Proposed Development site. The nearest Natura 2000 Site is Courtmacsherry Estuary SAC (Site Code 001230) located c. 9.5km south of the proposed development and the Courtmacsherry Bay SPA (Site Code 004219) located c. 10.1km south of the proposed development. The development site has no hydrological connection with either of these SAC/SPAs.

**2.1.5 Bathing Waters and Recreational Waterbodies**

A review of Environmental Sensitivity Mapping online maps that includes the Register of Protected Areas (RPA) under the Water Framework Directive (WFD) has shown that there are no Recreational Waters, Bathing Waterbodies RPA, within the proposed development or located near the Bandon River. The nearest Recreational Waters, Bathing Waterbodies RPA to the proposed development is Coolmaine (Bathing Water ID: IESWBWC090\_0000\_0100) located c.12.3 km south.

**2.1.6 Water Supplies**

A review of the Environmental Protection Agency's (EPA) online mapping, which includes the Register of Protected Areas (RPA) established under the Water Framework Directive (WFD), indicates that there are no Nutrient Sensitive Areas within the proposed development. The nearest Nutrient Sensitive Area is the Bandon Estuary Upper.

A review of the EPA's surface water abstraction register (July 2025) identified 2 no. abstraction points located within Bandon River (Bandon\_090 and Bandon\_100 River Waterbodies): R00929-01 at Bandon\_090 waterbody, associated with the construction of the Bandon Wastewater Treatment Plant upgrade (Uisce Éireann infrastructure testing) and R00929-01, at Bandon\_100 waterbody, associated with Public Supply in Innishannon.

**2.1.7 Water Infrastructure**

Uisce Éireann have an existing 100mm diameter watermain in the L-2040 public roadway which is currently serving Phase 1 of the Blossom Hill development. There is an existing surface water drainage and a foul sewer network in the L-2040 public roadway (Cork Road).

**2.2 Hydrogeology**

**2.2.1 Regional Groundwater Quality**

As mentioned above, the groundwater body in the region of the site (Bandon GWB - European Code: IE\_SW\_G\_086) for which the site is located entirely within, has a WFD status of 'Good' (WFD Period: 2016-2021) and a WFD risk score (3rd Cycle) of "Not at Risk" of not achieving good status, meaning it has achieved its objectives.

**2.2.2 Aquifer Classification and Vulnerability**

The GSI has devised a system for classifying the bedrock aquifers in Ireland. The aquifer classification for bedrock depends on a number of parameters including, the area extent of the aquifer (km<sup>2</sup>), well yield (m<sup>3</sup>/d), specific capacity (m<sup>3</sup>/d/m) and groundwater throughput (mm<sup>3</sup>/d). There are three main classifications: regionally important, locally important and poor aquifers. Where an aquifer has been classified as regionally important, it is further subdivided according to the main groundwater flow regime within it. This sub-division includes regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). Locally important aquifers are sub-divided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (LI). Similarly, poor aquifers are classed as either generally unproductive except for local zones (PI) or generally unproductive (Pu).

The GSI (2025) National Aquifer Map identifies gravel and bedrock aquifers beneath the subject site and they are classified as 'Locally Important Aquifer (LI)', i.e. Bedrock which is Moderately Productive only in Local Zones.

Figure 2-3. Aquifer Classification (Source: GSI, 2025)



Groundwater vulnerability is an indication of how easily the aquifer can become contaminated by human activity. It is dependent on the thickness and permeability of the overlying soils and depth to the water table. For example, a bedrock aquifer with minimal thickness of overburden or with a thin layer of permeable overburden will be more vulnerable to contamination than a bedrock aquifer which has a thick layer of low permeability overburden. Extreme groundwater vulnerability is also associated with karst landforms as these are a direct pathway for water and contaminants to enter the aquifer from the surface.

The GSI (2025) guidance presently classifies the bedrock aquifer vulnerability in the region of the subject site as 'High' Vulnerability on the east portion of the site, which indicates that the depth of bedrock would

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be 3-5 m below ground level. However, the groundwater vulnerability rating is classified as 'Extreme' Vulnerability on the west portion of the site, which indicates that the depth of bedrock would be around 0-3 m below ground level. (refer to Figure 2-4 below).

Figure 2-4. Aquifer Vulnerability (Source: GSI, 2025)



2.2.3 Groundwater Supply

There are no recorded Public Supply Source Protection Area or Group Scheme Preliminary Source Protection Areas in the vicinity of the proposed development site.

The nearest Group Scheme Preliminary Source Protection area is Faran, located c. 14.7 km north of the proposed site. The nearest Public Supply Source Protection area is Crookstown Pound Cross PWS located c. 11.6 km north. Neither of these areas share a hydrological or hydrogeological connection to the site.

3. WATERBODIES IDENTIFICATION AND STATUS

The Water Framework Directive (WFD) 2000/60/EC was adopted in 2000 as a single piece of legislation covering rivers, lakes, groundwater, transitional (estuarine) and coastal waters. In addition to protecting said waters, its objectives include the attainment of 'Good Status' in water bodies that are of lesser status at present and retaining 'Good Status' or better where such status exists at present. 'Good Status' was to be achieved in all waters by 2015 or at least by 2027, as well as maintaining 'high status' where the status already exists. The EPA co-ordinates the activities of the River Basin Districts, local authorities and state agencies in implementing the directive, and operates a groundwater quality monitoring programme undertaking surveys and studies across the Republic of Ireland.

As presented in Section 1.4 above, this WFD Screening has identified three (3) no. WFD surface water bodies (river and transitional) and one (1) no. WFD groundwater bodies of relevance due to the close proximity and connection of these waterbodies with the Proposed Development.

In accordance with the WFD, each river catchment within the former RBD was assessed by the EPA and a water management plan detailing the programme of measures was put in place for each one. Currently, as presented in Table 1-1 above, the EPA classifies the WFD Ecological Status for the Bandon River and its local tributaries network (Bandon\_090 and Bandon\_100 WFD) waterbody as having 'Good' status (2016-2021 cycle) with a current WFD River Waterbody risk score of 'Not at risk' of not achieving good status'. The Upper Bandon Estuary Transitional Waterbody located c. 6.0 km downstream of the Proposed Development Site has a 'Poor' status and a risk score of and 'At risk of not achieving good status'. As mentioned above, the Upper Bandon Estuary failed to achieve good status due to poor fish status or potential in addition to moderate chemical and oxygenation conditions.

The main pressure associated with the Bandon Subcatchment (Bandon\_SC\_050) is mainly Urban Waste Water (agglomeration PE of 2,001-10,000) on Bandon River (Bandon\_090) and agricultural and pasture activities on Upper Bandon Estuary, based on the WFD Cycle 2 report produced by the EPA in January 2019 and the 3rd Cycle Bandon-Ilken Catchment Report (HA20) (EPA, 2024). The Upper Bandon Estuary is an Area for Action (AFA).

There is an existing hydrological connection/pathway between the Proposed Development Site and these surface waterbodies through the site drainage which ultimately discharges into the Bandon River which discharges into the Upper Bandon Estuary.

As mentioned in Section 1.4 above, the groundwater body (GWB) underlying the site is the Bandon Groundwater Body (European Code: IE\_SW\_G\_086). Based on the most recent data (www.epa.ie), the Bandon GWB for which the site is located entirely within, has a WFD status of 'Good' (WFD Period: 2016-2021) and a WFD risk score (3rd Cycle) of 'Not At Risk' of not achieving good status.

The Proposed Development will temporarily increase the aquifer vulnerability during construction prior to paving and installation of stormwater drainage and services. However, there is no potential for change in groundwater levels as a result of local changes in the groundwater regime at the site due to the unlikely occurrence of dewatering activities and the natural recharge capacity of the underlying 'Locally Important Aquifer', which allows for the maintenance of groundwater levels. This ensures that the aquifer's integrity and functionality remain unaffected by any temporary dewatering measures.

Other waterbodies that may be hydrologically connected to the Proposed Development site, but are located further away (namely Lower Bandon Estuary Transitional Waterbodies [EU code: IE\_SW\_080\_0100], Kinsale Harbour [EU code: IE\_SW\_080\_0000] and Western Celtic Sea Coastal Waterbodies [EU code: IE\_SW\_010\_0000]) were excluded from the assessment due to their distance from the subject site, the potential loading of contaminant from the site and significant dilution through its pathway.

Figure 3-1 to Figure 3-4 below summarise the water quality of the aforementioned waterbodies.

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Figure 3-1. Water Quality for the Bandon\_090 River Waterbody (Source: EPA, 2025)

Waterbody: BANDON_090			
Name:	BANDON_090	Code:	IE_SW_208020800
Subcatchments:	<a href="#">20_2 Bandon_SC_080</a> <a href="#">20_5 Bandon_SC_050</a>	Catchments:	<a href="#">20 Bandon_080</a>
Latitude:	51.7365247	Longitude:	-8.7495506
Cycle 1 RBD:	South Western	Local Authority:	Cork County Council
Waterbody Category:	River	WFD Risk:	Not at risk
Protected Area:	No	High Status Objective:	No
Heavily Modified:	Unknown	Artificial:	Unknown
Area (Km <sup>2</sup> ):	N/A	Length (Km):	42.53
Transboundary:	No	Canal:	No

SW 2016-2021

Status	Assessment Technique	Status Confidence	Value
▼ Ecological Status or Potential	Monitoring	High confidence	Good
▼ Biological Status or Potential			Good
Invertebrate Status or Potential			Good
▼ Supporting Chemistry Conditions			Pass
▼ General Conditions			Pass
▼ Oxygenation Conditions			Pass
Dissolved Oxygen (% Sat)			Pass
Other determinant for oxygenation conditions			High
▼ Acidification Conditions			Pass
pH			Pass
▼ Nutrient Conditions			Pass
▼ Nitrogen Conditions			Moderate
Nitrate			Moderate
Ammonium			High
▼ Phosphorous Conditions			High
Orthophosphate			High

Figure 3-2. Water Quality for the Bandon\_100 River Waterbody (Source: EPA, 2025)

Waterbody: BANDON_100			
Name:	BANDON_100	Code:	IE_SW_208020900
Subcatchments:	<a href="#">20_13 Bandon_SC_D60</a> <a href="#">20_5 Bandon_SC_050</a>	Catchments:	<a href="#">20 Bandon_080</a>
Latitude:	51.7793157	Longitude:	-8.6874333
Cycle 1 RBD:	South Western	Local Authority:	Cork County Council
Waterbody Category:	River	WFD Risk:	Not at risk
Protected Area:	Yes	High Status Objective:	No
Heavily Modified:	Unknown	Artificial:	Unknown
Area (Km <sup>2</sup> ):	N/A	Length (Km):	11.22
Transboundary:	No	Canal:	No

SW 2016-2021

Status	Assessment Technique	Status Confidence	Value
▼ Ecological Status or Potential	Monitoring	High confidence	Good
▼ Biological Status or Potential			Good
Invertebrate Status or Potential			Good
▼ Supporting Chemistry Conditions			Pass
▼ General Conditions			Pass
▼ Oxygenation Conditions			Pass
Dissolved Oxygen (% Sat)			Pass
Other determinant for oxygenation conditions			High
▼ Acidification Conditions			Pass
pH			Pass
▼ Nutrient Conditions			Pass
▼ Nitrogen Conditions			Moderate
Nitrate			Moderate
Ammonium			High
▼ Phosphorous Conditions			High
Orthophosphate			High

