



ATTACHMENT B.5:

**ENVIRONMENTAL IMPACT ASSESSMENT
REPORT,
DECEMBER 2022**



Irish Water
Uisce Éireann

BANDON WASTE WATER DISCHARGE LICENCE REVIEW – D0136-01

ENVIRONMENTAL IMPACT ASSESSMENT REPORT



DECEMBER 2022

IRISH WATER

BANDON WASTE WATER DISCHARGE LICENCE REVIEW

EIAR

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DECEMBER 2022

PROJECT NO. 20893-06					
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1. INTRODUCTION

1.1. Overview

This Environmental Impact Assessment Report (EiAR) for the Bandon agglomeration operational discharges has been prepared by Nicholas O'Dwyer Ltd. (NOD) and supporting Environmental Consultants (*i.e.*, Thorne Ecology, Awn Consulting Ltd., Enviroguide Consulting., AONA Environmental Consulting Ltd., Courtney Deery Heritage Consultancy Ltd., and Stephenson Halliday Ltd.) on behalf of Irish Water (IW) in support of the Bandon Waste Water Discharge Licence (WWDL) D0136-01 Review Application.

The subject matter of the review application involves a WWDL application from a Waste Water Treatment Plant (WwTP) with a capacity of greater than 10,000 population equivalent (p.e.). Therefore, a mandatory EiAR is required, as per Regulation 17 of the relevant Waste Water Discharge Regulations, 2007 - 2020.

1.2. Background Information

Bandon is a town in County Cork, approximately 25km south west of Cork City. The River Bandon runs through the town. The Bandon WwTP is located at NGR 150425E, 055700N on the east side of the town along the banks of the River Bandon. The agglomeration is served by a sewerage system that comprises gravity sewers, Pumping Stations, rising mains and the aforementioned WwTP.

Figure 1.1 shows the proposed Bandon agglomeration boundary alongside key elements of infrastructure associated with the WWDL Review Application.

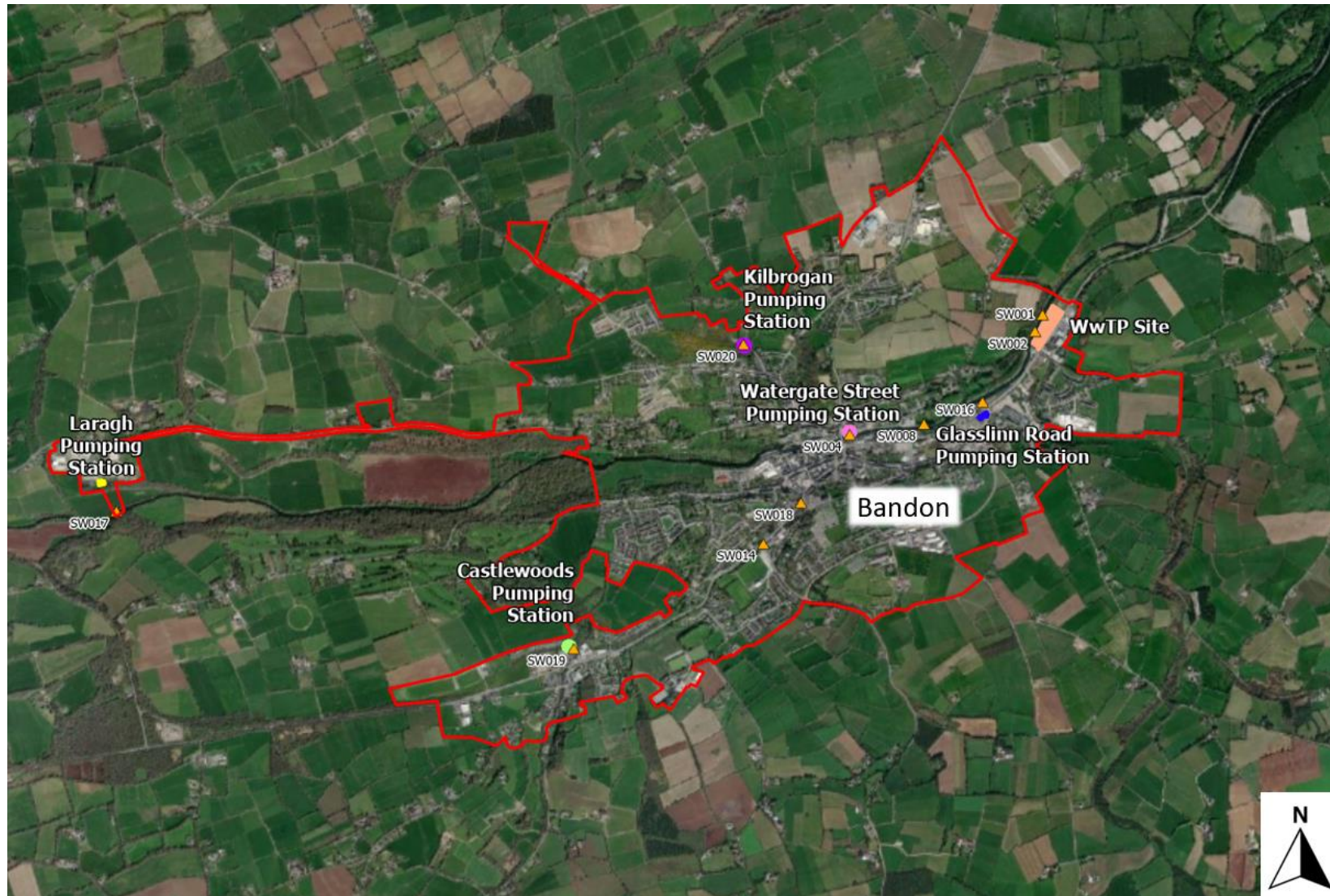


Figure 1.1 Location of Bandon Agglomeration (red line), Bandon WwTP, Laragh Pumping Station, Watergate Street Pumping Station, Kilbrogan Pumping Station, Castlewoods Pumping Station, and Glasslinn Road Pumping Station.

1.2.1. Existing Waste Water Works

The Bandon WwTP was constructed in the early 1960s and was significantly upgraded and extended in 1993. More recently, further upgrade works were completed in Q2 2021. The plant has a current design population equivalent (p.e.) of 14,456, and therefore has adequate capacity to treat the current load of 9,744 p.e. (AER, 2021).

Discharges from the Bandon agglomeration are currently authorised under Waste Water Discharge Licence (WWDL) D0136-01.

Treated effluent from the WwTP discharges to the River Bandon at NGR 150411E, 055785N which is part of the Bandon Ilen catchment area (HA 20).

There are currently 14 no. overflows associated with the agglomeration (see **Table 1.1**). Of the 14 no. SWOs, 9 no. do not meet the definition of 'Storm Water Overflow' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995 (SW003 and SW006-SW007, SW009-SW013 and SW015). 4 no. SWOs (SW002, SW004, SW008 and SW014) meet the DoEHLG criteria and 1 no. SWO (SW005) has not been assessed against the DoEHLG criteria.

Table 1.1 Overflows Relating to D0136-01

Overflow	Asset	Type	Discharge Co-ordinates (NGR)
SW002	WwTP	SWO/EO	150368E, 055690N
SW003*	Glasslinn Road PS	SWO	150077E, 055316N
SW004	Watergate Street PS	SWO/EO	149316E, 055104N
SW005*	Network	SWO	149265E, 055150N
SW006*	Network	SWO	149552E, 055172N
SW007*	Network	SWO	149096E, 055045N
SW008	Network	SWO	149738E, 055164N
SW009*	Network	SWO	149281E, 055040N
SW010*	Network	SWO	149250E, 055069N
SW011*	Network	SWO	149929E, 055254N
SW012**	Network	SWO	149297E, 054974N
SW013*	Network	SWO	149116E, 054830N
SW014	Network	SWO	148826E, 054484N
SW015*	Network	SWO	148562E, 054290N

* Decommissioned

** To be decommissioned by end of Q1 2023

Improvement works within the Bandon agglomeration have taken place over recent years or are in the process of being completed and involved several elements as listed below:

- Bandon WwTP and Glasslinn Road Pumping Station Upgrade (Bandon Sewerage Scheme) – These works were completed in Q2 2021;
- Bandon IDA Laragh WwTP Upgrade - This upgrade project was completed in Q3 2018. As part of this WWDL Review Application, the Bandon IDA Laragh

Agglomeration (A0362-01) is to be amalgamated into the Bandon agglomeration; and

- Bandon Watermain & Sewer Network Project including the removal of 10 no. Storm Water Overflows (SWOs) – These works are underway and are due to be completed by the end of Q1 2023.

The above projects were deemed required to ensure the ELVs as per WWDL D0136-01 were complied with; to accommodate current and future flows and increase flow capacity in the system; to replace plant and equipment that had exceeded its operational life; to reduce sewage discharges to the Bandon River which were identified as a pressure in the catchment; to reduce risk of flooding from sewer network in Bandon Town; and, to ultimately ensure effective management of waste water treatment process to protect the environment and public health.

Details of the above projects are provided in the sections below.

1.2.2. Bandon Waste Water Treatment Plant / Glasslinn Road Pumping Station Upgrade (Bandon Sewerage Scheme)

Upgrade works at Bandon WwTP were required to improve the treatment processes, thereby resulting in an improved effluent discharge quality. The upgraded plant was designed to meet the Emission Limit Values (ELVs) stipulated in the WWDL (D0136-01). The upgrade works also included the replacement of existing plant and equipment that had exceeded their normal operational life. This project was completed in Q2 2021.

The Bandon Sewerage Scheme involved the following key infrastructure elements:

WWTP:

- Installation of new inlet screening & grit removal units;
- Construction of a new reinforced concrete stormwater storage tank. The new stormwater storage tank has a capacity of 900 m³ to cater for 2 hours retention of flows (Formula A flow less the Full Flow to Treatment flow). Once the capacity of the stormwater storage tank is exceeded the excess water is discharged to the River Bandon *via* a Dual Function Overflow, SW002 (NGR 150368E, 055690N);
- Retention and refurbishment of the existing Primary Sedimentation Tanks including replacement of the out-of-date mechanical & electrical equipment;
- Replacement of the surface aeration system in the Aeration Ditch with a more efficient system;
- Upgraded sludge wasting and recycling system. This involved the installation of new Return Activated Sludge (RAS) pumps, new Waste Activated Sludge (WAS) pumps, instrumentation and electrical control;
- Replacement of the sludge dewatering building to house new sludge dewatering equipment;
- Installation of an additional Picket Fence Thickener (PFT) and upgrade of the existing PFT and Sludge Holding Tank, complete with sludge feed pumps to the sludge dewatering plant;
- Provision of a new back-up generator and banded fuel tanks at the WwTP to provide for continued operation of the WwTP in the event of an interruption in the power supply. The primary purpose for the new generator was to provide additional

resilience for the WwTP and reduce the risk of flooding in the Bandon Sewer Network in the event of a mains power failure;

- Hydraulic upgrade of interconnecting pipelines; and
- New chemical storage tank (plan area *ca.* 5m²), emergency shower and eyewash, chemical dosing pumps and delivery pipework.

Glasslinn Road Pumping Station:

- Upgrade (replacement) works to Glasslinn Road Pumping Station;
- New Rising Mains from the Glasslinn Road Pumping Station to WwTP;
- Screening and pumping of storm water from Glasslinn Road Pumping Station to River Bandon;
- Decommissioning and demolition of existing tanks and structures;
- The Glasslinn Road Pumping Station is designed with the capacity to pump flows up to 217l/s (Formula A). These flows are pumped to the new inlet works at the upgraded WwTP site;
- During normal operation overflows are not expected;
- Once flows greater than 217l/s enter the Glasslinn Road Pumping Station, all flows over 217l/s cascade into the wet well of the storm water Pumping Station *via* a new storm screen;
- Storm water flows up to a 1 in 5 year return period (1855l/s) are screened. A 6mm solids separation screen with a minimum solids capture ratio of 80% (based on "Formula A" flow) is present;
- The wet well for the storm Pumping Station also provides overflow storage capacity on-site at Glasslinn Road Pumping Station. The capacity of the wet well of the storm Pumping Station is 250m³ which provides over 2 hours of dry weather flow back-up storage;
- When the waste water pumping station discharge flowrate falls below 217l/s, a storm return pump is mobilised to pump storm flows from the storm wet well back to the wet well of the waste water Pumping Station to reduce the frequency that stormwater discharges to the River Bandon;
- In the event that the capacity of the storm Pumping Station wet well is exceeded then excess flows are pumped directly to the River Bandon *via* a new overflow pipeline. Any discharges to the receiving water are significantly diluted by stormwater. The capacity of the overflow is sufficient for the 1 in 30-year storm event arriving at Glasslinn Road Pumping Station from the Bandon Sewer Network minus the Formula A flows being pumped to the WwTP; that is, 2568l/s;
- The overflow pipeline was installed in order to control spills from the Pumping Station wet well and to avoid flooding of the Pumping Station site, neighbouring land and Bandon Town;
- Construction of a new ESB substation to cater for the increased electrical load;
- Provision of a new back-up generator and banded fuel tanks at the Pumping Station to provide for continued operation of the Pumping Station in the event of an interruption in the power supply. The primary purpose for the new generator is to

provide additional resilience for the Pumping Station. It also reduces the risks of flooding in the Bandon Sewer Network in the event of a mains power failure;

- A minimum of 2 no. suitable openings were provided in each of the covers of the wet wells of the storm and waste water Pumping Station to facilitate the removal of grit/sedimentation that may build up in the deep chambers;
- Installation of an additional HDPE diameter rising main from the Pumping Station to the WwTP inlet works. The new rising main was sized to cater for the full flow to preliminary treatment (*i.e.*, 217l/s) and has the minimum internal diameter required to achieve compliance with the relevant IW standards and Code of Practice;
- Both the existing 350mm diameter (*ca.* dia. only) rising and the 175mm diameter (*ca.* dia. only) rising main were retained and integrated into the permanent works as stand-by delivery pipework to the new inlet works; and
- Flow measurement on new rising main; existing 350mm diameter rising main and on existing 175mm diameter rising main.

1.2.3. Bandon IDA Laragh WwTP Upgrade

As part of this WWDL Review, the Bandon IDA Laragh Agglomeration (A0362-01) is to be amalgamated into the Bandon agglomeration.