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Figure 3-3. Water Quality for the Upper Bandon Estuary Transitional Waterbody (Source: EPA, 2025)

Waterbody: Upper Bandon Estuary			
Name:	Upper Bandon Estuary	Code:	IE_SW_080_0300
Catchments:	<a href="#">20 Bandon-Ilen</a>	Longitude:	-8.64169
Latitude:	51.75423	Local Authority:	Cork County Council
Cycle 1 RBD:	South Western	WFD Risk:	At risk
Waterbody Category:	Transitional	High Status Objective:	No
Protected Area:	Yes	Artificial:	No
Heavily Modified:	No	Length (Km):	N/A
Area (Km <sup>2</sup> ):	0.35		
Transboundary:	No		

SW 2016-2021

Status	Assessment Technique	Status Confidence	Value
▼ Ecological Status or Potential	Monitoring	high confidence	Poor
▼ Biological Status or Potential			Poor
Phytoplankton Status or Potential			Moderate
Fish Status or Potential			Poor
▼ Supporting Chemistry Conditions			Moderate
▼ General Conditions			Moderate
▼ Oxygenation Conditions			Moderate
Dissolved Oxygen (% Sat)			Moderate
Other determinand for oxygenation conditions			Good
▼ Nutrient Conditions			Moderate
Phosphorous Conditions			High

Figure 3-4. Water Quality for the Bandon Groundwater Waterbody (Source: EPA, 2025)

Waterbody: Bandon			
Name:	Bandon	Code:	IE_SW_G_086
Catchments:	<a href="#">19 Lee, Cork Harbour and Youghal Bay</a> <a href="#">20 Bandon-Ilen</a> <a href="#">21 Duimmanus, Bantry-Kemmer</a>	Longitude:	51.746503
Latitude:	-8.811172	Local Authority:	Cork County Council
Cycle 1 RBD:	South Western	WFD Risk:	Not at risk
Waterbody Category:	Groundwater	High Status Objective:	No
Protected Area:	N/A	Artificial:	N/A
Heavily Modified:	N/A	Length (Km):	N/A
Area (Km <sup>2</sup> ):	N/A	Canal:	No
Transboundary:	No		

GW 2016-2021

Status	Assessment Technique	Status Confidence	Value
▼ Overall Groundwater Status			Good
▼ Quantitative Groundwater Status			Good
Saline (or Other) Intrusions Test			Good
Impact of Groundwater on Surface Water Ecological/Quantitative Status Test			Good
Groundwater Dependent Ecosystems (GWDTE) - Quantitative Assessment Test			Good
Water Balance Test			Good
▼ Chemical Groundwater Status			Good
Saline (or Other) Intrusions Test			Good
Impact of Groundwater on Surface Water Ecological/Chemical Status Test			Good
Groundwater Dependent Ecosystems (GWDTE) - Chemical Assessment Test			Good
Drinking Water Protected Area Test			Good
General Chemical Assessment Test			Good

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#### 4. DESCRIPTION OF THE PROPOSED DEVELOPMENT

The purpose of this section is to provide an overview of the key relevant details of the construction phase and operational phase of the Proposed Development. The information presented in this section is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full development package. For a more comprehensive understanding of the Proposed Development, please refer to Chapter 2 'Description of the Proposed Development' of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the Proposed Development.

The subject application is for a large-scale Residential Development (LRD) comprising of the construction of 212 no. residential units and all ancillary development works including footpaths, car and bicycle parking, drainage, bicycle and bin stores, lighting and landscaping/amenity areas at Knockbrogan, Bandon, Co. Cork. Access will be provided via the existing access road onto the Cork Road permitted under reference 21/4059. The Proposed Development as set out in the public notices consists of an overall site area of c. 7.844 ha.

##### 4.1 Construction Phase

The activities required for the construction phase of the proposed development represents the greatest risk of potential impact on the hydrological and hydrogeological environment. These activities primarily pertain to the site preparation, excavation and infilling activities required to facilitate construction of the Proposed Development.

There will be a need for soil excavation on-site. The earthworks will include the excavation of level platforms and foundations for building and the importation of stone material for access roads, etc. The design of road levels and finished floor levels has been carried out in such a way as to minimise cut / fill type earthworks operations.

The proposed works are expected to generate an estimated cut volume of ca. 35,762 m<sup>3</sup> and a corresponding fill volume of 35,246 m<sup>3</sup>. In addition, ca. 21,270 m<sup>3</sup> of topsoil will be excavated and is intended to be stored and reused entirely on site as part of the overall development.

The required fill volume will be met entirely using material generated from on-site excavation. The underlying subsoil predominantly consists of fractured rock, which is proposed to be crushed in situ for use as sub-base material for roads and hardstanding areas. Based on the planned reuse and site operations, no significant surplus or shortfall of material is anticipated. However, any excavated material that does not get reused will be removed from the site. This will be taken for appropriate offsite reuse, recovery, recycling and / or disposal.

Due to the expected excavation levels, pumping out of standing water may be necessary. Localised perched groundwater within the cohesive deposits/ weathered bedrock, or pooling surface water during and after heavy rainfall events is expected. Dewatering (removing of perched groundwater) is necessary to create a dry working environment and prevent water from seeping into the excavation and flooding the construction site. If dewatering is necessary, it will occur via suitably installed dewatering wells/sumps containing pumps to abstract groundwater and surface water (rainfall landing on the site).

During construction water will discharge the existing stormwater network in the L-2040 public roadway. Where required, a wastewater discharge licence will be applied for to manage surface water on site during the construction phase. This shall permit the discharge of trade effluent arising from groundwater/surface water ingress on the construction site. In case of any exceedances of discharge permit conditions, water will be disposed of to a licenced facility. The treatment and monitoring of this water prior to disposal will occur outside the construction site in a regional facility north of the site.

At a minimum, the works will be carried out according to standard best international practice including, but not limited, to:

- ▶ CIRIA, (2001), *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, (C532)* Construction Industry Research and Information Association;
- ▶ CIRIA (2002) *Control of water pollution from construction sites: guidance for consultants and contractors (SPI56)* Construction Industry Research and Information Association;
- ▶ CIRIA (2005), *Environmental Good Practice on Site (C650)*; Construction Industry Research and Information Association;
- ▶ BPGCS005, *Oil Storage Guidelines*; and
- ▶ CIRIA 697 (2007), *The SUDS Manual*; and *UK Pollution Prevention Guidelines*, (PPG) UK Environment Agency, 2004.

##### 4.2 Operational Phase

The surface water network is laid out to provide gravity falls without the necessity for pumping. The network generally runs from east to west. There is a northern section of phase 3 running west to east and then south to connect to the eastern end of the main section of the network. The proposed Phase 3 surface water network connects at two locations to the existing phase 1 and phase 2 element of the Blossomhill development. Network is connected to public sewers in the L2040 public roadway. The surface water design calculations for phases 1 & 2 have taken account of and are sized to accommodate phase 3 run-off volumes.

To ensure appropriate water quality treatment, a range of Sustainable Drainage System (SuDS) measures will be implemented across the site. These will include Attenuation Tanks, Filter Drains, Permeable Paving, Swales and Petrol Interceptor. Filtration units will be installed on both the inlet and outlet pipework associated with the underground attenuation tanks to serve as a final stage of treatment, reducing levels of total suspended solids, hydrocarbons, and heavy metals in the surface water runoff.

The development will result in an increase in hardstand which will reduce the local recharge to ground and a loss of land already used as landfill.

There will be no requirement for excavation of topsoil, subsoil and near-surface rock head during the operational phase. The majority of the site will be capped by hardstand/building during construction and installation of drainage will minimize the potential for contamination of the aquifer beneath the site during the operational phase.

Surface water discharge from the subject site will be managed and controlled in order to have minimal impact on the current drainage environment. The discharge from the development lands will be limited to greenfield run-off rates via flow control devices, with the resulting excess volumes attenuated via means on on-site attenuation. The surface water run-off will be directed through SuDs features to new attenuation facilities and ultimately discharge to existing stormwater sewer and ultimately into Bandon River.

The foul water drainage strategy for the proposed development includes the development of a gravity flow system connecting into the existing foul sewer network in the L-2040 public roadway. From here, the wastewater will be conveyed through the foul sewer network to the Bandon WWTP (D0136), where it will undergo full treatment before being discharged into Bandon River (Bandon\_090 river waterbody). The Bandon WWTP currently has sufficient operational capacity to accommodate the projected additional load from the proposed development. It should be noted that the peak foul effluent discharge, calculated for the Proposed Development as 6.69 l/s, would equate to 4.28% of the Bandon WWTP peak hydraulic capacity.

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**5. ASSESSMENT OF SOURCE-PATHWAY-RECEPTOR (SPR) MODEL**

A conceptual site model is developed based on a good understanding of the hydrological and hydrogeological environment, plausible sources of impact and knowledge of receptor requirements. This in turn allows possible Source Pathway Receptor (S-P-R) linkages to be identified. If no S-P-R linkages are identified, then there is no risk to identified receptors.

The proposed development site is located in the former Southwestern River Basin District (Hydrometric Area No. 20) and lies within the Bandon-Ilen Catchment (Catchment ID: 20) and the Bandon\_SC\_050 Sub-Catchment (Sub-Catchment ID: 20\_5).

As stated in Section 2.2 above, the site is underlain by the Bandon Groundwater Body (GWB) (European Code: IE\_SW\_G\_086), which has been investigated by the GSI and is described as a which has been investigated by the GSI and as a 'Locally Important Aquifer'. The majority of groundwater flow in this aquifer will occur in the top few metres, through the weathered zone in a lateral direction towards rivers and springs, as well as through, joints and fractures, rather than through the rock mass.

No significant dewatering is expected. However, depending on the time of year development works are carried out, local minor dewatering may be required during excavation works and groundworks at the proposed development site. This will slightly and temporarily increase the aquifer vulnerability, prior to paving and installation of stormwater drainage and services. However, there is no potential for change in groundwater levels as a result of local changes in the groundwater regime at the site due to the limited extent of the unlikely dewatering activities and the natural recharge capacity of the underlying "Locally Important Aquifer", which allows for the maintenance of groundwater levels. In addition, the mitigation measures that will be implemented during construction (as set out in the CEMP) and operational design measures (SuDS) will ensure there are no potential impacts on the hydrogeological and hydrological environment.

The site is connected to the Bandon River and Upper Bandon Estuary waterbodies. There are no SPA/SAC protected sites connected to the proposed development site. There are no Recreational Waters or Bathing Waterbodies located in the vicinity of the site.

Other waterbodies that may be hydrologically connected to the Proposed Development site, but are located further away (namely Lower Bandon Estuary Transitional Waterbodies [EU code: IE\_SW\_080\_0100], Kinsale Harbour [EU code: IE\_SW\_080\_0000] and Western Celtic Sea Coastal Waterbodies [EU code: IE\_SW\_010\_0000]) were excluded from the assessment due to their distance from the subject site, the potential loading of contaminant from the site and significant dilution through its pathway.

If not mitigated, contaminated water can pose a temporary risk to the local drainage network connected to the Bandon River (Bandon\_090 and Bandon\_100 river waterbodies) and Upper Bandon Estuary transitional waterbody (6.0 km downstream), and the underlying 'Locally Important Aquifer' i.e. the Bandon GWB. However, no impacts on these waterbodies are foreseen based on the low expected loading of any potential contaminant, the significant distance to these waterbodies, natural attenuation in the subsoils, and the high level of dilution in the downstream waterbodies.

There is also an 'indirect' hydrological connection/pathway with the Bandon River and Upper Bandon Estuary transitional waterbody through the proposed foul sewer connection to Bandon WWTP (Reg: D0136), located along the Bandon River c. 0.5 km downstream of the subject site (post treatment and in accordance with EPA licence conditions). As there is capacity available at Bandon WWTP, no potential impacts are anticipated on the Bandon River, Upper Bandon Estuary or the Bandon GWB.

Table 5-1 below describes the S-P-R model for the proposed development site and includes the robust mitigation and design measures which will be incorporated into the proposed development throughout the construction phases.

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Table 5-1. Pollutant Linkage (S-P-R) Assessment

Source	Pathway	Receptor	Risk of Impact	Mitigation/Design Measures
<b>Construction Impacts (summary)</b>				
<p>Unmitigated leak from an oil tank to ground/ unmitigated leak from construction vehicle (1,000 litres worst case scenario).</p> <p>Discharge to ground of runoff water with:</p> <ul style="list-style-type: none"> <li>• High pH from cement process.</li> <li>• Hydrocarbons from construction vehicles.</li> <li>• Run-off containing a high concentration of contaminated suspended solids from the former landfill.</li> </ul>	<p>Vertical migration through contaminated overburden to underlying "Locally Important Aquifer" (LI), classified by the GSI as having a 'High' to 'Extreme' vulnerability.</p> <p>Excavations will temporarily increase the aquifer vulnerability.</p> <p>Lateral migration via groundwater within the underlying bedrock aquifers to the hydrological and hydrogeological environment i.e. Bandon River and Upper Estuary.</p>	<p>Underlying 'Locally Important Aquifer' Bedrock Aquifer' (Bandon GWB).</p> <p>Bandon_090 River Waterbody (c 0.3 km downstream)</p> <p>Bandon_100 River Waterbody (c 2.8 km downstream)</p> <p>Upper Bandon Estuary Transitional Waterbody (c. 6.0 km downstream)</p>	<p>No likely impact on the status of the Bandon GWB (Locally Important Aquifer) due to low potential loading, shallow depth of excavations and mitigation measures during construction (refer to CEMP).</p> <p>No likely impacts on the status of the Surface Waterbodies (river and transitional) due to low potential loading, significant distance to these waterbodies, natural attenuation in the subsoils, and the high level of dilution in the downstream waterbodies, in addition to mitigation measures in place (refer to CEMP).</p>	<p>Only potential for temporary impacts due to accidental releases. Mitigation measures outlined in a CEMP which will be a live document. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the CEMP and any subsequent conditions relevant to the proposed development. These include management of soils, re-fuelling of machinery and chemical handling, control of water during the construction phase and treatment of discharge water where required.</p>

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Source	Pathway	Receptor	Risk of Impact	Mitigation/Design Measures
<b>Operational Impacts (summary)</b>				
<p>Discharge to ground of hydrocarbons from roads, car parking, and hardstanding areas.</p> <p>Discharge of foul water to the Bandon River post treatment at Bandon WWTP (Reg: D0136).</p>	<p>Indirect pathway through stormwater drainage to the Bandon_090, Bandon_100 and Upper Bandon Estuary transitional waterbody.</p> <p>Lateral migration via groundwater within the underlying 'Locally Important' Bedrock Aquifer to the hydrological environment i.e. Bandon_090, Bandon_100 and Upper Bandon Estuary transitional waterbody.</p> <p>Indirect pathway to Bandon River and Upper Bandon Estuary through the proposed foul sewer connection (post treatment) at Bandon WWTP (Reg: D0136).</p>	<p>Underlying 'Locally Important Aquifer' Bedrock Aquifer' (Bandon GWB).</p> <p>Bandon_090 River Waterbody (c 0.3 km downstream)</p> <p>Bandon_100 River Waterbody (c 2.8 km downstream)</p> <p>Upper Bandon Estuary Transitional Waterbody (c. 6.0 km downstream)</p>	<p>No perceptible risk due to the implementation of the design measures which includes SuDS and the use of interceptors along the drainage system. Furthermore, the extent of loading of potential contaminant, distance between the source and the receptors along with significant dilution in the drainage network will ensure any released hydrocarbons and other contaminants are at background levels (i.e., with no likely impact above water quality objectives as outlined in S.I. No. 272 of 2009, S.I. No. 386 of 2015 and S.I. No. 77 of 2019).</p> <p>No perceptible risk to the hydrological or hydrogeological environment following treatment in the EPA licenced Bandon WWTP (Reg: D0136). The plant has capacity and the peak effluent discharge from the development would equate to 4.28% of the Bandon WWTP hydraulic capacity.</p>	<p>The proposed development is designed to ensure the protection of the hydrological and hydrogeological environment by incorporating SuDs measures in design including permeable paving, attenuation system, petrol interceptor, among others. These features will effectively manage surface water flows, directing them to the attenuation system to maximize their storage potential. Flow control devices will be installed downstream of the ponds' outlet pipes to ensure that surface water runoff is stored efficiently before entering the downstream network, i.e. Bandon_090, Bandon_100 and Upper Bandon Estuary transitional waterbody.</p> <p>Positive impacts is expected as new surface water management will improve existing discharging conditions into Bandon River.</p> <p>Wastewater discharge has been agreed with Uisce Éireann in a Wastewater Connection Application.</p>

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**6. NO-DETERIORATION ASSESSMENT**

**6.1 Hydrological Environment**

As stated in Section 5 above, the Proposed Development has an 'indirect' hydrological connection with the Bandon\_090 and Bandon\_100 River Waterbodies and the Upper Bandon Estuary Transitional Waterbody (located c. 0.3 km, 2.8 km and 6.0 km downstream of the subject site, respectively) through the stormwater drainage.

This is a lengthy hydrological pathway allowing significant time for settlement and dilution, should an accidental release (even without mitigation) to surface water occur. Therefore, no potential impacts are anticipated during construction and operation in the receiving waterbodies.

There is also an 'indirect' hydrological connection/pathway with the Bandon\_090 and Bandon\_100 River Waterbodies and the Upper Bandon Estuary Transitional Waterbody through the proposed foul sewer connection to Bandon WWTP (Reg: D0136), located along the Bandon River c. 0.5 km downstream of the subject site. This plant has capacity to treat the foul water from the development, and no potential impacts are anticipated on the receiving waterbodies.

During construction, there are mitigation and design measures which will be implemented to protect the hydrological (and hydrogeological) environment. There is a potential of accidental discharges should mitigation fail during the construction phase, however these are temporary short-lived events that will not impact on the water status of waterbodies long-term and as such will not impact on trends in water quality and over all status assessment. This is based on the low expected loading of any potential contaminant, the significant distance to these waterbodies, natural attenuation in the subsoils, and the high level of dilution in the downstream waterbodies. As such, there is no potential for any accidental release into the Bandon River and the Proposed Development will not cause any significant deterioration or change in water quality status or prevent attainment, or potential to achieve the WFD objectives or to meet the requirements and/or objectives in the third cycle river basin management plan (2022-2027) i.e. Water Action Plan 2025 - A River Basin Management Plan for Ireland

Nevertheless, the project-specific Construction and Environmental Management Plan (CEMP) which the works contractor will develop will implement strict mitigation measures to ensure the protection of the hydrological (and hydrogeological) environment during construction which will ensure that there will be no negative impact on the quantitative or qualitative or morphology of the nearby watercourses.

During operation, in the scenario of an unmitigated leak of fuel from car park areas and roads, these are temporary short-lived events that will not impact on the status of the waterbodies mentioned above in the long-term. This is based on the low expected loading of any potential contaminant, the significant distance to these waterbodies, natural attenuation in the subsoils, and the high level of dilution in the downstream waterbodies.

However, to mitigate potential contamination from surface water runoff, which may originate from roads, car parks and hardstanding areas, a sustainable urban drainage system (SuDS) will be implemented. This system is designed to minimize the risk of contaminants, such as hydrocarbons, entering the stormwater drainage network and subsequently impacting surface waterbodies downstream (Bandon\_090 and Bandon\_100 River Waterbodies and the Upper Bandon Estuary Transitional Waterbody); as well as groundwater bodies i.e. the Bandon GWB underlying the site.

The surface water drainage strategy integrates various SuDS measures, including permeable paving, attenuation system, and petrol interceptors. These features will effectively manage surface water flows, directing them to the attenuation system to maximize their storage potential. The flow control devices will be installed downstream of the system to ensure the surface water runoff is stored maximising storage

potential, prior to entering the network downstream i.e. the Bandon\_090 waterbody located 0.3m downstream of the Proposed Development.

The SuDS and proposed measures have been designed in detail with the ultimate aim of protecting the hydrological (& hydrogeological) environment.

There are no proposed diversions of any drainage ditches or waterbodies as part of the proposed development.

Overall, the potential effects on the current status of the surface waterbodies are considered *no impact i.e. no change to the WFD status or elements in terms of the hydrological environment.*

**6.2 Hydrogeological Environment**

No significant dewatering is expected. However, depending on the time of year development works are carried out, local minor dewatering may be required during excavation during excavation of topsoil materials associated and groundworks at the proposed development site. This will slightly and temporarily increase the aquifer vulnerability, which is classified by the GSI as having 'High' to 'Extreme' vulnerability, prior to paving and installation of stormwater drainage and services.

This minor dewatering would be perched water within the overburden layer composed of low permeable glacial tills. Therefore, groundwater is not anticipated to be encountered during the minor excavation works projected at this location.

There is no potential for change in groundwater levels as a result of local changes in the groundwater regime at the site due to the limited extent of the unlikely dewatering activities and the natural recharge capacity of the underlying 'Locally Important Aquifer', which allows for the maintenance of groundwater levels. In addition, the mitigation measures that will be implemented during construction (as set out in the CEMP) and operational design measures (SuDS) will ensure there are no potential impacts on the hydrogeological and hydrological environment.

Therefore, there is no potential for change in water quality or levels as a result of local changes in the groundwater regime at the site. There are no planned discharges to groundwater during the operational phase and no long-term groundwater dewatering for the project. The proposed development design includes hardstand cover across the site.

During construction, there is limited potential of accidental discharges. However, should these occur they are temporary short-lived events that will not impact on the water status of the underlying bedrock aquifer long-term and as such will not impact on trends in water quality and over all status assessment. The project-specific Construction and Environmental Management Plan (CEMP), which the works contractor will develop will implement strict mitigation measures to ensure the protection of the hydrogeological environment during construction which will ensure that there will be no negative impact on the quantitative or qualitative of the underlying gravel and bedrock aquifers.