The Bandon IDA Laragh WwTP upgrade, which was completed in Q3 2018, comprised of the provision of a new Pumping Station to collect waste water from the existing industrial estate and the pumping of the collected load to the Bandon WwTP for treatment. As part of this work, the Bandon IDA WwTP was decommissioned.

The Bandon Laragh Pumping Station has been designed with the capacity to pump stormwater ("*Formula A*") flows. Therefore, during normal operations or during storm events, overflows are not expected. In addition, tanks associated with the IDA WwTP were retained to provide overflow storage on-site. The storage capacity of the on-site WwTP tank is 80m³. This provides a minimum of 24 hours future dry weather flow storage and up to 84 hours existing average flow storage. In the context of best practice (DoEHLG, 1995), this volume of storage is considered an extra-large volume of storage for a Pumping Station. A 6mm solids separation screen with a minimum solid capture rate of 80% (based on "*Formula A*" flow) was installed at the SWO point. This provides primary treatment in the event that effluent spills to the outfall (SW017) at NGR 145152E, 054669N.

There is an Emergency Overflow (EO) from the new Pumping Station. This outfall is only used in the case of a "*catastrophic breakdown*" of the Pumping Station. This overflow controls spills from the sump and avoids flooding of the site and neighbouring land. Although these spills would be extremely rare, measures were included in the design to avoid such spills during emergency breakdown events.

1.2.4. Bandon Watermain & Sewer Network Project

The Bandon Watermain & Sewer Network Project will increase flow capacity in the system, reduce sewage discharges to the River Bandon and will reduce surcharging of drainage pipe networks in the town. The works consist of the following:

- The removal of 10 no. storm water overflows in Bandon Town and its environs;
- New sections of combined sewer;

- New sections of storm drains;
- New sections of water mains;
- Replacement of defective water mains; and
- Associated ancillary works.

Due to these changes, the incoming design flows to the Glasslinn Road Pumping Station will increase from 1,597l/s to 2,988l/s for the 30-year rainfall event. A new 1,200mm diameter pipeline will be constructed to accommodate these flows and will terminate at the Glasslinn Road Pumping Station.

Works relating to this Project are underway and are due to be completed by the end of Q1 2023.

1.2.5. Planning History

In July 2016 (and as amended in September 2016), IW applied to Cork County Council Planning Authority under Section 34 of the Planning and Development Act, 2000 (as amended) for the **Bandon IDA Laragh WwTP upgrade works**. Planning permission was granted for the Bandon IDA Laragh WwTP upgrade works on the 20th January 2017 by Cork County Council subject to 6 no. conditions. This planning decision was subsequently appealed to An Bord Pleanála. A final grant of planning was obtained from An Bord Pleanála (Ref: PL 04.247978) on the 15th June 2017, subject to 6 no. conditions.

In February 2017, IW applied to Cork County Council Planning Authority under Section 34 of the Planning and Development Act, 2000 (as amended) for the **Bandon Sewerage Scheme** (Ref. Planning Register Number 174106). A final grant of planning was obtained on the 29th August 2017, subject to 11 no. conditions.

The **Bandon Watermain & Sewer Network Project** was classed as exempted development under Class 58 of Schedule 2 of the Planning and Development Regulations, 2000, as amended.

1.2.6. Scope of the EIAR

The EIAR being submitted with this Waste Water Discharge Authorisation (WWDA) Review Application considers the impact of the operational discharges associated with the Bandon agglomeration after the completion of the Bandon Sewerage Scheme, the Bandon IDA Laragh WwTP Upgrade, and the Bandon Watermain & Sewer Network Project.

It does not assess the impacts associated with the construction of the upgrade projects which have already received planning permission, or which have been classed as exempted development.

The scope of the EIAR comprises the operational discharges associated with the Bandon WWDA D0136-01 Review Application and is henceforth referred to as "*the Project*".

A description of the Project for the Bandon WWDA D0136-01 Review is provided in **Chapter 3**.

1.2.7. Need for D0136-01 WWDA Review

Following an examination of the Bandon WWDA in June 2021, the Environmental Protection Agency (EPA) concluded that the WWDA does not satisfy the environmental requirements of the WWDA, 2007 regulations, as amended. The reasoning for their

conclusion and recommendation for a review of the current WWDA D0136-01 was based on the following:

1. The licence was granted over 3 years ago.
2. Planning permission has been granted for proposed development works associated with the licence.
3. The agglomeration is included in IW's investment plan.
4. There has been a material change, which could not reasonably have been foreseen when the licence was granted, in relation to the receiving waters, namely, the deterioration of the status of the Bandon River (Bandon_090) from 'Good' to 'Moderate'. [Note: Since the receipt of the above examination from the EPA, the 2016-2021 WFD assessment period has been published and the WFD status of the Bandon_090 is now classed as Good status].

The p.e at the time of the determination of D0136-01 in 2015 was less than 10,000 p.e. This application relates to an agglomeration p.e. of 14,456 *i.e.*, > 10,000 p.e. threshold band.

As part of this WWDL Review a more onerous Ortho-P ELV of 1.6mg/l is being proposed in order to meet the Good-status 95%ile Environmental Quality Standard (EQS) downstream of the primary discharge.

The inclusion of a Total Phosphorus (TP) ELV of 2mg/l is being proposed as part of this Review due to the Upper Bandon Estuary nutrient sensitive estuary (P limited) being located *ca.* 5km downstream of the primary discharge point, and the fact that the p.e. of the agglomeration will be greater than 10,000.

As part of this WWDL Review, the Bandon IDA Laragh Agglomeration (A0362-01) will be amalgamated into the current Bandon agglomeration, and CoA A0362-01 will be surrendered.

This Review also relates to inclusion of 5 no. overflows (*i.e.*, SW016, SW017, SW018, SW019 and SW020) into the licence, and the removal of 10 overflows from the agglomeration (*i.e.*, SW003, SW005-SW007, SW009-SW013, SW015).

1.3. EIA Team

Article 5(3)(a) of the amended EIA Directive (2014/52/EU) (EIA Directive) states that "*the developer shall ensure that the environmental impact assessment report is prepared by competent experts*". The Guidelines on the Information to be contained in Environmental Impact Assessment Reports issued by the EPA in May 2022 highlights the need for competent experts to be involved in the EIA process and in the preparation of the EIAR.

Working closely with the IW WWDA Specialist, Environmental Specialists from NOD coordinated and managed the preparation of this EIAR and led a team of competent experts in the preparation of the EIAR specialist chapters. Each contributing expert provides a statement of authority, and an explanation of the methods of data collection and assessments that were carried out with reference to applicable discipline or industry standards and government guidance.

Table 1.2 lists the competent experts who were involved in the preparation of each Chapter of the EIAR.

Table 1.2 EIA Chapters and competent experts

EIA Chapter	Company	Name & Qualifications
Chapter 1 - Introduction	Nicholas O'Dwyer Ltd	Krista Farrugia, Principal EIA Consultant, BSc, MSc, PgDip, PIEMA Ursula Daly, Environmental Consultant, Nicholas O' Dwyer Ltd., BSc
Chapter 2 - The EIA Process		
Chapter 3 - Description of the Project and Site		
Chapter 4 - Policy & Legislative Context		
Chapter 5 - Biodiversity	Thorne Ecology	Kate Harrington, Principal Ecologist, MSc, MCIEEM
Chapter 6 - Water	AWN Consulting Ltd	Teri Hayes, Director, BSc MSc PGeol EurGeol
Chapter 7 - Population & Human Health	Enviroguide Consulting	Janet O'Shea, Technical Director, BSc, IEMA, MCIWM, C. Env
Chapter 8 - Material Assets	Enviroguide Consulting	Charlotte Lawler-Greene, Principal Environmental Consultant, BSc, MSc
Chapter 9 - Traffic and Transport	Nicholas O'Dwyer Ltd	Graham Young, Nicholas O' Dwyer Ltd., Senior Engineer, CEng, Dip. PM, BA BAI
Chapter 10 - Air Quality and Climate	AWN Consulting Ltd	Ciara Nolan, Senior Air Quality Consultant, MSc, BSc, AMIAQM, AMIEnvSc
Chapter 11 - Noise and Vibration	AONA Environmental Consulting Ltd	Mervyn Keegan, Director, MSc, BSc, MIAQM, MIOA
Chapter 12 - Odour	AWN Consulting Ltd	Ciara Nolan, Senior Air Quality Consultant, MSc, BSc, AMIAQM, AMIEnvSc
Chapter 13 - Archaeology, Architectural and Cultural Heritage	Courtney Deery Heritage Consultancy Ltd.	Lisa Courtney, Director, BA, MSc, IAI, ICOMOS
Chapter 14 - Lands, Soils and Geology	AWN Consulting Ltd	Teri Hayes, Director, BSc MSc PGeol EurGeol
Chapter 15 - Landscape and Visual	Stephenson Halliday	Daniel Leaver, Associate Director, BSc, MSc, CMLI

EIA Chapter	Company	Name & Qualifications
Chapter 16 - Risk of Major Accidents and/or Disasters	Nicholas O'Dwyer Ltd	Krista Farrugia, Principal EIA Consultant, Nicholas O' Dwyer Ltd., BSc, MSc, PgDip, PIEMA
Chapter 17 - Interactions	Nicholas O'Dwyer Ltd.	Krista Farrugia, Principal EIA Consultant, Nicholas O' Dwyer Ltd., BSc, MSc, PgDip, PIEMA Ursula Daly, Environmental Consultant, Nicholas O' Dwyer Ltd., BSc
Chapter 18 – Schedule of Mitigation Measures	Nicholas O'Dwyer Ltd.	Ursula Daly, Environmental Consultant, Nicholas O' Dwyer Ltd., BSc
Chapter 19 - Bibliography	Nicholas O'Dwyer Ltd.	Ursula Daly, Environmental Consultant, Nicholas O' Dwyer Ltd., BSc
Chapter 20 – Abbreviations	Nicholas O'Dwyer Ltd.	Ursula Daly, Environmental Consultant, Nicholas O' Dwyer Ltd., BSc

In addition to the main contributors to the EIAR, information on the contents of this EIAR was sought from relevant stakeholders in an EIA scoping consultation process. The findings from the scoping process are presented in **Section 2.3** below.

1.3.1. Difficulties Encountered

No difficulties were encountered during the preparation of this EIAR.

2. THE EIA PROCESS

2.1. General

The process by which the likely significant effects of a project on the environment are assessed is set out in the EU EIA Directive 2011/92/EU on the assessment of the effect of certain public and private projects on the environment (codification) (transposed to Irish law through the Planning and Development Regulations 2001, as amended), as amended by EIA Directive 2014/52/EU (transposed to Irish law through the European Union (Planning and Development) (Environmental Impact Assessment) Regulations S.I. 296 of 2018 and in terms of Waste Water Discharges in S.I. No. 214 of 2020 - European Union (Waste Water Discharge) Regulations 2020.

The EIA process includes a number of key characteristics:

- It is systematic, comprising a sequence of tasks defined both by regulation and by practice;
- It is analytical, requiring the application of specialist skills from the environmental sciences;
- It is impartial, its aim being to inform the decision-makers;
- It is consultative, with provision being made for obtaining feedback from interested parties, including local authorities and statutory agencies; and
- It is interactive, allowing opportunities for environmental concerns to be addressed during the planning, design, and implementation of a project.

The structure and general sequence of this EIAR follows the EPA Guidelines (2022), as illustrated in **Figure 2.1** below. The process may be summarised succinctly as follows:

1. Screening – Is EIA Required?
2. Scoping – If EIA is Required, what aspects of the Environment should be considered?
3. Preparation of EIAR

The EIAR informs the EIA process being conducted by the Competent Authority (CA), which in this case is the EPA as part of the WWDA process.

2.1.1. EIA Directive, Legislation and Guidelines

The development of this EIAR has been informed by the EIA Directive (2014/52/EU), National Legislation, EU and EPA guidelines and other guidelines and circulars.

This EIAR adheres to the fundamental principles of the EIA process as outlined in the EU Guidelines (2017) and EPA Guidelines (2022). The Guidelines set out the matters that must be addressed in an EIAR which include:

- Anticipating, avoiding and reducing significant effects;
- Assessing and mitigating effects;
- Maintaining objectivity;
- Ensuring clarity and quality;
- Providing relevant information to decision makers; and
- Facilitating consultation.

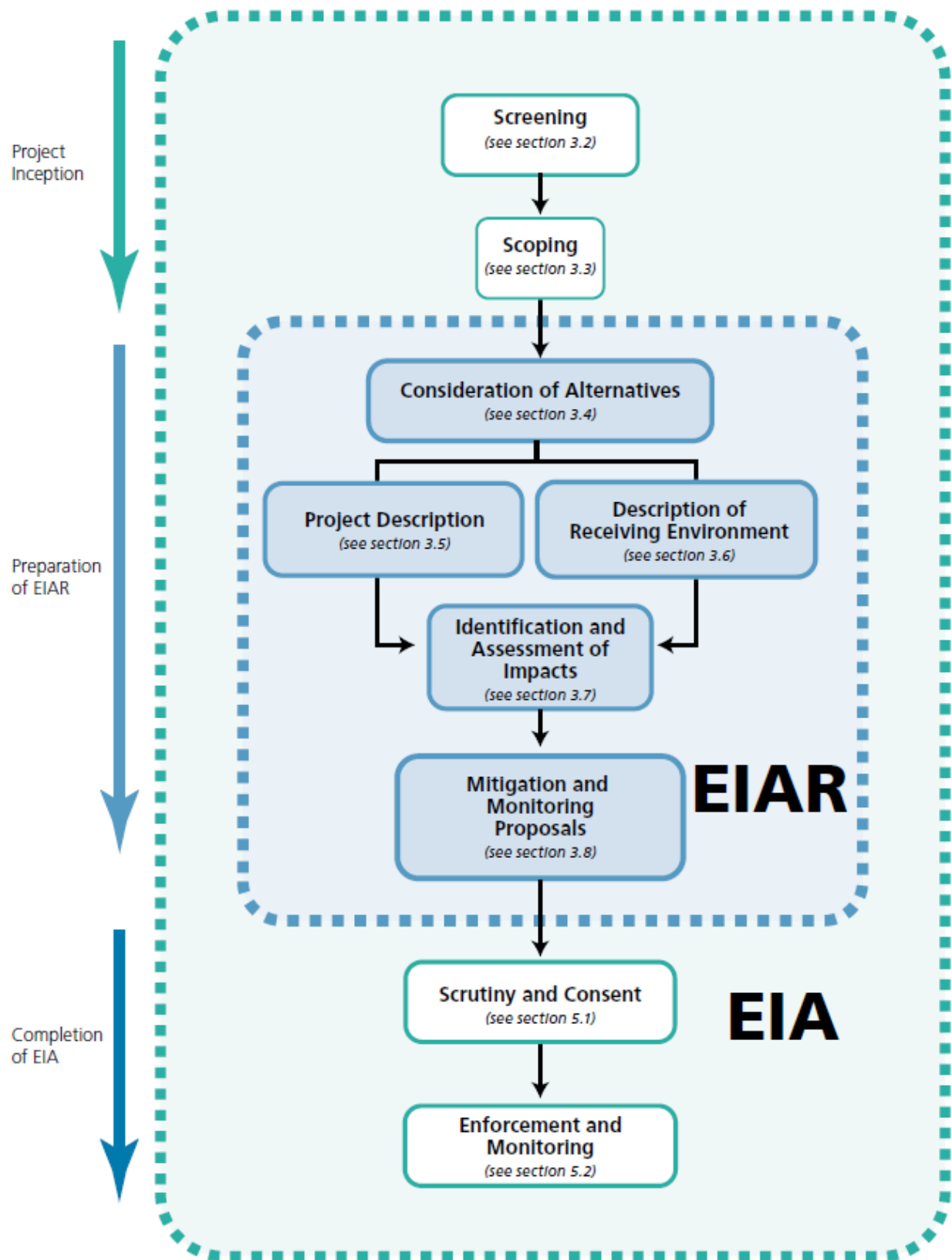


Figure 2.1. The Position of the EIAR within the EIA Process¹

¹ Environmental Protection Agency, Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, May 2022, <https://bit.ly/3SUhQCY> , [accessed 01/11/2022].