In terms of the operational phase, the risk to the aquifer is considered to be low due to the presence of handstand and a drainage system incorporating use of oil / hydrocarbon / petrol interceptors (or equivalent) on the stormwater drainage system prior to discharge from the site.

Overall, the potential effects on the WFD status to the groundwater bodies are considered *no impact i.e., no change to the current status or elements in terms of the underlying hydrogeological environment.*

**6.3 Assessment in Terms of Future Good Status**

The Bandon\_090 and Bandon\_100 WFD surface waterbodies have a most recent WFD surface water status (WFD Period: 2016-2021) of 'Good' and its current WFD risk score (3<sup>rd</sup> risk cycle) is 'Not at risk' of not

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achieving good status by 2027, meaning they have achieved their objectives, and their overall status is considered good.

The Upper Bandon Estuary Transitional Waterbody located c. 6.0 km downstream of the Proposed Development Site has a 'Poor' status and a risk score of and 'At risk of not achieving good status'. As mentioned above, the Upper Bandon Estuary failed to achieve good status due to poor fish status or potential in addition to moderate chemical and oxygenation conditions.

The main pressure associated with the Bandon Subcatchment (Bandon\_SC\_050) is mainly Urban Waste Water (agglomeration PE of 2,001-10,000) on Bandon River (Bandon\_090) and agricultural and pasture activities on Upper Bandon Estuary, based on the WFD Cycle 2 report produced by the EPA in January 2019 and the 3rd Cycle Bandon-Illen Catchment Report (HA20) (EPA, 2024).

As for these pressures and with respect to Urban Wastewater, no perceptible risk to the hydrological or hydrogeological environment is foreseen following treatment in the EPA licenced Bandon WWTP (Reg: D0136). The plant has capacity and the peak effluent discharge from the development would equate to 4.28% of the Bandon WWTP hydraulic capacity. With respect to agricultural and pasture activities, the Proposed Development is not associated with activities related to these pressures.

Presently, the groundwater body in the region of the site (Bandon GWB) for which the site is located entirely within, has a WFD status of 'Good' (WFD Period: 2016-2021) and a WFD risk score (3<sup>rd</sup> Cycle) of 'Not at Risk' of not achieving good status, meaning it has achieved its objectives, and its overall status is considered good.

At present there are no local targeted measures within the catchment to maintain or achieve improvements to the status of the water bodies. However, the following are some pressures associated with waterbody catchments:

- ▶ Physical Modifications.
- ▶ Management of pollution from agricultural activities.
- ▶ Management of pollution from sewage and waste water.
- ▶ Management of pollution from urban environments.
- ▶ Changes to natural flow and levels of water.
- ▶ Managing invasive non-native species.

The proposed development will incorporate SuDs measures within the landscape and drainage design in order to manage run-off quality and foul sewers management will be in compliance with UÉ specifications. No dewatering is required during operation. All discharges will be adequately treated through the proposed SuDs measures as outlined in Section 4.2 above. As such there will be no change to the existing status as a result of the proposed development.

Based on the above information it is not considered that any aspects of the proposed development will prevent the WFD objectives from being achieved or to meet the requirements and/or objectives in the Water Action Plan 2024 - A River Basin Management Plan for Ireland, (Department of Housing Local Government & Heritage, Sept 2024).

**7. CONCLUSIONS**

Appendix A contains the background information and the WFD classification elements for surface water and groundwater body status. The colour coded system referred to in Appendix A, is used in Appendix B – Table 1 and Table 2 to give a visual impression of the surface water and groundwater assessment, respectively

The WFD assessment indicates that, based on the current understanding of the proposed development, there is no potential for adverse or minor temporary/ long-term or localised effects on the Bandon River waterbody (Bandon\_090 and Bandon\_100; EU Code IE\_SW\_20B020800 and IE\_SW\_20B020900, respectively) or the Upper Estuary transitional waterbody (EU Code: IE\_SW\_080\_0300).

Therefore, it has been assessed that the proposed development will not cause any significant deterioration or change in water body status or prevent attainment, or potential to achieve, future good status or to meet the requirements and/or objectives in the Water Action Plan 2024 - A River Basin Management Plan for Ireland, (Department of Housing Local Government & Heritage, Sept 2024).

The WFD assessment indicates that there is no potential for adverse or minor temporary or localised effects on the Bandon GWB (European Code: IE\_SW\_G\_086). Therefore, it has been assessed that it is unlikely that the proposed development will cause any significant deterioration or change on its water body status or prevent attainment, or potential to achieve the WFD objectives or to meet the requirements and/or objectives in the Water Action Plan 2024 - A River Basin Management Plan for Ireland, (Department of Housing Local Government & Heritage, Sept 2024).

No further assessment of WFD is recommended given that no significant deterioration or change in water body status is expected based on the current understanding of the proposed development during construction and operation.

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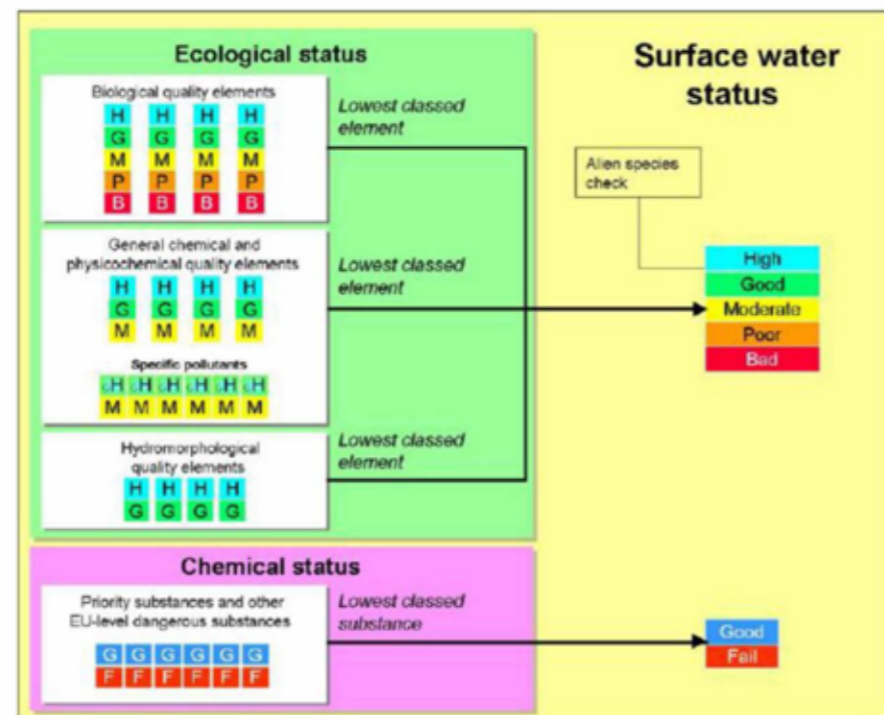
APPENDIX A. WFD ASSESSMENT MATRIX

WATER FRAMEWORK DIRECTIVE ASSESSMENT MATRIX

1.1 Background to Surface Water Body Status & Groundwater Body Status

Under the WFD, surface water body status is classified on the basis of chemical and ecological status or potential. Ecological status is assigned to surface water bodies that are natural and considered by the EPA not to have been significantly modified for anthropogenic purposes (i.e., culverting). Ecological potential is assigned to artificial and man-made water bodies (such as canals), or natural water bodies that have undergone significant modification. The term 'ecological potential' is used as it may be impossible to achieve good ecological status because of modification for a specific use, such as navigation or flood protection. The ecological potential represents the degree to which the quality of the water body approaches the maximum it could achieve. The worst-case classification is assigned as the overall surface water body status, in a 'one-out all-out' system (i.e., by taking the worst case of all the combined risk outcomes). This system is summarised below in Figure 1.

Figure 1. WFD classification elements for surface water body status (Environmental Agency, 2015)



1.1.2 Chemical Status

Chemical status is defined by compliance with environmental standards for chemicals that are priority substances and/or priority hazardous substances, in accordance with the Environmental Quality Standards Directive (2008/105/EC). This is assigned on a scale of good or fail. Surface water bodies are

only monitored for priority substances where there are known discharges of these pollutants, otherwise, surface water bodies are reported as being at good chemical status.

1.1.3 Ecological Status

Ecological status or potential is defined by the overall health or condition of the watercourse. This is assigned on a scale of High, Good, Moderate, Poor or Bad, and on the basis of four classification elements or 'tests', as follows:

- **Biological:** This test is designed to assess the status indicated by a biological quality element such as the abundance of fish, invertebrates or algae and by the presence of invasive species. The biological quality elements can influence an overall water body status from Bad through to High.
- **Physico-chemical:** This test is designed to assess compliance with environmental standards for supporting physicochemical conditions, such as dissolved oxygen, phosphorus and ammonia. The physicochemical elements can only influence an overall water body status from Moderate through to High.
- **Specific pollutants:** This test is designed to assess compliance with environmental standards for concentrations of specific pollutants, such as zinc, cypermethrin or arsenic. As with the physico-chemical test, the specific pollutant assessment can only influence an overall water body status from Moderate through to High.
- **Hydromorphology:** For natural waterbodies, this test is undertaken when the biological and physicochemical tests indicate that a water body may be of High status. It specifically assesses elements such as water flow, sediment composition and movement, continuity, and structure of the habitat against reference or 'largely undisturbed' conditions. If the hydromorphological elements do not support High status, then the status of the water body is limited to Good overall status. For artificial or highly modified waterbodies, hydromorphological elements are assessed initially to determine which of the biological and physico-chemical elements should be used in the classification of ecological potential. In all cases, assessment of baseline hydromorphological conditions are an important factor in determining possible reasons for classifying biological and physicochemical elements of a water body as less than Good, and hence in determining what mitigation measures may be required to address these failing water bodies.

1.2 Background to Groundwater Body Status

Under the WFD, groundwater body status is classified on the basis of quantitative and chemical status. Status is assessed primarily using data collected from the EPA monitoring network; therefore, the scale of assessment means that groundwater status is mainly influenced by larger scale effects such as significant abstraction or widespread/ diffuse pollution. The worst-case classification is assigned as the overall groundwater body status, in a 'one-out all-out' system. This system is summarised in Figure 2 below.

1.2.1 Quantitative Status

Quantitative status is defined by the quantity of groundwater available as baseflow to watercourses and water-dependent ecosystems, and as 'resource' available for use as drinking water and other consumptive purposes. This is assigned on a scale of Good or Poor, and on the basis of four classification elements or 'tests' as follows:

- **Saline or other intrusions:** This test is designed to identify groundwater bodies where the intrusion of poor quality water, such as saline water or water of different chemical composition, as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions.
- **Surface water:** This test is designed to identify groundwater bodies where groundwater abstraction is leading to a significant diminution of the ecological status of associated surface water bodies.

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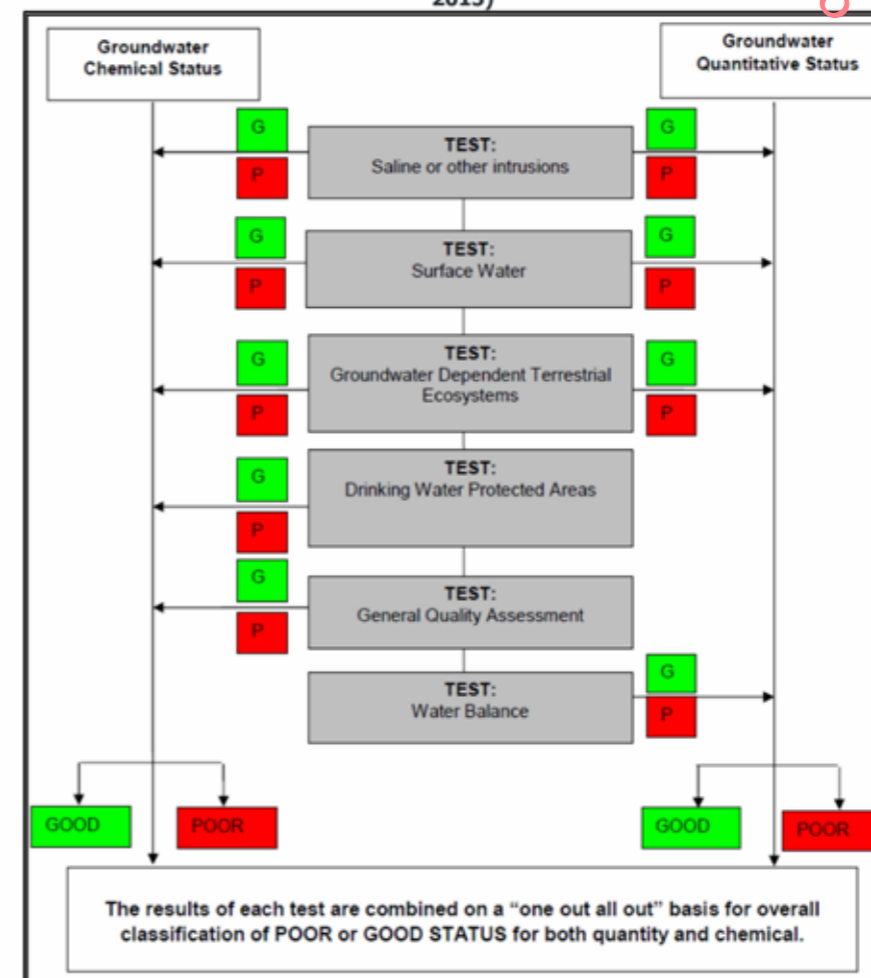
- **Groundwater Dependent Terrestrial Ecosystems (GWDTEs):** This test is designed to identify groundwater bodies where groundwater abstraction is leading to "significant damage" to associated GWDTEs (with respect to water quantity).
- **Water balance:** This test is designed to identify groundwater bodies where groundwater abstraction exceeds the "available groundwater resource", defined as the rate of overall recharge to the groundwater body itself, as well as the rate of flow required to meet the ecological needs of associated surface water bodies and GWDTEs.

1.2.2 Chemical Status

Chemical status is defined by the concentrations of a range of key pollutants, by the quality of groundwater feeding into watercourses and water-dependent ecosystems and by the quality of groundwater available for drinking water purposes. This is assigned on a scale of Good or Poor, and on the basis of five classification elements or 'tests' as follows:

- **Saline or other intrusions:** This test is designed to identify groundwater bodies where the intrusion of poor-quality water, such as saline water or water of different chemical composition, as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions.
- **Surface water:** This test is designed to identify groundwater bodies where groundwater abstraction is leading to a significant diminution of the chemical status of associated surface water bodies.
- **GWDTEs:** This test is designed to identify groundwater bodies where groundwater abstraction is leading to "significant damage" to associated GWDTE's (with respect to water quality).
- **Drinking Water Protected Areas (DrWPAs):** This test is designed to identify groundwater bodies failing to meet the DrWPA objectives defined in Article 7 of the WFD or at risk of failing in the future.
- **General quality assessment:** This test is designed to identify groundwater bodies where widespread deterioration in quality has or will compromise the strategic use of groundwater.

Figure 2. WFD classification elements for groundwater body status (Environmental Agency, 2015)



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**APPENDIX B. NON-DETERIORATION ASSESSMENT**

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**Table 1 - Risk screening of potential to cause deterioration of current WFD status**

Scheme Elements	Proposed Development							Mitigation Measures	Overall Impact with mitigation measures	
	Phase (Construction/ Operation)	Construction	Construction	Construction	Construction	Operation	Operation			
<b>Surface Water</b> Bandon_090 River Waterbody (IE_SW_20B020800) Bandon_100 River Waterbody (IE_SW_20B020900) Upper Bandon Estuary Transitional Waterbody (IE_SW_080_0300)	Phase (Construction/ Operation)	Construction	Construction	Construction	Construction	Operation	Operation	Pollution due to accidental discharges or spillages from car parks and hardstanding areas during the operation phase		
Identified Quantitative Impacts	Increased run-off and sediment loading	Temporary land-take during the construction phase	Pollution due to accidental discharges or spillages during the construction phase	Release of sediments, pollutants and construction material during Bridge construction.	Increase in Hardstanding					
WFD Status	Macrophytes and phyto-benthos - combined	Predicted change to status elements (green = none, amber = possibly, red = likely)	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	<b>Construction:</b> The project-specific CEMP will include robust mitigation measures to protect the hydrological environment. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent conditions relevant to the proposed development. These include management of soils, re-fuelling machinery and chemical handling and control of water during the construction phase.	No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Macrolvertebrates	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Fish	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
Physio-Chemical Status	Total Ammonia	Predicted change to status elements (green = none, amber = possibly, red = likely)	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	<b>Operation:</b> The proposed development is designed to ensure the protection of the hydrological environment such as delivery and distribution and use of oil interceptors on the stormwater system and the use of SuDS techniques. In order to limit the surface water discharge from the site to pre-development, greenfield rates, and to ensure improvement in the overall surface water quality before ultimate discharge the principles of Sustainable Drainage Systems, (SuDS) are to be implemented. Details are to be agreed with local county council authorities. The proposed foul drainage system will eventually discharge to the licenced Bandon WWTP.	No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Total Nitrogen	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Ortho-Phosphate	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
Hydromorphological Elements	Quantity and dynamics of river flow	Predicted change to status elements (green = none, amber = possibly, red = likely)	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No anticipated impacts to the hydrological environment with no deterioration to the WFD Status	
	Connection to Groundwater	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		
	River continuity	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		
	River depth and width variation bed	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		
	Structure and substrate of river bed	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		
	Structure of riparian zone	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		

ALTERNATIVES

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**Table 2 - Risk screening of potential to cause deterioration of current WFD status**

	Groundwater	Scheme Elements	Proposed Development					Mitigation Measures	Overall Impact
			Phase (Construction/ Operation)	Construction	Construction	Construction	Operation		
	<b>Bandon Groundwater Body (GWB) IE_SW_G_086</b>	Identified Quantitative Impacts	Increased run-off and sediment loading	Release of sediments, pollutants and construction material during Bridge construction.	Pollution due to accidental discharges or spillages during the construction phase	Increase in Hardstanding	Pollution due to accidental discharges or spillages from car parks and hardstanding areas during the operation phase		
Quantitative Elements	<b>Saline or other intrusions.</b> To identify groundwater bodies where the intrusion of poor quality water as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions.	Predicted change to status elements (green = none, amber = possibly, red = likely)	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	<p><b>Construction:</b> The project-specific CEMP will include robust mitigation measures to protect the underlying hydrogeological environment. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent conditions relevant to the proposed development. These include management of soils, re-fuelling machinery and chemical handling and control of water during the construction phase. No significant dewatering is required which could impact on quantitative status.</p> <p><b>Operation:</b> The proposed development is designed to ensure the protection of the underlying hydrogeological environment such as use of oil interceptors on the stormwater system and prior to discharge from the site and the use of SuDS techniques. In order to limit the surface water discharge from the site to pre-development, greenfield rates, and to ensure improvement in the overall surface water quality before ultimate discharge the principles of Sustainable Drainage Systems, (SuDS) are to be implemented. No significant abstraction is required which could impact on quantitative status. The proposed foul drainage system will eventually discharge to the licenced Bandon WWTP.</p>	No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	<b>Surface water.</b> To assess the impact of groundwater abstractions on the ecological status of surface water bodies.		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	<b>Groundwater Dependent Terrestrial Ecosystems (GWDE's)</b> To assess the impact of groundwater abstractions on the condition of GWDE'S.		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	<b>Water balance</b> To identify groundwater bodies where abstractions exceed the available resource.		Not Applicable (no dewatering anticipated)	Not Applicable (no dewatering anticipated)	Not Applicable (no dewatering anticipated)	Not Applicable (no water supply from borehole anticipated)	Not Applicable (no water supply from borehole anticipated)		Not Applicable
Chemical Elements	<b>Saline or other intrusions.</b> To identify groundwater bodies where the intrusion of poor quality water as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions.	Predicted change to status elements (green = none, amber = possibly, red = likely)	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No anticipated impacts to the hydrological environment with no deterioration to the WFD Status	
	<b>Surface water.</b> To assess the impact of groundwater abstractions on the ecological status of surface water bodies.		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No anticipated impacts to the hydrological environment with no deterioration to the WFD Status	
	<b>Groundwater Dependent Terrestrial Ecosystems (GWDE's)</b> To assess the impact of nutrient concentrations in groundwater (primarily phosphates) on GWDE'S.		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No anticipated impacts to the hydrological environment with no deterioration to the WFD Status	
	<b>Drinking Water Protected Areas (DrWPAs)</b> To identify groundwater bodies failing to meet the DrWPA objectives defined in Article 7 of the WFD or at risk of failing in the future.		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No anticipated impacts to the hydrological environment with no deterioration to the WFD Status	
	<b>General quality assessment</b> To identify groundwater bodies where widespread deterioration in quality has or will compromise the strategic use of groundwater.		No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No measurable change anticipated.	No anticipated impacts to the hydrological environment with no deterioration to the WFD Status	

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# APPENDIX 15.1

GEOPHYSICAL SURVEY



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## Geophysical Survey Report Knockbrogan, Bandon, Co. Cork

License No.: 24R0381  
RMP: N/A

ITM: 549600, 555700



Ger Dowling, PhD MIAI  
August 2024

Geophysical Survey Report, Knockbrogan, Bandon, Co. Cork, 24R0381

### Summary

This report details the results of an archaeogeophysical survey (Licence No.: 24R0381) of lands at Knockbrogan townland, Bandon, Co. Cork. An area of approximately 7 hectares was targeted for investigation, involving high resolution magnetic gradiometry. The investigation was conducted as part of a preliminary (pre-planning) archaeological investigation.

Several possible pits/spreads were identified by the survey. Evidence for former cultivation and land division was also detected.