2.2. EIA Screening

The project has been screened against Regulation 17 of the Waste Water Discharge Regulations (S.I. No. 214/2020) which state the following: -

'17. The principal Regulations are amended by substituting the following Regulation for Regulation 17 –

"Certain applications to be accompanied by an EIAR

17. An application in respect of the waste water discharge from—

(i) a waste water treatment plant with a capacity of greater than 10,000 population equivalent as defined in Article 2, point (6), of the Urban Waste Water Treatment Directive, and

(ii) a waste water treatment plant specified in accordance with paragraph (6)(c) or (8)(b)(ii) of Regulation 18 or paragraph (3)(c) or (5)(b)(ii) of Regulation 25,

shall, subject to and in addition to compliance with the requirements of Regulation 16, be accompanied by a copy of an EIAR, which shall be submitted in electronic form (which shall be searchable by electronic means as far as practicable) and such other form as may be specified by the Agency".

The project involves a WWDA application for a WwTP with a capacity of greater than 10,000 p.e. as defined in Article 2, point (6), of the Urban Waste Water Treatment Directive (UWWT). Therefore, a mandatory EIA, and the preparation of an EIAR is required for this project to inform the WWDA process.

2.3. EIA Scoping Process

The scoping stage of the EIA is a process of determining the content and extent of the matters which should be covered in the environmental information to be assessed in the EIAR.

The EPA (2022) document *'Guidelines on the Information to be contained in Environmental Impact Assessment Reports'* states that *'All parties should be aware of the need to keep the EIAR as tightly focussed as possible. This focusses the effort and resources of all parties on the key significant issues. Scoping is usually guided by the following criteria: -*

- Use 'Likely' and 'Significant' as the principal criteria for determining what should be addressed. Any issues that do not pass this test should be omitted (scoped out) from further assessment. A section of the EIAR should describe the scoping process explaining why such issues have been scoped out and they are not being considered further. All the prescribed environmental factors need to be listed in the scoping section of the EIAR. It is important to note that the environmental factors themselves cannot be scoped out and must feature in the EIAR. Only topics and headings related to each factor can be scoped in or out. Each environmental factor should be clearly covered by one or more specific section headings in the EIAR. If scoping determines that no likely significant issues arise under any heading, then an explanatory text should be included;*

- *Precedence - where EIARs for similar projects on similar sites or for other project proposals for the same site are available, these can be useful references; and,*
- *Interactions – assessors need to be vigilant for pathways – direct and indirect – that can magnify effects through the interaction or accumulation of effects – for instance the potential for cumulative significant effects to arise from multiple non-significant impacts.*

It is important to reiterate that the scope of this EIA relates solely to the operational discharges from the Bandon agglomeration, as detailed in **Section 1.2.6** and **Chapter 3**.

This EIAR identifies, describes, and assesses in an appropriate manner the direct and indirect potential significant effects of the operational discharges from Bandon agglomeration on each of the factors listed in Article 3 of Directive 2011/92/EU as amended by Directive 2014/52/EU as below:

Article 3

1. The environmental impact assessment shall identify, describe, and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:

(a) population and human health;

(b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;

(c) land, soil, water, air and climate;

(d) material assets, cultural heritage and the landscape;

(e) the interaction between the factors referred to in points (a) to (d).

2. The effects referred to in paragraph 1 on the factors set out therein shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned”.

The EIAR includes an assessment of the discharge from the agglomeration (*i.e.*, Primary Discharge (SW001) from the Bandon WwTP, and overflows (SW002, SW004, SW008, SW014, SW016–SW020) to the receiving water *i.e.*, River Bandon.

2.3.1. Scoping Report

Nicholas O’ Dwyer Ltd., on behalf of IW, prepared a Scoping Report describing the nature of the operational discharges from the Bandon agglomeration, the need for the Project, and for each environmental factor as listed in the EIA Directive, the baseline environment, proposed assessment methodology and potential significant impacts.

On 12th September 2022, in accordance with Regulation 17C of the European Union (Waste Water Discharge) Regulations 2007 to 2020, IW submitted an EIA Scoping Report to the EPA with a request for the Agency to provide its opinion in writing on the scope and level of detail of the information required to be included in the EIAR.

In accordance with the requirements of Regulation 17C & 17D of the European Union (Waste Water Discharge) Regulations 2007 to 2020 (hereafter referred to as WWD Regulations), the Agency consulted with the below listed bodies on 13th September 2022 who were advised that a submission in relation to the information to be contained in the EIAR may be made to the Agency within four weeks beginning on the date of the notice:

- Minister for Agriculture, Food and the Marine;

- Inland Fisheries Ireland;
- Development Applications Unit (Department of Housing, Local Government and Heritage);
- An Taisce;
- Health Service Executive;
- Health and Safety Authority;
- Fáilte Ireland;
- An Bord Pleanála;
- Cork County Council (Planning Section and Environment Section);
- Marine Institute;
- Sea Fisheries Protection Authority;
- Bord Iascaigh Mhara; and
- Food Safety Authority of Ireland.

A summary of the comments and recommendations received from the agencies and organisations has been provided below.

2.3.2. Scoping Responses

Three consultees provided a submission. A summary of each scoping response is provided below.

Table 2.1 Scoping Responses

Consultee	Date of Response	Summary of Response	Acknowledgement of Response
Health Service Executive (HSE)	20/10/2022	The HSE recommended that public consultation and the wider determinants of health and wellbeing are considered, including: Consideration of Alternatives; Population and Human Health; Hydrology and Hydrogeology; Noise and Vibration; Air and Climate; Odour; Land, Soils and Geology; and Ancillary Facilities. The HSE also referred to guidance documents to utilise when preparing the EIAR.	The assessment contained herein has taken full regard of the HSE submission.
Inland Fisheries Ireland (IFI)	27/09/2022	The IFI state that Bandon River is one of the premier angling, spawning and nursery waters in the South Western River Basin District and that "the	The assessment contained herein has taken full regard of the IFI submission. It is acknowledged that the 2013-2018 WFD status of the

Consultee	Date of Response	Summary of Response	Acknowledgement of Response
		<p><i>deterioration of the status of the Bandon River (Bandon_090) from 'Good' to 'Moderate' is naturally a cause for concern".</i></p> <p>The IFI also request that the current actual background data is applied for calculation of the assimilative capacity of the river.</p>	<p>Bandon_080 and Bandon_090 was Moderate status (2013-2018). However, it should be noted that the recently published 2016-2021 WFD status of the Bandon_080 and Bandon_090 is now Good status.</p> <p>The WAC calculations used to inform the Bandon WWDL review application and supporting documents, including this EIAR document, have been based on the EPA's notional clean river approach and the mean background concentrations upstream of the primary discharge (Station: RS20B020800 - data from January 2020 – May 2022).</p>
Sea Fisheries Protection Authority	14/09/2022	The consultee raised no topics for attention.	Noted

The scoping responses received were taken into consideration when preparing this EIAR.

2.3.3. Scoping Opinion

In relation to the information in paragraph 2 of Schedule 6 to the Planning and Development Regulations of 2001, as amended, and having regard to the specific characteristics of the project, including location and technical capacity, and likely impact on the environment, the EPA provided the following opinion:

- (i) *identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of a project on each of the factors listed in Article 3 of Directive 2011/92/EU as amended by Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment (EIA Directive). It is important to note that the environmental factors themselves cannot be scoped out and must feature in the EIAR. Only subtopics and headings related to each factor can be scoped in or out. Each environmental factor should be clearly covered by one or more specific section headings in the EIAR. If scoping determines that no likely significant issues arise under any heading, then an explanatory text should be included;*
- (ii) *address the matters raised in the responses received from the bodies detailed above;*

- (iii) *address the requirements of Regulation 17A of the WWD Regulations;*
- (iv) *address compliance with the requirements of the Urban Waste Water Treatment Directive and Water Framework Directive including the programme of measures;*
- (v) *include an assessment of all discharges from the waste water works (primary, storm water overflow and emergency overflows) including a cumulative assessment that demonstrates that the project aims to achieve the Water Framework Directive environmental objectives for the receiving waters including objectives and standards for associated protected areas;*
- (vi) *address monitoring of waste water discharges and the receiving water;*
- (vii) *have regard to the EPA's Guidelines on the information to be contained in Environmental Impact Assessment Reports*
- (viii) *have regard to the relevant topics contained in the EPA's Advice Notes on Current Practice (in the preparation of Environmental Impact Statements) September 2003;*
- (ix) *satisfy the requirements of the EIA Directive.*

All of the points listed above were taken into consideration throughout the process of preparing this EIAR.

2.4. EIAR Structure

The composition of this EIAR is in accordance with EPA Guidelines (2022) which requires that information contained within an EIAR should be in accordance with Article 3(1), Article 5(1) and any additional information specified under Annex IV under the Directive 2014/52/EU.

This EIAR has been prepared with consideration of the EPA's "Guidelines on the Information to be Contained in Environmental Impact Assessment Reports" (May 2022), and the "Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment", Department of Housing, Planning and Local Government (August 2018).

The EIAR is presented in the format set out in the EPA's "Guidelines on the Information to be Contained in Environmental Impact Assessment Reports" (May 2022). It is presented as follows:

Non-Technical Summary provides a non-technical summary of the EIAR laid out in a similar, but condensed, format to the main EIAR.

Main Report of the EIAR, provides a general introduction and background to the project, describes the EIA process, provides a project description, including alternatives considered, and policy and legislative context (**Chapters 1 to 4**). **Chapters 5 to 15** describe the potential environmental impacts of The Project in relation to each environmental factor. **Chapter 16** assesses risks of major accidents and/or disasters. **Chapters 17** is a summary of how the different environmental effects interact and **Chapter 18** provides a schedule of mitigation measures, representing the environmental commitments associated with the operational discharges from the agglomeration. A Bibliography is provided in **Chapter 19** and Abbreviations are presented in **Chapter 20**.

- Chapter 1 - Introduction
- Chapter 2 – The EIA Process
- Chapter 3 - Description of the Project and Site
- Chapter 4 – Policy & Legislative Context
- Chapter 5 - Biodiversity
- Chapter 6 - Water
- Chapter 7 – Population & Human Health
- Chapter 8 - Material Assets
- Chapter 9 – Traffic and Transportation
- Chapter 10 - Air Quality and Climate Change
- Chapter 11 - Noise and Vibration
- Chapter 12 – Odour
- Chapter 13 - Archaeology, Architectural and Cultural Heritage
- Chapter 14 – Lands, Soils and Geology
- Chapter 15 - Landscape & Visual
- Chapter 16 – Risk of Major Accidents and/or Disasters
- Chapter 17 – Interactions
- Chapter 18 – Schedule of Mitigation Measures
- Chapter 19 – Bibliography
- Chapter 20 – Abbreviations
- Appendix 1 – Criteria for Rating Site Attributes – Estimation of Importance of Hydrology Attributes
- Appendix 2 – Waste Assimilative Capacity Calculations
- Appendix 3 – Water Framework Directive Assessment

2.4.1. Environmental Factors Chapter Layout

Each Environmental Factor Chapter contained within this EIAR has been structured according to EPA Guidelines (2022) and is generally structured as outlined below.

2.4.1.1. Introduction

This section will introduce the environmental factor to be assessed and the areas to be examined in the assessment.

2.4.1.2. Methodology

This section will contain the specific topic related methodologies. This will include the methodology and raw data used in describing the existing environment and undertaking the impact assessment.

2.4.1.3. Receiving Environment

An accurate description of the existing baseline environment is necessary to predict the likely significant impacts of a proposed development. To describe the existing environment, desktop reviews of existing data sources were undertaken for each specialist area, as required. The literature review includes published reference reports and datasets. Desktop studies, as required, were supplemented by specialised field surveys to confirm the accuracy of the desktop study or to gather further, site-specific baseline environmental information. The sensitivity of the environment to the operational discharges is also described and sensitive receptors identified as relevant.

2.4.1.4. Description of Likely Significant Effects

This section predicts how the receiving environment will be impacted by the operational discharges and describes the potential significance of the impact.

2.4.1.5. Mitigation Measures

This section provides the recommendations for mitigation measures to reduce or eliminate any significant negative impacts identified.

2.4.1.6. Residual Impacts

This section describes the assessment of the specific direct and indirect impacts of the operational discharges. Residual Impacts are predicted impacts remaining after mitigation measures have been applied. The predicted impacts are discussed having regard to their character, magnitude, duration, consequences, and significance, and also their cumulative impacts.

Table 2.2 below outlines the approach to describing environmental impacts and effects in this EIAR. This methodology follows that set out in the EPA guidelines (2022). In the context of Water (hydrology), Transport Infrastructure Ireland (TII) criteria for rating the magnitude and significance of impacts and the importance of hydrological attributes during the EIA stage are also relevant in assessing the impact and are presented in **Appendix 1**.

2.4.1.7. Monitoring

This section provides a description of any proposed project monitoring of effects on the environment which might be deemed necessary.

2.4.2. Risk of Major Accidents and/or Disasters

This Chapter of the EIAR identifies how the potential for accidents and disasters relevant to the operational discharges have been identified and how those risks have been managed. This is in accordance with Article 3(2) of the EIA Directive, which states:

"The effects referred to in paragraph 1 on the factors set out therein shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned".

The Risk of Major Accidents and/or disasters is outlined in **Chapter 16** of this EIAR.

2.4.3. Environmental Interactions

This Chapter of the EIAR covers the interactions between each of the environmental factors covered in **Chapters 5 to 15** of the EIAR. This Section is directed by Article 3(1)(g) of the EIA Directive 2014/52/EU, which requires *"the interaction between the factors referred to in points (a) to (d)"*.

2.4.4. Schedule of Mitigation Measures

This Chapter of the EIAR summarises the mitigation measures that have been identified in the individual sections. These include mitigation measures that are incorporated into the design of the discharges and any measures taken to prevent discharges from polluting

the receiving waterbody. The Schedule of Mitigation Measures is outlined in **Chapter 18** of this EIAR. A summary of recommendations is also provided in this Chapter.

2.5. Assessment of Impacts

The purpose of this EIAR is to present an assessment of the likely significant effects of the Project (*i.e.*, the operational discharges SW001, SW002, SW004, SW008, SW014 and SW016 - SW020) on the environment. This will inform the EPA's assessment process on whether to grant consent for a WWDA review for the Bandon agglomeration and will assist the EPA in identifying conditions that may be attached to the licence. The type and characteristics of the impacts are set out in Annex III(3) and Annex IV(5) of the EIA Directive.

Table 2.2 below outlines the approach to describing environmental impacts and effects in this EIAR. This methodology follows that set out in the EPA guidelines (2022).

Table 2.2 Description of Effects. Source: EPA Guidelines (2022)

Quality of Effects It is important to inform the non-specialist reader whether an effect is positive, negative or neutral.	Positive Effects A change which improves the quality of the environment (for example, by increasing species diversity, or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/Adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem, or damaging health or property or by causing nuisance).
Describing the Significance of Effects 'Significance' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful (also see <i>Determining Significance</i>).	Imperceptible An effect capable of measurement but without significant consequences.
	Not Significant An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.
	Very Significant An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.
	Profound Effects An effect which obliterates sensitive characteristics.
Describing the Extent and Context of Effects Context can affect the perception of significance. It is important to establish if the effect is unique or, perhaps, commonly or increasingly experienced.	Extent Describe the size of the area, the number of sites and the proportion of a population affected by an effect.
	Context Describe whether the extent, duration or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)

<p>Describing the Probability of Effects</p> <p>Descriptions of effects should establish how likely it is that the predicted effects will occur so that the CA can take a view of the balance of risk over advantage when making a decision.</p>	<p>Likely Effects</p> <p>The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.</p> <p>Unlikely Effects</p> <p>The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.</p>
<p>Describing the Duration and Frequency of Effects</p> <p>'Duration' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful.</p>	<p>Momentary Effects</p> <p>Effects lasting from seconds to minutes.</p> <p>Brief Effects</p> <p>Effects lasting less than a day.</p> <p>Temporary Effects</p> <p>Effects lasting less than a year.</p> <p>Short-term Effects</p> <p>Effects lasting one to seven years.</p> <p>Medium-term Effects</p> <p>Effects lasting seven to fifteen years.</p> <p>Long-term Effects</p> <p>Effects lasting fifteen to sixty years.</p> <p>Permanent Effects</p> <p>Effects lasting over sixty years.</p> <p>Reversible Effects</p> <p>Effects that can be undone, for example through remediation or restoration.</p> <p>Frequency of Effects</p> <p>Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).</p>

3. DESCRIPTION OF PROJECT AND SITE

3.1. Characteristics of the Existing Environment

The subject matter of this EIAR comprises the operational discharge activities from the Bandon agglomeration after the works completed under the Bandon Sewerage Scheme and the Bandon IDA Laragh WwTP Upgrade, as described in **Chapter 1**. It also relates to the operational discharges after the completion of Bandon Watermain & Sewer Network Project (due to be completed by end of Q1 2023), see **Chapter 1**. Therefore, this document is only concerned with the likely significant effects on the receiving environment associated with the operational discharges from the agglomeration. Demolition and construction related impacts are not relevant to this EIAR process.

There are several environmental receptors associated with the operational discharge activities that are taken into consideration as part of the EIAR process. These include, but are not limited to, the following designated features:

- There are no European sites directly downstream of the operational discharges. There is 1 no. Special Protection Area (SPA) located a significant distance downstream of the primary discharge point (*i.e.*, Sovereign Islands SPA (Site Code 004124) *ca.* 29km downstream. Bandon River Special Area of Conservation (SAC) is located *ca.* 29km upstream of the primary discharge point. Courtmacsherry Bay SPA and Clonakilty Bay SPA are located *ca.* 10km south and *ca.* 16km southwest of Bandon, respectively, but are not hydrologically connected.
- There are no proposed Natural Heritage Areas (NHAs) in the immediate vicinity of the operational discharges. The nearest pNHAs in the vicinity of the operational discharges are the following:
 - Bandon Valley above Inishannon – *ca.* 1.3km d/s of primary discharge; and
 - Bandon Valley West of Bandon - *ca.* 3km u/s of primary discharge;
- There is a drinking water abstraction point at Innishannon located *ca.* 4.5 km downstream of the primary abstraction point;
- The Bandon Estuary Upper which lies *ca.* 5km downstream of the primary discharge point is designated as a nutrient sensitive area (P limited) in accordance with the UWWT Directive 91/271/EEC on Urban Waste Water Treatment and S.I. No. 254 of 2001, S.I. No. 440 of 2004 and S.I. No. 48 of 2010;
- The operational discharges discharge to the Bandon_080 and the Bandon_090, both of which have a Good WFD status (2016-2021). This is an improvement from the 2013-2018 assessment period, where both waterbodies had a Moderate status. Approximately 0.8km downstream of the primary discharge point, the Bandon_090 flows into the Bandon_100 which has a WFD 2016-2021 designation of Good status, which is an improvement from its previous Moderate status (2013-2018).
- The River Bandon is a not a designated salmonid waterbody but it is important for fishing and is primarily a salmon and sea trout river. It also has resident brown trout and there are a number of angling associations in the area;
- The River Bandon downstream of the agglomeration is not a designated Freshwater Pearl Mussel (FWPM) catchment under the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations (2009), as amended. It should be noted however that FWPM are known from the Bandon River SAC further upstream of the agglomeration and there may be *ex-situ* populations downstream of the SAC, but upstream of Bandon. Connectivity to the operational discharges is indirectly

established to the Bandon River SAC FWPM population due to the role salmonid species play in the FWPM life cycle.

Figure 3.1 shows some of the key receptors and sensitivities associated with the Bandon operational discharge activities.

This EIAR, has been prepared in accordance with Directive 2011/92/EU, as amended by Directive 2014/52/EU (the EIA Directive) and S.I. No. 214 of 2020 - European Union (Waste Water Discharge) Regulations 2020, and assesses the likely significant effects on the environment from the operational discharges on the identified receptors, alone and in combination with other plans and projects.

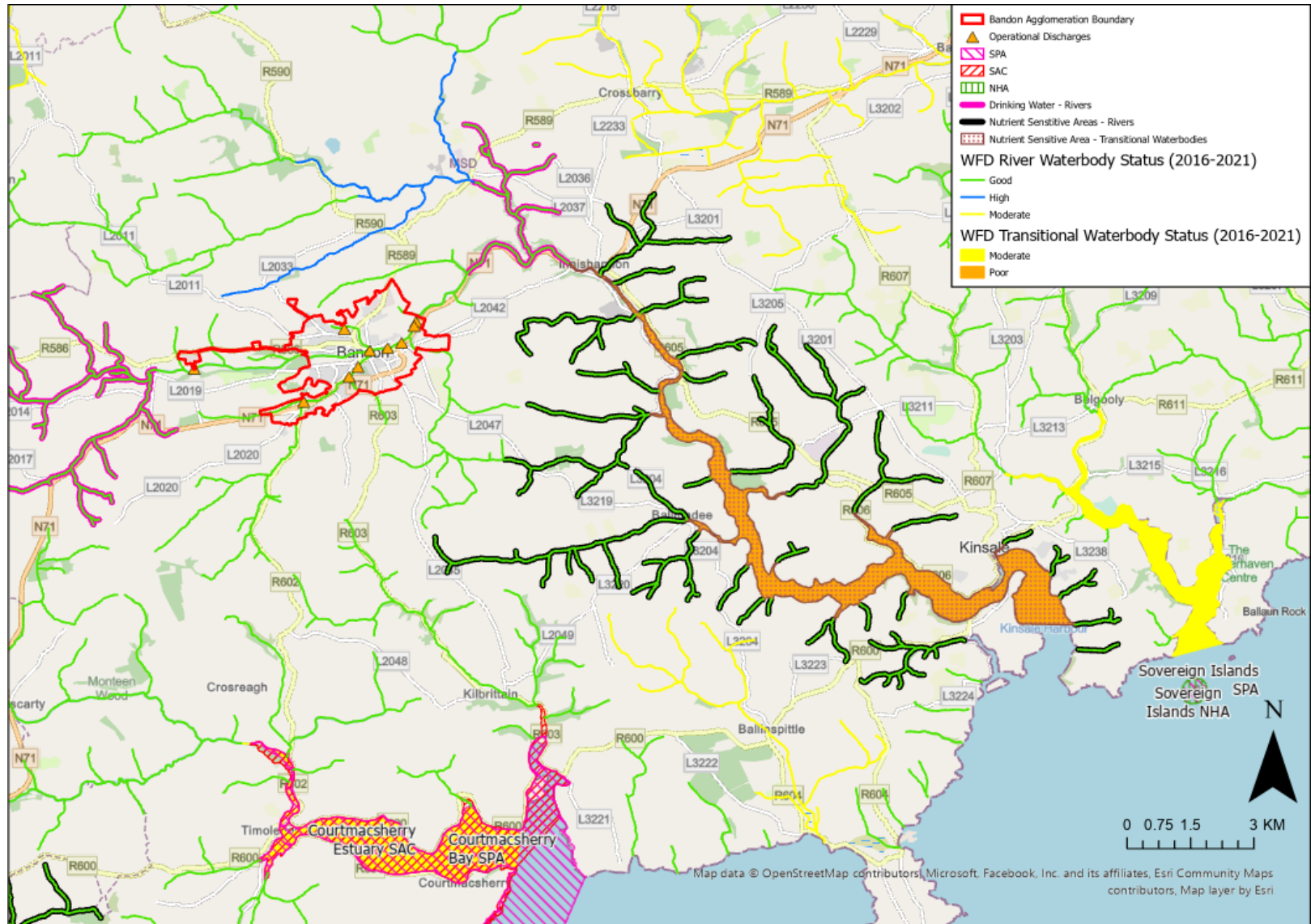


Figure 3.1 Key Receptors and Sensitivities in relation to the Bandon Agglomeration & Associated Operational Discharges

3.2. Consideration of Alternatives

Article 5 of the amended EU EIA Directive 2011/92/EU requires that the EIAR shall contain "a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment." As per Annex IV of the amended Directive, information in the EIAR should include a description of the reasonable alternatives relevant for the project in terms of design, technology, location, size and scale; and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

3.2.1. "Do Nothing" Scenario

If the Bandon Sewerage Scheme works had not been implemented, it is possible that there would be inadequate treatment capacity within the WwTP to meet the future needs of the area served. This would result in ineffective management of the wastewater treatment process and risks to the environment and public health. It is therefore considered that the "Do-Nothing" scenario was not an option in relation to this aspect of the completed works.

In the absence of the Bandon IDA Laragh WwTP upgrade, which was completed in Q3 2018, the potential for highly polluted effluent discharges from the Industrial Estate would have continued. This may have resulted in a deterioration of water quality in the River Bandon at the discharge point.

If the Bandon Watermain and Sewer Network Project is not completed, the possibility of future flood events, like those currently being experienced in the town, will continue. Climate change is already resulting in more intense storms and rainfall events and an increased likelihood and magnitude of river and coastal flooding is predicted for the future. This will have economic and social impacts on businesses, residents, public infrastructure, and services that have been affected by previous flood events. Furthermore, in the absence of the Bandon Watermain and Sewer Network Project, frequent discharges of untreated waste water to the River Bandon during storm events would continue. It is therefore considered that the "Do-Nothing" scenario was not an option.

3.2.2. Alternative Locations

The upgrade works at Bandon WwTP were required to ensure that there would be adequate treatment capacity to meet the future needs of the area served. Bandon WwTP was deemed the most feasible option as the existing network gravitates to Glasslinn Road Pumping Station and then to the WwTP. The option of providing a separate treatment facility located elsewhere in the catchment would be less feasible and would also involve diversion of flows to a new facility for treatment as well as separation and pumping of network flows and land acquisition. Consideration of alternative locations is, therefore, not relevant to the Project.

3.3. Project Description: Operational Discharges

Chapter 1 of this EIAR provides details on the background and a description of the existing WwTP, and the upgrades to the Bandon WwTP and network.

This section provides details on the operational discharges from the Bandon agglomeration *i.e.*, the subject matter of this EIAR.

Figure 3.2 shows the layout of the WwTP. **Table 3.1** summarise the discharges, explained in further detail below.

3.3.1. Primary Discharge (SW001)

The primary discharge (SW001) from the WwTP will remain the same as it was prior to the Bandon Sewerage Scheme Upgrade and will continue to discharge to the River Bandon at NGR 150411E, 055785N.

The location of the SW001 is shown in **Table 3.1** and on **Figure 3.3**.

The Bandon Watermain & Sewer Network Project will increase the flow capacity in the sewer system and will result in a greater volume of waste water in the agglomeration receiving treatment prior to the discharge of the treated effluent to the River Bandon in accordance with the proposed ELVs.