### Survey details

**Site Name:** Knockbrogan  
**Townlands:** Knockbrogan  
**County:** Cork

**Parish:** Kilbrogan  
**Barony:** Kinalmeaky

**RMP/SMR Nos:** N/A  
**ITM (centroid):** 549600, 555700

**Land use:** Tillage  
**Geology:** Mudstone, sandstone and thin limestone (Kinsale Formation)  
**Soils:** Coarse loamy drift with siliceous stones (Ross Carbury Series)

**Detection License No.:** 24R0381  
**Planning Reference No.:** N/A

**Survey Type & Instrument:** Fluxgate Gradiometer – Five-channel magnetometer  
**Sample/Transverse Interval:** 0.10m/0.5m

**Area Surveyed:** c.7 ha  
**Survey Date:** 09 August 2024

**License Holder:** Ger Dowling  
**Report Author:** Ger Dowling  
**Report Date:** 10 August 2024

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Plate 2. Looking west across southeastern field, with construction spoil heap in background

Plate 3. Close-up view of spoil heaps, viewed from the southwest

Plate 4. Construction area in the western field, looking south

## Abbreviations

CO	Cork
GPS	Global Positioning System
ITM	Irish Transverse Mercator
nT	nanoTesla (unit of magnetic measurement)
OS	Ordnance Survey
QGIS	Quantum Geographical Information Systems
RMP	Record of Monument and Places
SMR	Sites and Monuments Record

## Coordinate System

All GPS coordinates given in this report are in Irish Transverse Mercator (ITM)

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## 1 Introduction

This report details the results of an archaeogeophysical survey (Licence No.: 24R0381) at Knockbrogan townland, Bandon, Co. Cork. The survey, comprising high resolution magnetic gradiometry, was focused on several tillage fields and covered approximately 7 hectares in total size. The survey was conducted as part of a pre-planning archaeological survey.

The site has not previously been subjected to geophysical survey and it was hoped that the investigation would identify and map any subsurface archaeology that may be present.

Geophysical Survey Report, Knockbrogan, Bandon, Co. Cork, 24R0381

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## 2 Site Location

The survey is located in the townland of Knockbrack, Co. Cork (Figure 1). The site, which lies on the northern edge of the town of Bandon, is in the Civil Parish of Kilbrogan and the Barony of Kinalmeaky.<sup>1</sup>

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<sup>1</sup> [Cnoc Brógáin/Knockbrogan | logainm.ie](https://logainm.ie): accessed on 03 July 2024.

### 3 Survey Background

The survey was conducted in respect of a pre-planning study (archaeological reconnaissance).

### 4 Archaeological Background

#### 4.1 Recorded/Known Archaeology

There are no recorded monuments with the survey area (Figure 2). The nearest known site is a standing stone (CO110-024) about 80m to the south. The stone is described in the Files of the Archaeological Survey as being of rectangular shape, aligned east-west, and measuring about 1.8m high and 0.58m wide by 0.18m thick.<sup>2</sup>

The broader hinterland of the survey area is the setting for a range of monuments of varying date and significance, including a church (CO110-021001), a holy well (CO110-021002) and a nineteenth-century brewery complex (CO110-025001) and nearby gasworks (CO110-025002).<sup>3</sup> The SMR buffer zone for the historic town of Bandon (CO110-019001) also lies about 260m southwest.

The survey area is shown as farmland on early historical maps (Figures 3 & 4).

#### 4.2 Previous Investigations

No recorded archaeological excavations have previously been conducted at the survey area.<sup>4</sup>

Nearby excavations in Knockbrogan townland have involved test trenching in advance of a housing development constructed immediately west of the survey area in 2021.<sup>5</sup> This revealed at least ten possible features of archaeological interest, including curvilinear and linear ditches, as well as five potential post-/stake-holes and an isolated hearth. Other nearby investigations comprised three separate phases of test trenching in advance of the construction of individual dwelling houses between 2002 and 2024.<sup>6</sup> These works did not reveal anything of archaeological potential.

<sup>2</sup> [Historic Environment Viewer \(arcgis.com\)](#): accessed on 03 July 2024.

<sup>3</sup> *Ibid.*

<sup>4</sup> [Excavations](#): accessed on 03 July 2024.

<sup>5</sup> [30938 « Excavations](#): accessed on 03 July 2024.

<sup>6</sup> [7542 « Excavations](#), [7543 « Excavations](#) & [33978 « Excavations](#): accessed on 03 July 2024.

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## 5 Survey Location and Aims

The investigation, comprising high resolution magnetic gradiometry, focused on several adjoining fields and covered an area of approximately 7 ha (Plates 1 & 2; Figure 5). Part of the lands on the north are disturbed and partly covered by spoil from an adjacent construction site (Plate 3; see Figure 5 for location); this area is not suitable for geophysical survey.

The fields are used for tillage had recently been harrowed at the time of the investigation. Bounded by tree-lined hedgerows accompanied in places by post-and-wire fences, the fields are mainly flat, though a moderate, south-facing slope occurs in the two, westernmost fields. Immediately to the west is a large (residential) development site, while the wider landscape is home to modern housing estates and agricultural land, both tillage and pasture.

The underlying bedrock of the locality comprises mudstone, sandstone and thin limestone (Kinsale Formation).<sup>7</sup> The local soils comprise coarse loamy drift with siliceous stones (Ross Carbury Series).<sup>8</sup>

The geophysical investigation aimed to:

- identify any geophysical anomalies of possible archaeological origin within the specified survey area
- accurately locate these anomalies and present the findings in map form
- describe the anomalies and discuss their likely provenance in a written report
- incorporate all of the above in a report to the Client

<sup>7</sup> Geological Survey of Ireland Spatial Resources, Public Data Viewer Series: <https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228> [accessed on 03 July 2024].

<sup>8</sup> Irish National Soils Map, 1:250,000k, V1b (2014): <http://gis.teagasc.ie/soils/map.php> [accessed on 03 July 2024].

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## 6 Survey Methodology and Instrumentation

The survey involved high-resolution magnetic gradiometry survey (Table 1). This technique measures changes in the magnetic properties of the soil and is widely used in modern investigations due to its ability to detect a broad range of sub-surface archaeological remains, including ditches and pits, and 'industrial' features associated with metalworking and pottery production.

The magnetic survey was conducted using a five-channel fluxgate gradiometer system, combining a Sensys MAGNETO MXPDA and Sensys FGM650 probes, with cm-precision GPS (Trimble R12 antenna and TSC5 controller) georeferenced to Irish Transverse Mercator and Ordnance Datum. Mounted on a cart and pulled by a quad bike, the system records magnetometer and GPS data simultaneously into a single data file. The data capture strategy involved logging readings every 0.10m intervals along transects spaced 0.5m apart, with a maximum traverse width of 2.5m. The sampling strategy produces a high-resolution dataset, giving clarity to any archaeological features detected.

The highly accurate positioning of the survey data provides strong confidence when integrating the geophysical results with other datasets such as aerial imagery in GIS, and also ensures repeatability should further investigation of anomalies (e.g., test excavation) be required.

Table 1. Geophysical survey details

Technique	Instrumentation	Sensor spacing	Sample rate	Survey Area	Number of recorded data
Magnetic Gradiometry	Five-channel fluxgate gradiometer array	0.5m	100 Hz	c.7 ha	1,611,994

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## 7 Data Management, Processing and Interpretation

Gradiometry data was logged to a laptop computer and archived daily to an external hard drive. The collated data was processed using the following methodology:

- Real-time positioning of magnetometer data based on GPS measurements;
- Processing (track correction and equalisation) of collated magnetometer data; and
- Export of georeferenced greyscale images at optimum visual range

The magnetometry and GPS data were georeferenced through Sensys proprietary software (Geoserver 2.00-01 followed by DLMGPS 4.01-13) and processed in Sensys MAGNETO 3.01-17 software. The processed data was subsequently imported into QGIS for final image production (Figures 6 & 7). Final geophysical datasets have been formatted as raster data models/GeoTiffs (projected to ITM, EPSG:2157) to enable subsequent geospatial analysis. Fieldwork, data processing and reporting adhered to the most up-to-date guidelines for conducting archaeogeophysical surveys.<sup>9</sup> All geophysical raster datasets will be digitally archived to best practice.<sup>10</sup>

<sup>9</sup> Schmidt A., Linford P., Linford N., David, A., Gaffney C., Sarris A., and Fassbinder J. 2016. *EAC Guidelines for the Use of Geophysics in Archaeology: Questions to Ask and Points to Consider*. EAC Guidelines 2. [Online] Available from:

[https://f64366e3-8f7d-4b63-9edf5000e2bef85b.filesusr.com/ugd/881a59\\_fdb1636e95f64813a65178895aea87cf.pdf](https://f64366e3-8f7d-4b63-9edf5000e2bef85b.filesusr.com/ugd/881a59_fdb1636e95f64813a65178895aea87cf.pdf)

<sup>10</sup> Niven, K. 2012. *Raster Images: A Guide to Good Practice*. Archaeology Data Service/Digital Antiquity, Guides to Good Practice. [Online] Available from: [http://guides.archaeologydataservice.ac.uk/g2gp/RasterImg\\_Toc](http://guides.archaeologydataservice.ac.uk/g2gp/RasterImg_Toc); & Schmidt, A. and Ernenwein, E. 2012. *Guide to Good Practice: Geophysical Data in Archaeology*. Oxford: Oxbow.

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## 8 General Considerations and Complicating Factors

### 8.1 Access and Ground Conditions

The survey area comprises several large tillage fields. A small, fenced-off area used for construction activity near the western edge of the western field had to be avoided by the survey (Plate 4).

### 8.2 Modern Interference

A number of small-scale 'ferrous-type' (dipolar) responses are evident in the results from the gradiometry survey. These are a common occurrence in magnetic data and in most cases represent modern metal and other magnetised debris in the (top)soils.

Areas of magnetic disturbance deriving from survey in proximity to post-and-wire fences and modern construction areas were also recorded along the edge of the survey area.

### 8.3 Former Land Use

The survey results are dominated by evidence for past ploughing. Registering as multiple, closely-spaced, parallel, linear positive/negative anomalies, these are at various orientations and relate to several different episodes of tillage farming in recent centuries.

A number of former field boundaries depicted on both the first-edition six-inch Ordnance Survey Map (surveyed 1841–42; published 1845) and the 25-inch Ordnance Survey Map (1888–1913) were identified by the survey (for historical mapping, see Figures 4 and 5). Other probable former land divisions were also mapped, and although not depicted on early cartographic sources, these can be seen, in most instances, to append to historically-attested examples and are also likely to be of relatively modern date. Several possible field drains/pipes were also mapped.

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## 9 Survey Results

Table 2. Survey results

<b>Site name</b>	Knockbrogan		
<b>ITM (centroid)</b>	549600, 555700		
<b>Area surveyed</b>	c.7 ha		
<b>Figure Numbers</b>	6 & 7		
<b>Anomaly Number</b>	<b>Form/nature of anomaly</b>	<b>Possible source(s) of anomaly</b>	<b>Interpretative discussion</b>
1	Small band of positive magnetism	Possible archaeology/modern	Possible spread, may contain burnt/fired material in its fill. Interpretation as archaeology is speculative. Anomaly may equally reflect buried modern debris/material. A small 'pit-type' response was also mapped about 3m to NW and may comprise a small pit/deposit of unknown significance.
2	'Pit-type' response	Possible archaeology/modern	Possible pit/spread, may contain burnt/fired material in its fill. Archaeological interpretation is cautious.
3	'Pit-type' response	Possible archaeology/modern	Possible pit/spread (c.5m in length NE-SW). May contain burnt or fired material in its fill, such as such as might be associated with a hearth- or oven-type archaeological feature. Tentative interpretation. A modern origin also possible.
4	'Pit-type' response	Possible archaeology/modern	Possible pit/spread, may contain burnt/fired material in its fill.
5	'Pit-type' response	Possible archaeology/modern	Possible pit/spread, may contain burnt/fired material in its fill.
	Multiple positive-negative-positive linears	Agricultural	Relict field boundaries, likely originally defined by bank and ditch combination. Marked on early historical maps.
	Multiple positive-negative-positive linears	Possible agricultural	Probable ditches, suggestive of former field system. Many examples appearing to field boundaries marked on early historical maps.
	Several slender positive lineations	Possible agricultural	Possible field drains/pipes.