3.3.2. Dual Function Overflow (SW002) at WwTP

There is a single Dual Function Overflow (SW002) at the Bandon WwTP *i.e.*, an overflow which can act as a SWO or as an Emergency Overflow (EO) depending on the event. The location of SW002 is shown in **Table 3.1** and on

This SWO has been designed to meet the definition of 'Storm Water Overflow' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995. The following measures are also in place:

- A 900m³ Stormwater Holding Tank is provided at the WwTP; flows in excess of the Stormwater Tanks capacity overflow to the River Bandon;
- Overflows from the Storm Water Holding Tank are screened before entering the River Bandon. This provides primary treatment in the event that effluent spills to the outfall;
- Provision of a SCADA and telemetry system, this system ensures compliance and compatibility with IW's Design Specifications;
- Provision of a standby power supply at the WwTP to provide for continued operation of the waste water treatment equipment in the event of an interruption in the power supply; and
- All flows will be monitored continuously and recorded by flowmeters at the WwTP.

3.3.3. Dual Function Overflow (SW004) at Watergate Street Pumping Station

There is a single Dual Function Overflow (SW004) at the Watergate Street Pumping Station. The location of SW004 is shown in **Table 3.1** and on **Figure 3.3**.

This SWO has been designed to meet the definition of 'Storm Water Overflow' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995. The following measures are also in place:

- Storm water capacity provided in wastewater pump sump (total capacity of ca. 1,136l/s). Flows in excess of the total pump capacity discharge through 2 no. screened overflows to the adjacent storm sump. This provides primary treatment in the event that effluent spills to the outfall; and
- Alarms for pump and level at the Watergate Street Pumping Station with alarms sent to operators.

3.3.4. Storm Water Overflow (SW008) at Glasslinn Road

There is a single network Storm Water Overflow (SW008) along the Glasslinn Road. The location of SW008 is shown in **Table 3.1** and on **Figure 3.3**.

This SWO has been designed to meet the definition of 'Storm Water Overflow' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995.

3.3.5. Storm Water Overflow (SW014) at N71 Road

There is a single network Storm Water Overflow (SW014) along the N71 Road. The location of SW014 is shown in **Table 3.1** and on **Figure 3.3**.

This SWO has been designed to meet the definition of 'Storm Water Overflow' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995.

3.3.6. Dual Function Overflow (SW016) at Glasslinn Road Pumping Station

There is a single Dual Function Overflow (SW016) at the upgraded Glasslinn Road Pumping Station. The location of SW016 is shown in **Table 3.1** and on **Figure 3.3**.

This SWO has been designed to meet the definition of 'Storm Water Overflow' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995. The following measures are also in place:

- Storm water storage capacity provided in wet well (250m³);
- Storm water flows up to a 1 in 5-year return period (1855l/s) are screened before entering the River Bandon. A 6mm solids separation screen with a minimum solids capture ratio of 80% (based on "Formula A" flow) is present. This provides primary treatment in the event that effluent spills to the outfall;
- Provision of a standby power supply at the Glasslinn Road Pumping Station to provide for continued operation of the pumping equipment in the event of an interruption in the power supply; and

- Alarms for pump and level at the Glasslinn Road Street Pumping Station with alarms sent to operators.

3.3.7. Dual Function Overflow (SW017) at Laragh Pumping Station

There is a single Dual Function Overflow (SW017) at the Laragh Pumping Station. The location of SW017 is shown in **Table 3.1** and on **Figure 3.3**.

This SWO has been designed to meet the definition of '*Storm Water Overflow*' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG '*Procedures and Criteria in Relation to Storm Water Overflows*', 1995. The following measures are also in place:

- Storm water storage capacity provided in storm tanks (80m³). This provides a minimum of 24 hours future dry weather flow storage and up to 84 hours existing average flow storage. In the context of best practice, this volume of storage is considered an extra-large volume of storage for a pumping station;
- A 6mm solids separation screen with a minimum solids capture ratio of 80% (based on "*Formula A*" flow) is present. This provides primary treatment in the event that effluent spills to the outfall;
- Alarms for pump and level at the Laragh Pumping Station with alarms sent to operators; and
- Uninterruptible Power Supply for up to 30 minutes is provided for all instrumentation, controllers, alarms and data storage systems. This ensures that alarms are sent in the event of a loss of power.

3.3.8. Storm Water Overflow (SW018) at New Road

There is a single network SWO (SW018) along the New Road. The location of SW008 is shown in **Table 3.1** and on **Figure 3.3**.

This SWO has been designed to meet the definition of '*Storm Water Overflow*' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG '*Procedures and Criteria in Relation to Storm Water Overflows*', 1995.

3.3.9. Emergency Overflow (SW019) at Castlewoods Pumping Station

There is a single EO (SW019) at the Castlewoods Pumping Station. The location of SW019 is shown in **Table 3.1** and on **Figure 3.3**.

This EO will discharge only during an emergency event. The following measures are also in place:

- Connection for a generator available at the Castlewoods Pumping Station to provide for continued operation of the pumping equipment in the event of an interruption in the power supply.

3.3.10. Dual Function Overflow (SW020) at Kilbrogan Pumping Station

There is a single Dual Function Overflow (SW020) at the Kilbrogan Pumping Station. The location of SW020 is shown in **Table 3.1** and on **Figure 3.3**.

This SWO has been designed to meet the definition of 'Storm Water Overflow' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995. The following measures are also in place:

- Connection for a generator available at the Kilbrogan Pumping Station to provide for continued operation of the pumping equipment in the event of an interruption in the power supply.

Table 3.1 Operational Discharges relating to the Bandon WWDA Review

Discharge Name	Type	Asset	Discharge Location (NGR)
SW001	Primary Discharge	WwTP	150411E, 055785N
SW002	Dual Function Overflow (Storm Water Overflow & Emergency Overflow)	WwTP	150368E, 055690N
SW004	Dual Function Overflow (Storm Water Overflow & Emergency Overflow)	Watergate Street Pumping Station	149316E, 055104N
SW008	Storm Water Overflow	Network	149738E, 055164N
SW014	Storm Water Overflow	Network	148826E, 054484N
SW016	Dual Function Overflow (Storm Water Overflow & Emergency Overflow)	Glasslinn Road Pumping Station	150070E, 055290N
SW017	Dual Function Overflow (Storm Water Overflow & Emergency Overflow)	Laragh Pumping Station	145152E, 054669N
SW018	Storm Water Overflow	Network	149039E, 054717N
SW019	Emergency Overflow	Castlewoods Pumping Station	147749E, 53889N
SW020	Dual Function Overflow (Storm Water Overflow & Emergency Overflow)	Kilbrogan Pumping Station	148713E, 055617N

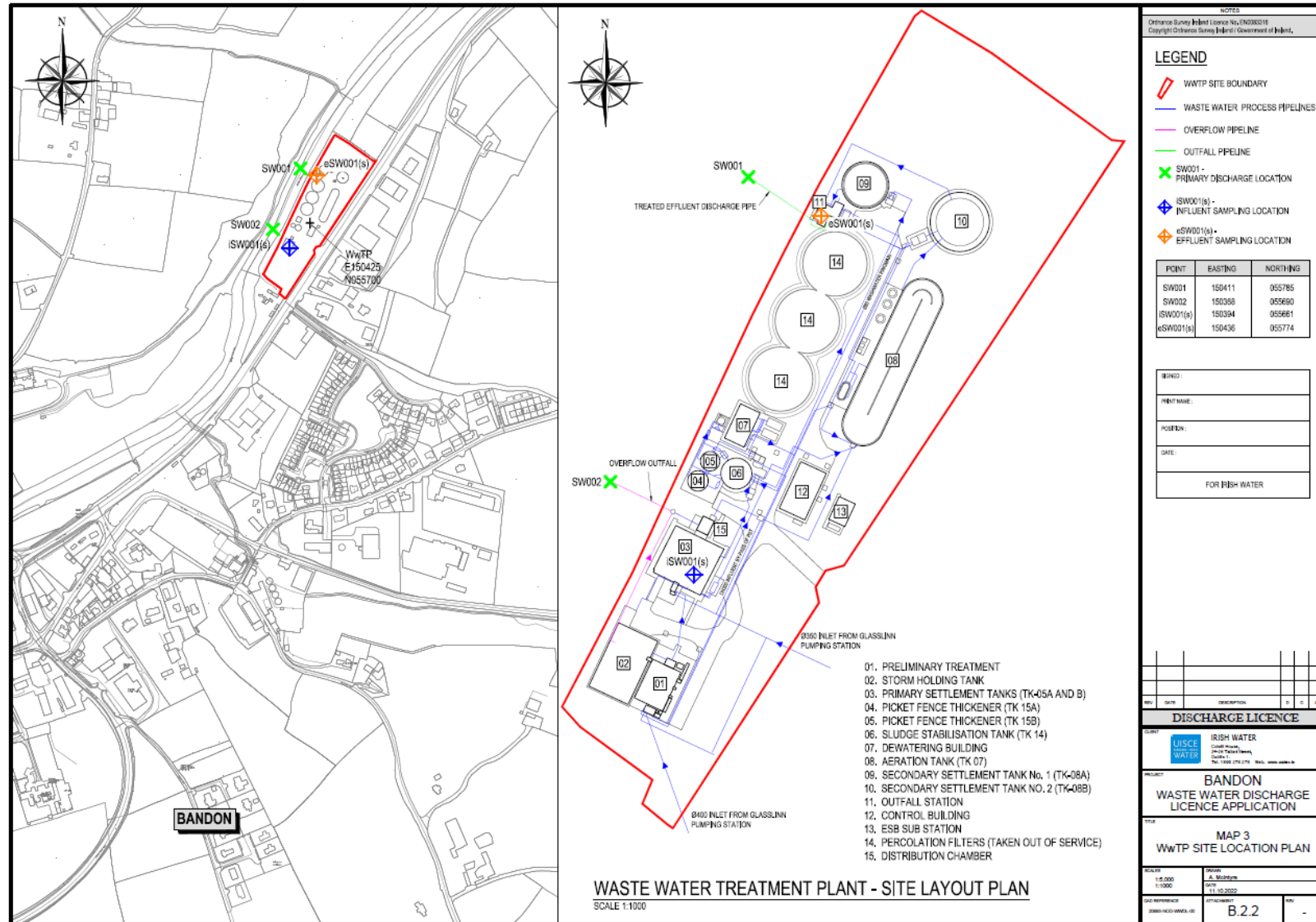


Figure 3.2 Bandon Waste Water Treatment Plant Layout

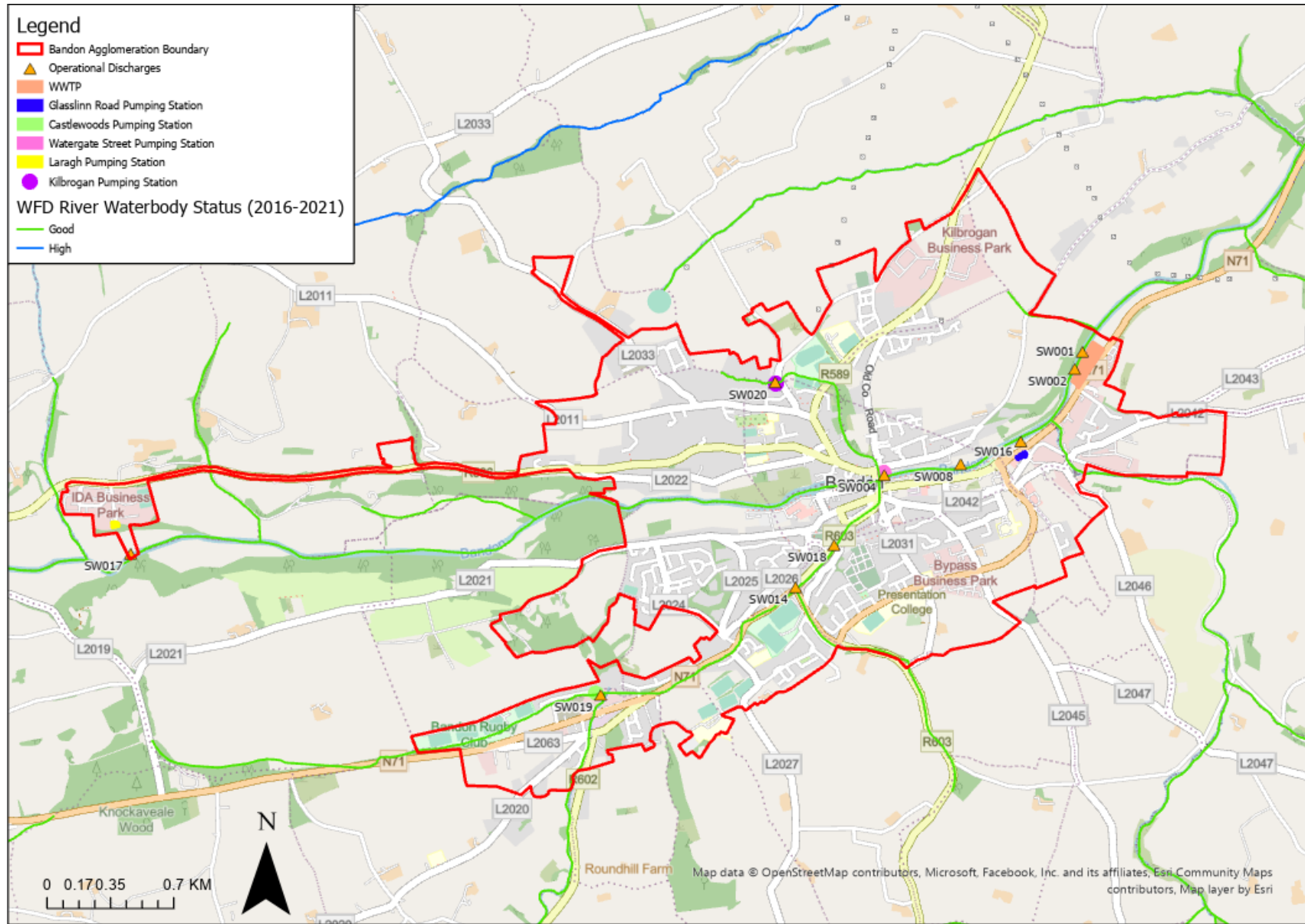


Figure 3.3 Operational Discharges relating to D0136-01 WWDL Review and Amended Agglomeration Boundary

3.4. Waste Water Treatment Plant Design

Planning Permission for the Bandon Sewerage Scheme (Cork County Council planning ref: 174106) was obtained on the basis of the upgraded WwTP (14,456 p.e) meeting the ELVs as per Schedule A.1 of the WWDL D0136-01 (Tech Amendment A): BOD 25mg/l, COD 125mg/l, SS 35mg/l, pH 6-9 pH units, Ortho-phosphate (as P 3mg/l and Ammonia 3mg/l).

Since planning was obtained, a Waste Assimilative Capacity (WAC) calculation based on the design DWF of 2,602m³/d was completed in 2022 to inform this WWDA Review Application and ensure that the above ELVs were fit for purpose based on the latest data available (see **Appendix 2 – Waste Assimilative Capacity**). It was concluded that a more onerous Ortho-phosphate ELV of 1.6mg/l was required to meet the Good-status 95%ile Environmental Quality Standard (EQS) downstream of the primary discharge.

Based on the distance of Upper Bandon Estuary nutrient sensitive estuary (P limited) downstream of the primary discharge point (*ca.* 5km), along with the fact that the p.e. of the agglomeration is greater than 10,000, a TP ELV of 2mg/l is being proposed under this Review.

Based on the proposed ELVs in **Table 3.2**, the receiving waterbody has the capacity to accommodate the discharge from the upgraded WwTP without causing a breach in the relevant standards as outlined in National and European legislation. This includes ensuring compliance with the Good standards set in the European Communities Environmental Objectives (Surface Water) Regulations, 2009, as amended (now S.I. No. 288 of 2022).

Table 3.2 presents the proposed ELVs for this Licence Review.

Table 3.2 Proposed Emission Limit Value (ELVs)

Parameter	Proposed Emission Limit Value (ELV)
Biological Oxygen Demand	25 mg/l
Chemical Oxygen Demand	125 mg/l
Suspended Solids	35 mg/l
Ortho-phosphate (as P)	1.6 mg/l
Ammonia (as N)	3 mg/l
Total Phosphorus	2 mg/l
pH	6 - 9

All flows arriving at the upgraded WwTP receive secondary treatment with Phosphorus removal in order to comply with the proposed ELVs tabled above.

These standards give effect to the principle of the Combined Approach as defined in Waste Water Discharge (Authorisation) Regulations, 2007 to 2020 in that they accommodate the Urban Waste Water Treatment Regulations, 2001 (as amended) and the status of the receiving waterbody, the River Bandon.

The Bandon WwTW has been designed to ensure that emissions from the works will not result in the contravention of any relevant EU Directives and National Regulations in accordance with IW's Design Specifications.

3.5. General Operations and Management

3.5.1. Operations and Maintenance Staff

The Bandon WwTP runs automatically and is capable of being monitored on a daily basis *via* the SCADA system. The WwTP is a manned site during normal working hours on Monday – Friday with 24 hour call out response where the amount of time spent on site will vary depending on various factors *e.g.*, weather or breakdowns in plant or maintenance works required such as cleaning of the intake screens, *etc.* In general, there are 1-2 people on site during normal operation of the plant. There is also a maintenance team on site for approximately one week a month to carry out any repairs or any other scheduled larger maintenance that may be required.

3.5.2. Environmental and Incident Management

The Operator has in place certified health and safety (OHSAS 18001) and environmental (ISO 14001) management systems. The management systems provide for the monitoring of environmental and safety performance and implementation of continual improvement through associated action programmes. These programmes are frequently and routinely monitored by IW and will continue to be developed over the operating life of the upgraded WwTP.

3.5.3. Measures to Prevent Unintended Discharges

There are accident prevention procedures and emergency response plans and procedures in place to prevent unintended discharges to the receiving waterbody. See **Attachment C.2** of the WWDA Review Application for a full summary of these measures to prevent unintended discharges.

The Bandon Wastewater Treatment Works (WwTW) has been designed to prevent unintended discharges from the works and to ensure that all emissions from the agglomeration comply with or will not result in the contravention, of any national or European legislation.

In accordance with its EPA WWDL, procedures are in place to notify the EPA of emergencies, exceedance of licence conditions and where environmental pollution has, or may have, taken place. Furthermore, all monitoring of flows, effluent and receiving waters will be carried out in accordance with the EPA WWDL.

3.5.4. Environmental Monitoring

A monitoring programme of the effluent discharge and ambient water quality is currently in place and will continue to be in place as per the WWDL requirements. Refer to Schedule A: *Discharges & Discharge Monitoring*, and Schedule B: *Ambient Monitoring* of WWDL D0136-01 for details on the current monitoring regime.

The results from this monitoring programme are provided in the conditioned Annual Environmental Report (AER) which is submitted to the EPA on an annual basis.

4. POLICY AND LEGISLATIVE CONTEXT

4.1. Introduction

This Chapter of the EIAR summarises the key relevant legislation, policy and guidance at EU, national, regional, and local levels in the context of the Project *i.e.*, in relation to the Bandon agglomeration operational discharges. Reference to planning and policy related to the WwTP / network upgrades is only included where relevant to the Project.

4.2. European Legislation

4.2.1. EU Urban Waste Water Treatment Directive

Council Directive 91/271/EEC concerning the Urban Waste Water Treatment (UWWT) Directive aims to protect human health and the environment from adverse effects of discharges from urban wastewater and certain industrial discharges, setting standards to ensure that Member States' urban cities, towns, and settlements, properly collect and treat wastewater prior to discharge. Directive 98/15/EC amends Directive 91/271/EEC and clarifies the requirements of the Directive in relation to discharges from urban wastewater treatment plants to sensitive areas that are vulnerable to eutrophication.

The Urban Waste Water Treatment Regulations, 2001, S.I. No. 254 of 2001 (as amended) transpose the UWWT Directive into Irish legislation.

The River Bandon is not listed as a nutrient sensitive area under the Directive. The Bandon_100 which lies *ca.* 1.8km downstream of the primary discharge point is designated as a river that intersects with a nutrient sensitive area. The Upper Bandon Estuary nutrient sensitive estuary (P limited) is located *ca.* 5km downstream of the primary discharge point. Based on the distance of this estuary waterbody downstream of the agglomeration, along with the fact that the p.e. of the agglomeration is greater than 10,000, a TP ELV of 2mg/l is being proposed in this licence review. It should be noted that the downstream Upper Bandon Estuary is not TN limiting as per the EPA's Urban Waste Water Treatment Directive (UWWT) (91/271/EEC) Article 5 Report (*i.e.*, Review of nutrient sensitive areas (freshwater and marine) as required by the Urban Waste Water Treatment Directive (91/271/EEC), 2020) and therefore a TN ELV is not required.

As described in **Chapter 3**, the upgraded Bandon WwTP is designed to include both secondary treatment and removal of Phosphorus.

All overflows associated with the Bandon agglomeration been designed to meet the definition of '*Storm Water Overflow*' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended, and the criteria as set out in the DoEHLG '*Procedures and Criteria in Relation to Storm Water Overflows*', 1995. Provision has been made for a standby power supply to allow for continued operation of the pumping equipment at Glasslinn Road Pumping Station and the equipment at the WwTP in the event of an interruption in the power supply. A connection for a generator is also available at the Castlewoods Pumping Station and Kilbrogan Pumping Station. The above, along with the removal of 10 SWOs in the current Bandon agglomeration, will ensure for the protection of the receiving aquatic environment.

Thus, once completed, the upgraded Bandon WwTW will be compliant with the UWWT Directive.

4.2.2. EU Water Framework Directive

The EU Water Framework Directive (WFD) (2000/60/EC) establishes a framework for the protection of all waters including rivers, lakes, estuaries, coastal waters and groundwater and their dependent wildlife/habitats under one piece of environmental legislation. It requires the achievement of 'Good Status' for all these waters to be achieved through a system of river basin management planning and extensive monitoring by 2015 or, at the least, by 2027. 'Good status' means both 'Good Ecological Status' and 'Good Chemical Status'. The classification for water quality is described based on biological, physico-chemical and hydromorphological quality elements.

The main tool for Member States' implementation of the WFD, is River Basin Management Plans (RBMP). The next River Basin Management Plan to be implemented is the draft 3rd River Basin Management Plan (2022-2027). Water bodies identified as being 'At Risk' of not achieving their environmental objectives need to have targeted measures implemented to achieve objectives under this Plan. The manner and the timeframe in which these targeted measures are implemented need to be prioritised to take account of the finite resources available and of the time and resources needed to develop appropriate measures.

The European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272 of 2009, as amended by the European Union Environmental Objectives (Surface Waters) (Amendment) Regulations, 2019 (S.I. No. 77 of 2019) and then most recently the European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2022 (S.I. No. 288 of 2022), are one of the pieces of legislation that transposes the WFD. The Regulations prescribe quality elements and quantify parameters used to classify surface water bodies as defined in the WFD.

IW are committed to ensuring that water services infrastructure operates in a manner that supports the achievement of the water body objectives under the Water Framework Directive.

As identified in **Chapter 3**, the operational discharges will discharge in the Bandon_080 and Bandon_090, both of which have a WFD 2016-2021 designation of Good status. Approximately 1.8km downstream of the primary discharge point the Bandon_090 flows into the Bandon_100 which has a WFD 2016-2021 designation of Good status.

A separate WFD Screening Assessment was carried out on the Project (refer to **Appendix 3**). This Assessment concluded that, based on the nature of the operational discharges, there is no potential for adverse or long-term effects on the River Bandon surface water body and that the operational discharges will not cause any significant deterioration or change in the current water body Good status or to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

The WFD Screening Assessment informed **Chapter 6** which assesses the likely significant effects on surface water.

4.2.3. EU Nature Directives

The EU Habitats Directive (92/43/EEC) and Birds Directive (2009/147/EC) are the core pieces of legislation implementing the EU's Biodiversity Strategy. The Habitats Directive provides the framework for legal protection for habitats and species of European

conservation significance while the Birds Directive focuses on the protection of all wild bird species occurring in the EU. The nature directives provide the legislative means to establish a network of sites (known as the Natura 2000 network) throughout the EU with the objective of conserving habitats and species deemed of conservation significance both at community level, and on an international scale. The Natura 2000 network includes Special Area of Conservation (SACs) designated under the Habitats Directive, and Special Protection Areas (SPAs) designated under the Birds Directive.

The EU Habitats Directive was transposed into Irish legislation through the European Union (Natural Habitats) Regulations, S.I. No. 94 of 1997. These Regulations were amended by S.I. No. 233 of 1998 and S.I. No. 378 of 2005. The European Communities (Birds and Natural Habitats) Regulations 2011 consolidate the European Communities (Natural Habitats) Regulations 1997 to 2005 and the European Communities (Birds and Natural Habitats) (Control of Recreational Activities) Regulations 2010, as well as addressing transposition failures identified in the Court of Justice of the European Union (CJEU) judgments.

Article 6, paragraphs 3 and 4 of the EU Habitats Directive require that an Appropriate Assessment (AA) is carried out for plans and projects that are not directly connected with or necessary to the management of the designated European site that could, however, result in a potential significant effect on the designated site. Regulation 42 of the European Communities (Birds and Natural Habitats) Regulations 2011, sets out the requirements for screening and conducting AA in Ireland.

A combined Appropriate Assessment (AA) Screening and Natura Impact Statement (NIS) Report was prepared in December 2022 to accompany the Bandon WWDL Review Application. This Report will enable the EPA as Competent Authority to conduct an AA Screening Determination and Stage 2 AA in respect of the Bandon agglomeration operational discharges, for the purposes of the European Union (Waste Water Discharge) Regulations 2007 to 2020.

Please refer to **Attachment D.2.2** of the WWDL Review Application for a copy of the AA Screening and NIS Report (December 2022).

Refer also to **Chapter 5** Biodiversity of this EIAR for further details.

4.3. National Policy and Plans

4.3.1. Water

4.3.1.1. *Water Services Strategic Plan: A Plan for the Future of Water Services (2015-2040)*

The Water Services Strategic Plan (WSSP) sets out IW's strategic objectives in its provision of water services. The six objectives are to:

- meet customer expectations;
- ensure a safe and reliable water supply;
- provide effective management of wastewater;
- protect and enhance the environment;
- support social and economic growth; and

- invest in the future of IW.

The plan identifies wastewater collection and treatment as one of the challenges to address. It specifies a main common problem is that combined sewers in many urban areas receive rainfall runoff in addition to wastewater. This frequently causes overload during heavy rainfall periods giving rise to overflows that can result in untreated water reaching, and polluting, watercourses.

As described in **Chapter 3**, the Bandon Watermain & Sewer Network Project allows for the removal of the 10 no. SWOs on the network and will ensure that there is adequate treatment capacity within the WwTP to meet the needs of the area served as well as ensuring that there will be effective management of the waste water treatment process to protect the environment and public health.

4.3.1.2. Irish Water's Capital Investment Plan 2020-2024

As the national public water services utility, IW is responsible for providing and developing water services throughout Ireland. Part of its statutory requirements include the preparation of business plans to the Commission for Regulation of Utilities (CRU) and the EPA. The Bandon Watermain & Sewer Network Project is included in the list of projects for the 2020-2024 investment period.

4.3.1.3. River Basin Management Plan for Ireland

The second cycle RBMP covers the period 2018-2021. The third cycle RBMP is currently in draft and covers 2022-2027. Under the requirements of the WFD, the RBMP must include a programme of measures to protect and restore most water bodies to at least 'Good' status by 2027. The operational discharges will contribute to the RBMP objectives in contributing to safeguarding the Good status of the River Bandon and could potentially contribute to the improvement of the River Bandon further downstream.

Refer to the WFD Screening Assessment (**Appendix 3**) and **Chapter 6** Water of this E.I.A.R.

4.3.2. Biodiversity

4.3.2.1. National Biodiversity Action Plan

The consultation stage for the draft fourth National Biodiversity Action Plan has recently been concluded, and review of feedback is currently underway. The National Biodiversity Action Plan (2017-2021) lists seven objectives:

- Objective 1: Mainstream biodiversity into decision-making across all sectors
- Objective 2: Strengthen the knowledge base for conservation, management, and sustainable use of biodiversity
- Objective 3: Increase awareness and appreciation of biodiversity and ecosystem services
- Objective 4: Conserve and restore biodiversity and ecosystem services in the wider countryside
- Objective 5: Conserve and restore biodiversity and ecosystem services in the marine environment

- Objective 6: Expand and improve management of protected areas and species
- Objective 7: Strengthen international governance for biodiversity and ecosystem services.