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	Positive trends	Possible archaeology/agricultural/natural	Possible ditches/drains.
	Multiple, closely spaced, parallel, positive-negative linears	Agricultural	Former cultivation, various orientations. Some overlapping and indicative of different phases of past ploughing.
	Multiple 'ferrous-type' (dipolar) responses	Modern	Ferrous debris and other weakly magnetised material in (top)soils.
	Faint, slender, slightly sinuous positive-negative band	Natural	Likely reflects localised variations in underlying (near-surface) geology. Located on sloping terrain.
	Areas of magnetic disturbance	Modern	Disturbance from adjacent post-and-wire fences and modern construction activity.

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## 10 Conclusion

The geophysical survey at Knockbrogan did not reveal any anomalies of obvious archaeological potential. A number of 'pit-type' anomalies [1–5] were mapped by the survey, though in the absence of supporting evidence, an archaeological interpretation for these is tentative.

The principal anomalies identified by the survey reflect past agricultural activity. Alongside different episodes of former cultivation, the investigation revealed the levelled remains of field boundaries recorded on early historical maps. Other probable relict land divisions of relatively modern date were also discovered and although not depicted on early cartographic sources, these can be seen, in most instances, to append to historically-attested examples. Several possible field drains/pipes are also discernible in the dataset.

### 10.1 Statement of Indemnity

*The geophysical properties of sub-surface features must contrast sufficiently with the surrounding soils/background variation to enable them to be detected and mapped using geophysical methods. As such, the clarity and definition of buried features can vary considerably, with some having well-defined signatures while others are only barely visible, or not discernible, in geophysical imagery. A lack of geophysical anomalies cannot be taken to imply the absence of archaeological features.*

*The interpretations presented here are invariably provisional and further work (e.g., test trenching) is required to fully assess the nature and archaeological potential of the anomalies identified by the present investigation.*

## 11 Figures

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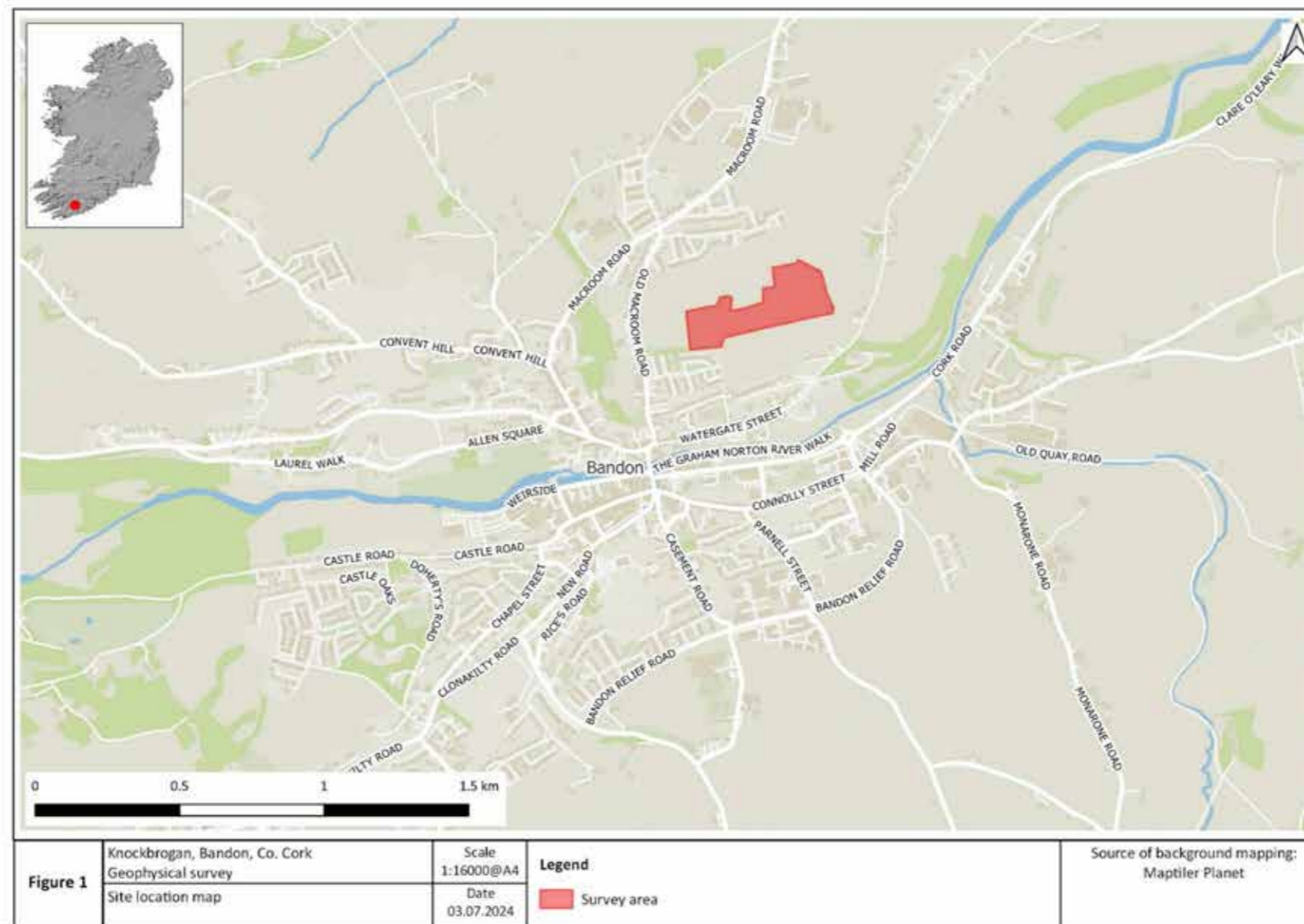


Figure 1. Site location map, showing survey area highlighted in red.

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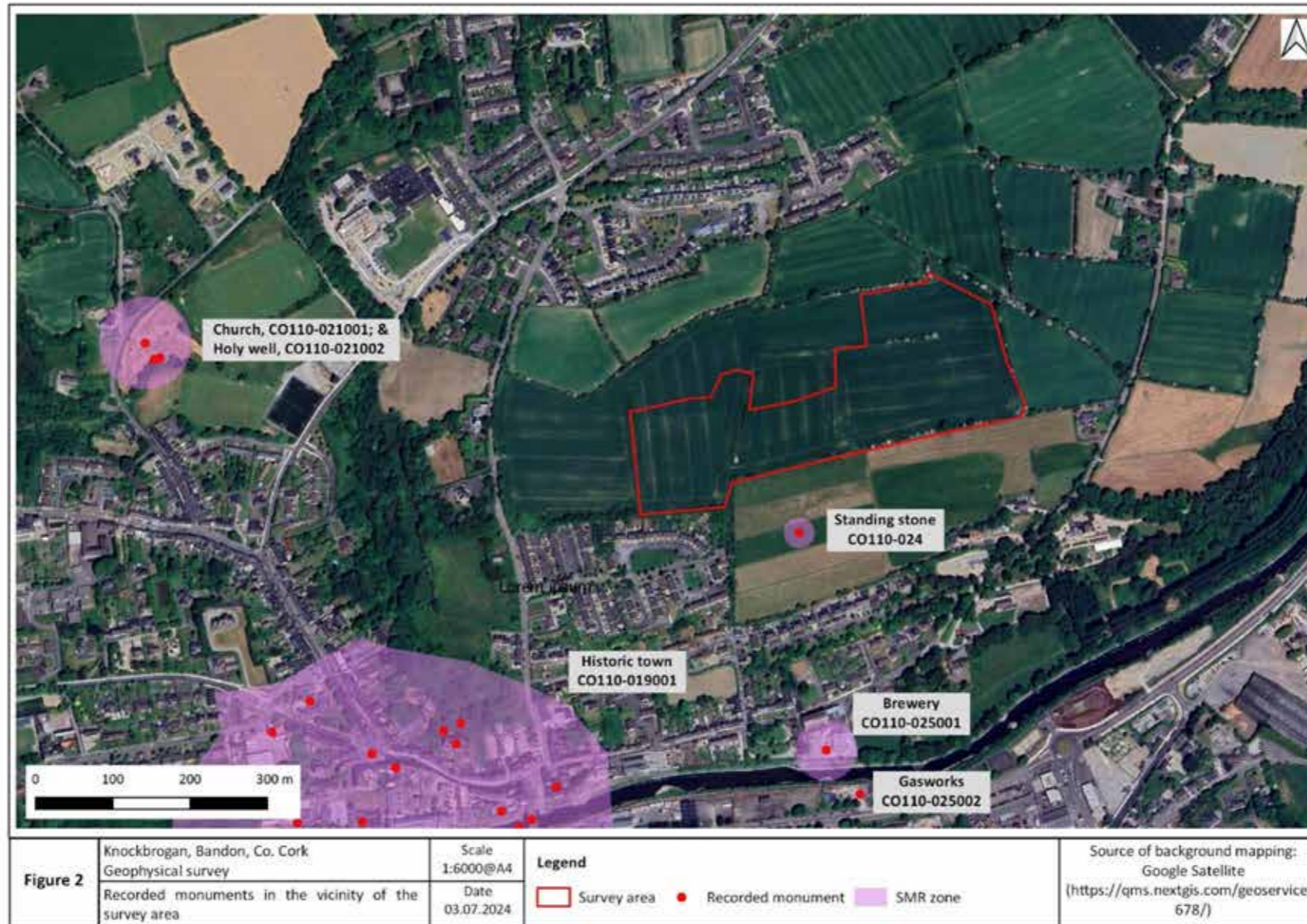


Figure 2. Location of recorded archaeological sites in the vicinity of the survey area.