Target 4.2 under Objective 4 aims to ensure that principal pollutant pressures on terrestrial and freshwater biodiversity are substantially reduced by 2020. Three actions are identified to reach the target. Action 4.2.1 calls for the continued protection, enhancement, and monitoring of the ecological status under the WFD, including reducing risks to water quality. Action 4.2.2 calls for IW to implement its WSSP.

Target 6.3 is to ensure that *no protected species are in a worsening status by 2020; majority species, in or moving towards, favourable status by 2020*. Action 6.3.3 focuses on the development, adoption and implementation of restoration programmes for a number of fish species including salmon, which is of importance and recorded in the River Bandon as described in **Chapter 5**. The action includes focusing on the improvement of passage of migratory fish species. Potential impacts to the fish ecology are assessed in **Chapter 5**.

4.3.2.2. Irish Water's Biodiversity Action Plan

IW's Biodiversity Action Plan (BAP) sets out a national programme of measures to protect and enhance biodiversity across IW sites. IW recognises the need to urgently increase and accelerate efforts to halt the decline of biodiversity and are fully committed to ensuring that they build and manage their infrastructure responsibly so that our ecosystems are protected, and where possible enhanced.

Refer to **Chapter 5** Biodiversity of this EIAR for further details.

4.3.3. Climate

4.3.3.1. Climate Action Plan

Ireland's Climate Action Plan 2021 sets out a plan of action with a target to achieve a 51% reduction in overall greenhouse gas (GHG) emissions by 2030 and net-zero emissions by 2050 as committed in the Programme for Government and set out in the Climate Action and Low Carbon Development (Amendment) Act 2021.

The Plan aims to address various sectors and challenges both on land and in the marine environment. The Project falls within the Water Resource and Flood Risk Management scheme as Water Services Infrastructure. Potential climate change impacts that could affect the sector are identified including the potential for increased waterborne disease from contamination of drinking water resulting from overland flows of pollutants. The Plan will be updated annually to ensure alignment with carbon budgets and sectoral ceilings.

Refer to **Chapter 10** Air Quality and Climate of this EIAR.

4.3.3.2. Cork County Council Climate Adaptation Strategy

The Cork County Council's Climate Adaptation Strategy 2019-2024 seeks to enhance resilience to climate hazards. The Strategy presents actions to address challenges and

develop innovative and sustainable solutions that address adaptation and enhance resilience to climate change. The Strategy lists seven high level goals:

- Local adaptation governance and business operations;
- Infrastructure and built environment;
- Land use and development;
- Drainage and flood management;
- Natural environment, built and cultural heritage;
- Community, health and wellbeing; and
- Other sectors and agencies.

The strategy includes a risk register that identifies hazards and consequences of extreme climate events and the services and business functions that could be impacted. In the context of drainage and flood management, wastewater is included on the risk register. The register identifies that rainfall or heatwave events could affect inflow and infiltration to the wastewater network and could cause interruptions to the anaerobic process. **Chapter 16** assesses potential risks, including from extreme events, and specifically from heavy rainfall.

4.3.4. Planning Framework

4.3.4.1. National Planning Framework

The National Planning Framework (NPF), published in February 2018, is the Government's high-level strategic plan for shaping the future growth and development of Ireland to the year 2040. The NPF is a region-focused strategy for managing growth, using state lands for certain strategic purposes and supporting this with strengthened, more environmentally focused planning at local level. The NPF is given effect with a 10-year capital investment programme in the National Development Plan 2018 – 2027 (NDP).

4.3.4.2. Regional Spatial and Economic Strategy for the Southern Region

The Regional Spatial and Economic Strategy (RSES) for the Southern Region provides the tool for implementation of the vision and objectives of the National Planning Framework for the Region. Bandon is identified as one of the twelve largest settlements with a population >5000 in the South West Region (with a population of 6957).

It is an objective of the RSES under RPO 26 to support co-ordination between local authorities, IW and other stakeholders to deliver investment in the sustainable development of water and wastewater and other infrastructure for towns and villages, prioritising retrofitting and improvement in the quality of existing services. The operational discharges are aligned with the wider scope of improved quality of discharges from the Bandon WWTW.

4.3.4.3. County Cork Development Plan

Chapter 11 of the County Cork Development Plan 2022-2028 addresses water management and considers *the provision and improvement of water, wastewater, surface*

water and flood alleviation services so as to facilitate development, support the delivery of population, housing and growth targets and prioritised so as to protect public health and protect, restore and improve the receiving environment and water quality.

Policy WM11-1 addresses the WFD and the River Basin Management Plan. It calls for the prioritisation of the provision of water services infrastructure in all settlements where services are not meeting current needs and are failing to meet the requirements of the UWWT Directive, and where there is a threat to breaches in the WFD and European sites requirements as a result. This policy also restricts development if appropriate wastewater treatment, which meets the requirements of the WFD and Habitats Directives, is not available. Restricting further development in the absence of adequate wastewater is reiterated through policy WM11-9.

Policy WM11-7 requires that the design and planning of water services infrastructure will consider the potential impacts of climate change and the need to increase the resilience of this infrastructure to any such impacts.

With respect to ELVs, Chapter 11 (para. 11.5.16) identifies that *in assessing the capacity of a WWTP to cater for future development where an ELV issue pertains, the assessment has been based on the hydraulic and organic loadings of the treatment plant relative to its design capacity on the assumption that the ELV issue will be resolved in an approach that will be determined/ agreed at a national level between Irish Water and the EPA.*

The upgrades to the Bandon WwTW, including the operational discharges, as described in **Chapter 3**, are in line with the above.

Refer also to **Chapter 5** Biodiversity and **Chapter 6** Water of this EIAR for further details.

4.3.4.4. Bandon Kinsale Municipal District: Local Area Plan

The Local Area Plan (2017) for Bandon recognises the need for upgrades and extensions to sewers in order to accommodate proposed growth in Bandon as well as the need for upgrade works at the Bandon WwTP. General Objective for Bandon BD-GO-05 specifies the need for provision of adequate water and wastewater infrastructure to service lands and to ensure the town achieves its growth targets.

The upgrades to the Bandon WwTW, including the operational discharges, as described in **Chapter 3**, are in line with the above local planning policy objectives.

4.4. National Legislation

National legislation relevant to each environmental factor is referenced in the specialist chapters as relevant in the context of the operational discharges.

5. BIODIVERSITY

5.1. Introduction

This Chapter, prepared by Thorne Ecology, provides an Ecological Impact Assessment (EcIA) of the Bandon agglomeration operational discharges, the subject matter of the D0136-01 WWDL Application Review.

The purpose of this Chapter of the EIAR is to assess the potential ecological impacts of “The Project” i.e., operational discharges arising from the Bandon agglomeration in accordance with the relevant legislation and guidance.

Bandon Town lies within an agricultural landscape on the N71 ca. 25km southwest of Cork City. The WwTP is located on the east side of the town on the banks of the River Bandon. All operational discharges under consideration herein discharge directly into the River Bandon (**Figure 5.1**).

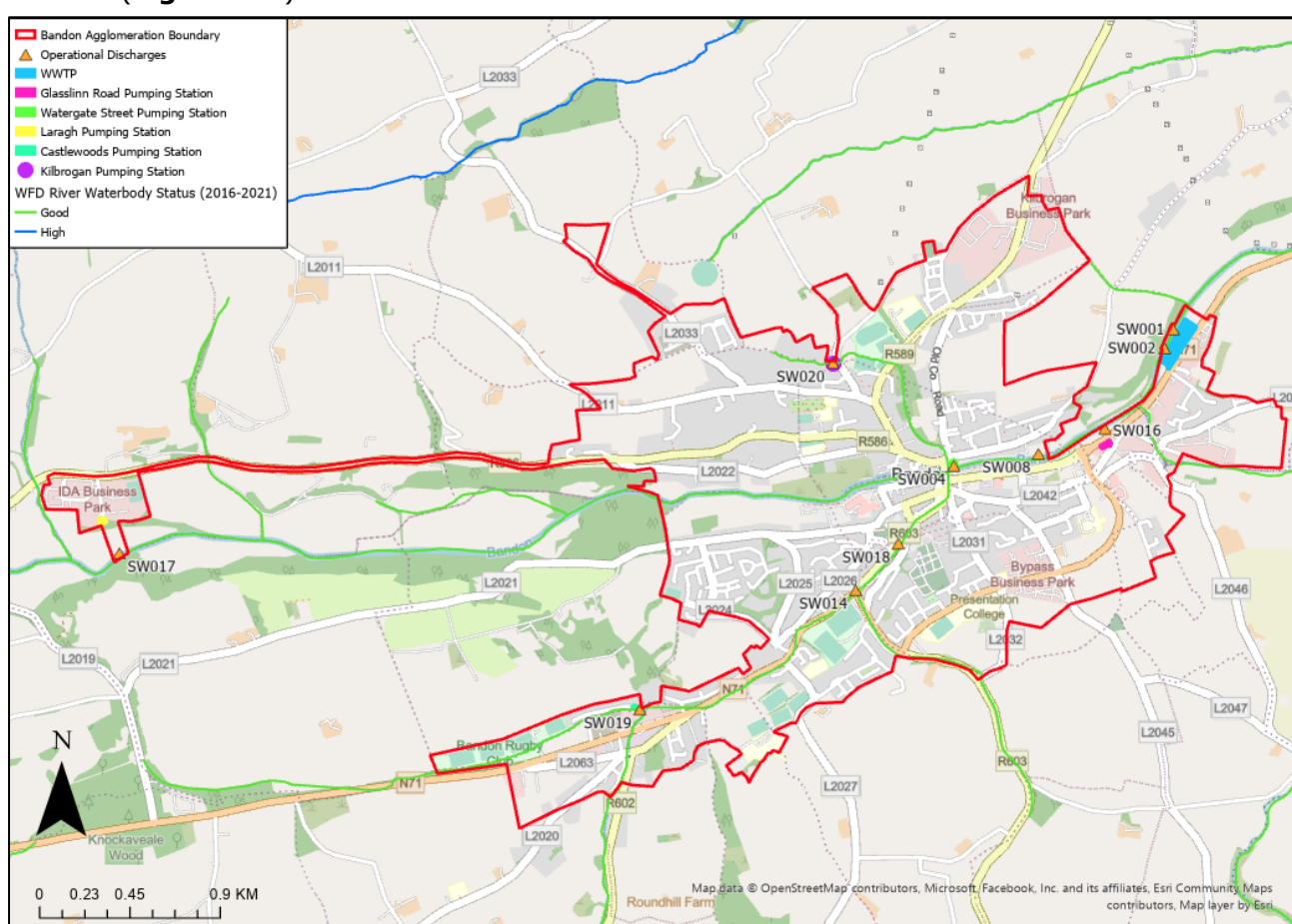


Figure 5.1. Operational Discharges Relating to D0136-01 WWDL Review

The purpose of the report is to:

- Describe and evaluate the baseline ecological environment relevant to the operational discharges;
- Identify and assess all potentially significant ecological effects associated with the operational discharges;

- Set out the mitigation measures required to ensure compliance with nature conservation legislation and to address any potentially significant ecological effects;
- Provide an assessment of the significance of any residual effects; and
- Where relevant, identify any monitoring requirements.

Statement of Authority

This Chapter was completed by Kate Harrington MSc MCIEEM, an Ecologist who has 18 years' experience in undertaking ecological surveys and assessments in Ireland and abroad. Ms Harrington's experience includes the preparation of AA Screening, NIS, Ecological Impact Assessments, biodiversity studies and water quality studies for a range of infrastructure projects. She has extensive experience of reviewing and undertaking ecological assessments for IW projects and activities as well as developing guidance documents and advising consultant engineers and ecologists regarding best practice. She currently works as a freelance ecologist and is pursuing a PhD in woodland ecology.

5.2. Methodology

5.2.1. Legislative & Policy Context

The assessment was conducted with regard to current legislation including:

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) and Directive 2009/147/EC (codified version of Directive (79/409/EEC as amended (Birds Directive)) – transposed into Irish law as European Communities (Birds and Natural Habitats) Regulations 2011 as amended;
- European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293 of 1988);
- European Union Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009;
- Flora Protection Order, 2015;
- Water Framework Directive (2000/60/EC) & the European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. 272 of 2009), as amended; and
- Wildlife Act 1976, as amended.

Policies and Objectives in the following Plans were also considered:

- The National Biodiversity Action Plan 2017-2021 (NBAP) & Ireland's 4th National Biodiversity Action Plan - Draft for Public Consultation September 2022;
- IW's Biodiversity Action Plan;
- River Basin Management Plan (2nd Cycle & Draft 3rd Cycle Plans); and
- Cork County Development Plan 2022-2028.

5.2.2. Desk Study

The sources of available desktop information used to inform the assessment included:

- The National Parks and Wildlife Service (NPWS) natural heritage database (www.npws.ie) was consulted for designated sites of nature conservation interest in the study area;
- The National Biodiversity Data Centre (NBDC) species database (<http://www.biodiversityireland.ie/>) and BSBI database <https://database.bsbi.org/> were consulted to obtain species records in the study area.
- The EPA mapping system (<https://gis.epa.ie/EPAMaps/>), and www.catchments.ie website for data related to water quality;
- The Inland Fisheries Ireland (IFI) website and www.wfdfish.ie website for fisheries data;
- Ordnance Survey Ireland mapping and aerial photography from <http://map.geohive.ie/>;
- Geological Survey Ireland (GSI) data and maps <https://www.gsi.ie/en-ie/data-and-maps/Pages/default.aspx> ;
- Information on the conservation status of birds in Ireland from Birds of Conservation Concern in Ireland <https://birdwatchireland.ie/birds-of-conservation-concern-in-ireland/>;
- Atkins Ecological Report (part of the Panning and Environmental Report), and Invasive Species Survey Report, dated December 2016 and submitted as part of the Bandon Sewerage Scheme Planning Application (Planning Ref: 174106); and
- Ryan Hanley Ecological Impact Assessment (part of the Environmental Impact Assessment Report) dated 2012. <https://www.gov.ie/ga/bailiuchan/19e15c-bandon-flood-relief-scheme-environmental-impact-assessment-eia/>

Field Study

A walkover survey was carried out by the author on September 13th 2022. The relevant discharge locations were visited with the aim of identifying the aquatic habitats in the receiving waters, and determining what ecological receptors occur, or have the potential to occur, within the zone of influence of the discharges. Habitats were classified with reference to The Heritage Council's 'A Guide to Habitats in Ireland' (Fossitt, 2000)² and the Annex I interpretation manual.³ Searches for protected species followed NRA (2009)⁴ guidance. Salmonid habitat was assessed for adult, juvenile and nursery habitat potential

²

<https://www.npws.ie/sites/default/files/publications/pdf/A%20Guide%20to%20Habitats%20in%20Ireland%20-%20Fossitt.pdf>

³ Interpretation Manual of European Union Habitats – EUR28 https://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/Int_Manual_EU28.pdf

⁴ NRA (2009) Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes <https://www.tii.ie/technical-services/environment/planning/Ecological-Surveying-Techniques-for-Protected-Flora-and-Fauna-during-the-Planning-of-National-Road-Schemes.pdf>

following DANI guidelines⁵, while lamprey habitat potential was assessed following Harvey & Cowx (2003)⁶.