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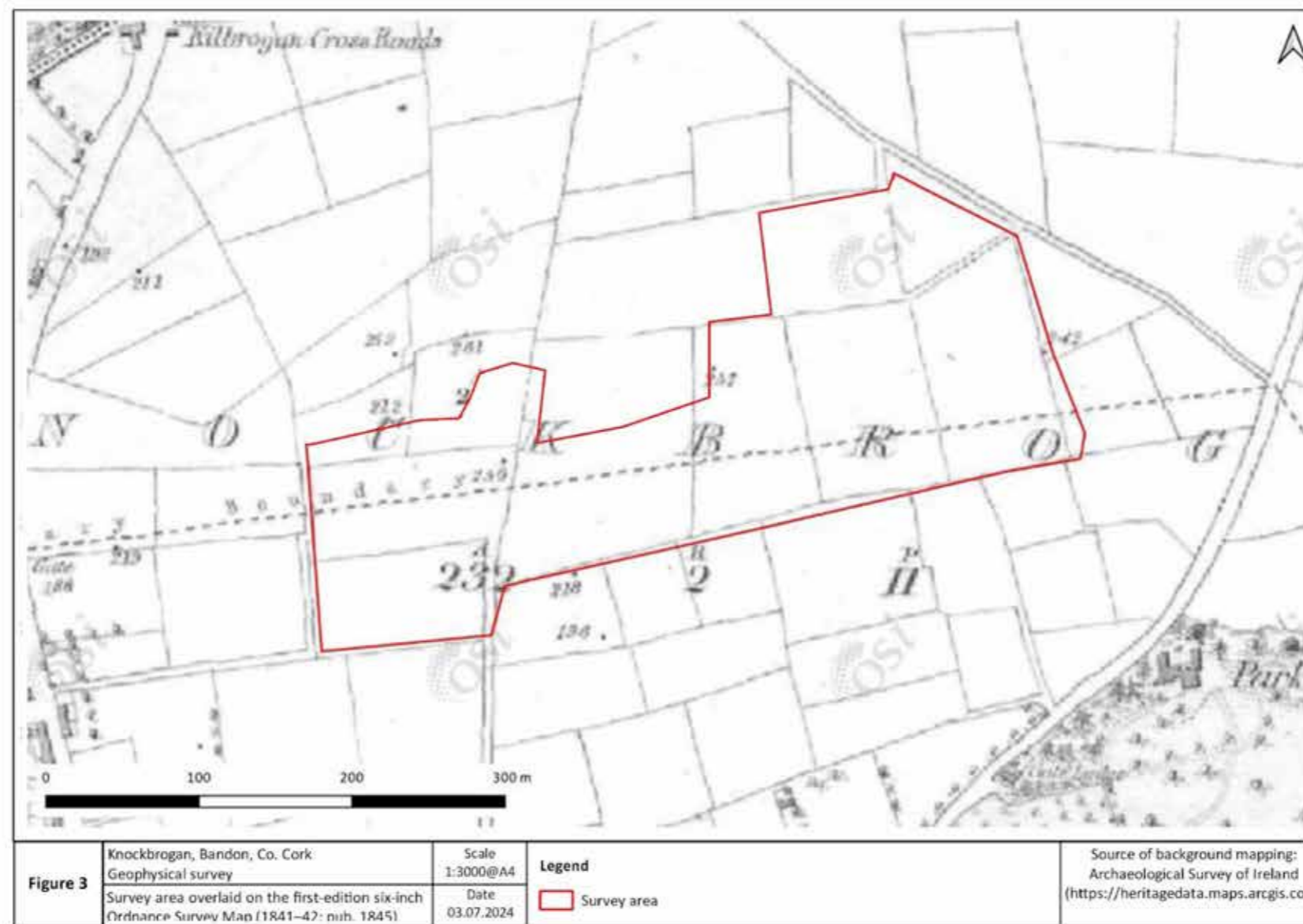


Figure 3. The survey area overlaid on the first-edition six-inch Ordnance Survey Map (surveyed 1841–42; published 1845).

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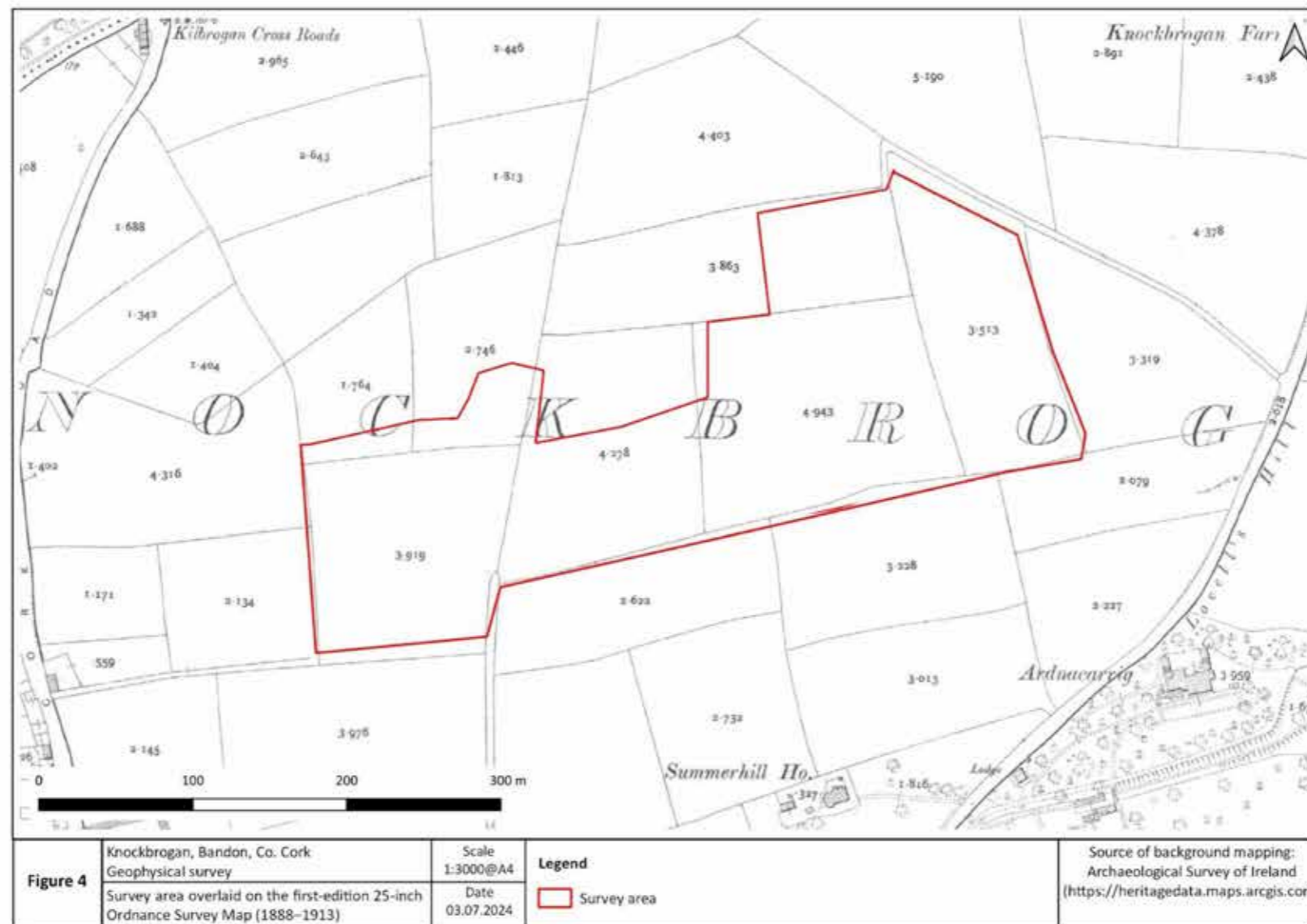


Figure 4. The survey area overlaid on the first-edition 25-inch Ordnance Survey Map (1888-1913).

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Figure 5. Survey area.

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Figure 6. Greyscale image of gradiometry results.

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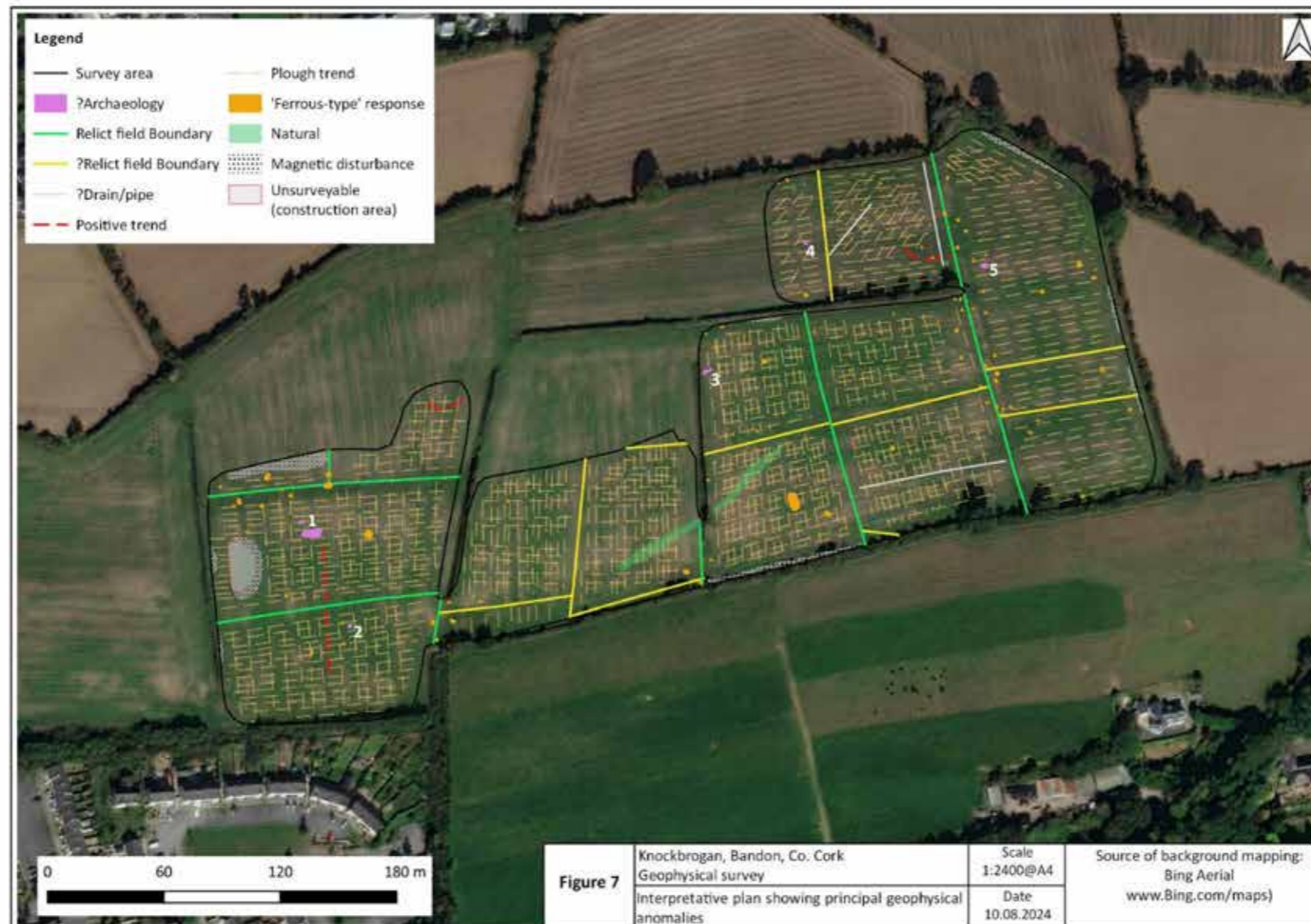


Figure 7. Interpretative plan showing principal geophysical anomalies.

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## 12 Plates

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Plate 1. Western field, looking southwest towards the town of Bandon.



Plate 2. Looking west across southeastern field, with construction spoil heap in background.

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Plate 3. Close-up view of spoil heaps, viewed from the southwest.



Plate 4. Construction area in the western field, looking south.