5.2.4. Assessment Methodology

The assessment was completed with regard to the following guidance:

- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester. Version 1.2 - Updated April 2022.
EPA (2022), Guidelines on the information to be contained in Environmental Impact Assessment Reports, EPA, May 2022.
- NRA (2009) Guidelines for the Assessment of Ecological Impacts of National Road Schemes Rev. 2, National Roads Authority⁷; and
- DHPLG (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment. Department of Housing, Planning and Local Government.

An Ecological Impact Assessment focuses on Key Ecological Receptors (KERs) which are identified by determining the potential Zone of Influence (ZoI) of the project for each potential receptor, in the context of the scale and nature of the project. The ZoI will vary for each ecological feature and their relative sensitivity to the development, but the central consideration is whether source-pathway-receptor connectivity could be established, where:

- A 'source' is defined as the individual element of the proposed works that has the potential to impact on an ecological receptor.
- A 'pathway' is defined as the means or route (*i.e.*, land, air, hydrological, hydrogeological pathways, *etc.*) by which a source can affect the ecological receptor; and
- A 'receptor' is defined ecological sites, habitats, features, assemblages, species or individuals that occur in the vicinity of a project and upon which impacts are likely.

KERs will include those habitats and species permanently or temporarily within the development site and surrounding area, as well as those potentially connected *via* air, noise or water pathways outside the site.

Ecological receptors are evaluated on the basis of the ecological assessment scheme set out in NRA (2009) and CIEEM (2018) guidance. This scheme considers the rarity, status and distribution of the habitat, species or groups of species within a geographic spatial framework. Ecological receptors are then assigned international, national, county, high local or low local value.

⁵ <https://www.daera-ni.gov.uk/sites/default/files/publications/dcal/provision-of-salmon-and-trout-habitat-leaflet.pdf>

⁶ Harvey J & Cowx I (2003). *Monitoring the River, Brook and Sea Lamprey, Lampetra fluviatilis, L. planeri and Petromyzon marinus. Conserving Natura 2000 Rivers Monitoring Series No. 5, English Nature, Peterborough*

⁷ National Roads Authority (NRA) is now Transport Infrastructure Ireland (TII)

Following CIEEM guidance, impacts to KER's are then characterised considering whether they are positive/negative and the extent, magnitude, duration, frequency, timing and irreversibility.

Mitigation is prescribed for potentially significant effects in order to avoid, reduce or offset the effects. This is followed by an assessment of residual effects and a conclusion regarding the significance of the effects. A significant effect is one which supports or undermines the conservation objectives⁸ for KER's or for biodiversity in general (CIEEM, 2018). Significant effects should be qualified with reference to the appropriate geographic scale (CIEEM, 2018) noting impacts may be significant at a lower geographic level than that at which the receptor has been valued.

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location (CIEEM, 2018). Different types of actions can cause cumulative impacts and effects:

- Additive/incremental – in which multiple activities/projects (each with potentially insignificant effects) added together to give rise to a significant effect due to their proximity in time and space (CIEEM, 2018).
- Associated/connected – a development activity enables another development activity *e.g.*, phased development as part of separate planning applications. Associated developments may include different aspects of the project which may be authorised under different consent processes. It is important to assess impacts of the project as a whole and not ignore impacts that fall under a separate consent process (CIEEM, 2018).

Cumulative effects are considered with the following types of future development within the ZoI; proposals for which consent has been applied which are awaiting decision including those subject to appeal; projects which have been granted consent (not limited to planning permissions) but which have not yet been started or which have been started but are not yet completed (*i.e.* under construction) and proposals by public authorities that can be reasonably foreseen (*e.g.* specified in development plans).

5.2.5. EIAR Scoping

IW issued a request to the EPA on the 12th September 2022, for a Scoping Opinion on the scope and level of detail to be included in an EIAR for the Bandon WWDL (D0136-01) review. In accordance with the requirements of Regulation 17C & 17D of the European Union (Waste Water Discharge) Regulations 2007 to 2020 (WWD Regulations), the EPA consulted with the relevant prescribed bodies under Regulation 21(1) of the above referenced WWD Regulations.

Three scoping responses were received from the Health Service Executive (HSE), Inland Fisheries Ireland (IFI) and the Sea Fisheries Protection Authority (SFPA). The other prescribed bodies did not provide a response within the timeframe set out.

The IFI response was the only pertinent response received in terms of Biodiversity:

⁸ While government-defined conservation objectives are central to assessing sites designated under the Habitats and Birds Directives, the concept also applies to EcIA in that any ecological receptor will have associated structural, composition and functional requirements, including interactions with other receptors, that must be met in order to sustain its ecological value.

"The Bandon River is one of the premier angling, spawning and nursery waters in the South Western River Basin District. Therefore, the deterioration of the status of the Bandon River (Bandon_090) from 'Good' to 'Moderate' is naturally a cause for concern. In this context IFI fails to see how a 'notionally clean river approach' could be applied when assessing the environmental impact of the Bandon and Agglomeration WwTP.

IFI would ask the EPA to ensure that current actual background data is applied when calculation of the assimilative capacity relative to legislative requirements is carried out as part of the licence review in this case".

The assessment contained herein has taken full regard of the IFI submission.

It is acknowledged that the 2013-2018 WFD status of the Bandon_090 was Moderate status. However, it should be noted that the recently published 2016-2021 WFD status of the Bandon_090 is now Good. Also, the WAC calculations (**Appendix 2**) used to inform the Bandon WWDL review application and supporting documents, including this EIAR, have been based on the EPA's notional clean river approach and the mean background concentrations upstream of the primary discharge (Station: RS20B020800 - data from January 2020 – May 2022).

5.3. Receiving Environment

The Project has been described in full in **Chapter 3** of this EIAR.

5.3.1. Water Quality

The agglomeration operational discharges to the River Bandon include the primary discharge from the upgraded WwTP (SW001), 5 no. Dual Function Overflows which can function as SWOs or EOs, 1 no. EO and 3 no. network SWOs. Refer to **Section 3.3** for further details. They span two adjoining river waterbodies, the Bandon_080 and Bandon_090. Both waterbodies were assigned Moderate WFD status (2013-2018), however in the recently published 2016-2021 assessment period, the WFD status of both the Bandon_080 and Bandon_090 is Good.

In the case of Bandon_090, the 2013-2018 WFD status was driven by Moderate Invertebrate status or potential, moderate nitrate conditions and failing DO conditions. The Bandon_080 is not monitored and the status assignment is based on expert judgment by the EPA. Urban run-off is identified as a significant pressure on the Bandon_080 according to EPA maps based on the 2nd RBMP cycle, with no significant pressures highlighted for Bandon_090. The 3rd cycle catchment assessment report however highlights SWOs from the Bandon agglomeration as a significant pressure for the Bandon_090 and Bandon_100 waterbodies⁹.

The EPA monitor biological water quality at Station RS20B020800 (1.5km d/s Bandon Br) which is adjacent to Bandon WwTP and ca. 20m upstream of SW002. The next Q value monitoring point downstream is RS20B020900 (Inishannon Br) ca. 5km downstream of Bandon WwTP. Approximately 5km upstream of Bandon and 1km upstream of SW017 RS20B020700 (Baxter's Br Bandon_070) is also monitored. All stations were assigned Q4

⁹<https://catchments.ie/wpcontent/files/catchmentassessments/20%20BandonIlen%20Catchment%20Summary%20WFD%20Cycle%203.pdf>

values in 2020 indicating Good water quality conditions. The Q value at station RS20B020800 adjacent to Bandon WwTP has improved relative to the Q3-4 achieved in 2018, indicating Moderate water quality conditions have improved to Good, and consequently reflected in the recent status update.

Water chemistry is monitored by Cork Co. Co./EPA at the stations referenced above as well as at RS20B020850 (Bandon-French's Wood) which lies ca. 1.8km downstream of Bandon WwTP. The most recent 18 months of data for key parameters are shown below in **Table 5.1**. Monitoring locations are shown on **Figure 5.2**.

Results were compared with the Environmental Quality Standards specified in the Surface Waters Regulations 2009 (as amended). Generally, at least Good status conditions are met upstream and downstream of the operational discharges with occasional exceedances. The River Bandon is not a salmonid river for which the Salmonid River Regulations (S.I. 293 of 1988) apply, however it is noted that the suspended solids results downstream of Bandon meet the requirement specified in these regulations.

Table 5.1 River Bandon Water Quality Monitoring

Sample Date	Ammonia mg/l	BOD mg/l	DO % Sat	Ortho-P mg/l	pH	SS mg/l
	95%ile EQS: ≤0.14 (good) ≤0.090 (high) Mean EQS: ≤0.065 (good) ≤0.040 (high)	95%ile EQS: ≤2.6 (good) ≤2.2 (high)	95%ile EQS: 80-120%	95%ile EQS: ≤0.075 (good) ≤0.045 (high) Mean: ≤0.035 (good) ≤0.025 (high)	EQS 4.5 < pH < 9.0	≤25 (Salmonid River Regulations (S.I. 293 of 1988))
RS20B020700						
24/03/2021	0.01	0.5	102	0.016	8	-
06/05/2021	0.01	0.5	106	0.005	7.8	-
15/07/2021	0.025	1.3	86	0.019	7.6	-
16/09/2021	0.032	1.6	91	0.026	7.9	-
21/10/2021	0.01	0.5	92	0.03	7.4	-
23/03/2022	0.01	0.5	105	0.017	7.6	-
05/05/2022	0.01	1.3	119	0.005	7.9	-
21/07/2022	0.022	1.1	103	0.014	7.8	-
03/02/2021	0.024	2	101.4	0.021	7.4	-
14/04/2021	0.009	1	109.5	0.005	8	-
23/06/2021	0.01	1.5	102.5	0.01	7.9	-
11/08/2021	0.045	1.1	118.2	0.037	8.1	-
13/10/2021	0.004	0.5	98.8	0.018	7.7	-
01/12/2021	0.045	2.1	101.4	0.039	7.9	-
02/02/2022	0.01	1	96.5	0.016	7.5	-
21/04/2022	0.01	1.9	101.6	0.02	7.8	-
15/06/2022	0.031	1.1	101.2	0.005	8.1	-
10/08/2022	0.01	1.2	99.9	0.005	8	-
RS20B020800						
24/03/2021	0.01	0.5	104	0.022	8.1	-
06/05/2021	0.01	0.5	109	0.011	7.9	-
15/07/2021	0.01	1	94	0.035	7.6	-
16/09/2021	0.026	1.3	104	0.027	7.9	-
21/10/2021	0.027	0.5	95	0.037	7.5	-
23/03/2022	0.01	0.5	106	0.028	7.7	-
05/05/2022	0.077	5.7	108	0.086	7.8	-
21/07/2022	0.02	1.2	121	0.06	8.1	-
RS20B020850						
03/02/2021	0.029	2.2	98.8	0.021	7.4	-
14/04/2021	0.016	2.4	122.4	0.02	8.1	-
23/06/2021	0.01	1.6	104.9	0.02	7.7	-
11/08/2021	0.031	1.3	131	0.03	8.6	-
13/10/2021	0.005	0.5	100.2	0.022	7.8	-

Sample Date	Ammonia mg/l	BOD mg/l	DO % Sat	Ortho-P mg/l	pH	SS mg/l
	95%ile EQS: ≤0.14 (good) ≤0.090 (high) Mean EQS: ≤0.065 (good) ≤0.040 (high)	95%ile EQS: ≤2.6 (good) ≤2.2 (high)	95%ile EQS: 80-120%	95%ile EQS: ≤0.075 (good) ≤0.045 (high) Mean: ≤0.035 (good) ≤0.025 (high)	EQS 4.5 < pH < 9.0	≤25 (Salmonid River Regulations (S.I. 293 of 1988))
01/12/2021	0.049	1.8	98.9	0.037	7.8	-
02/02/2022	0.01	1	96.2	0.016	7.7	-
21/04/2022	0.01	1.7	102.2	0.019	7.8	-
15/06/2022	0.01	1.4	98.6	0.005	7.9	-
10/08/2022	0.01	1.7	100.6	0.026	8.9	-
RS20B020900						
20/01/2021	0.054	3.2	99	0.043	7.1	22
18/02/2021	0.038	1.4	99	0.026	7.5	20
10/03/2021	0.268	3.6	101.2	0.063	7.5	-
24/03/2021	0.01	0.5	104	0.024	8	2
22/04/2021	0.01	1.9	123	0.015	9.3	4
06/05/2021	0.01	0.5	104	0.005	8	8
19/05/2021	0.048	2.2	100	0.03	7.7	-
16/06/2021	0.01	0.5	102	0.024	7.9	2
15/07/2021	0.01	1	100	0.04	7.8	4
21/07/2021	0.03	1.9	104	0.042	8.1	-
12/08/2021	0.01	1	90	0.032	8.3	2
16/09/2021	0.01	2.9	102	0.015	7.9	5
21/10/2021	0.01	0.5	96	0.038	7.4	5
03/11/2021	0.023	1.4	96.7	0.046	7.5	-
10/11/2021	0.023	1.5	102	0.023	7.2	5
02/12/2021	0.01	0.5	93	0.038	7.4	2
19/01/2022	0.022	0.5	101	0.028	7.7	2
02/03/2022	0.031	1.4	100.9	0.016	7.6	-
03/03/2022	0.01	0.5	95	0.023	7.8	2
23/03/2022	0.026	1.1	107	0.023	7.6	2
05/05/2022	0.081	5.7	110	0.092	7.8	22
25/05/2022	0.044	0.5	94.6	0.01	8	-
15/06/2022	0.027	2.5	126	0.072	8.3	2
21/07/2022	0.02	1.1	124	0.031	8.5	2

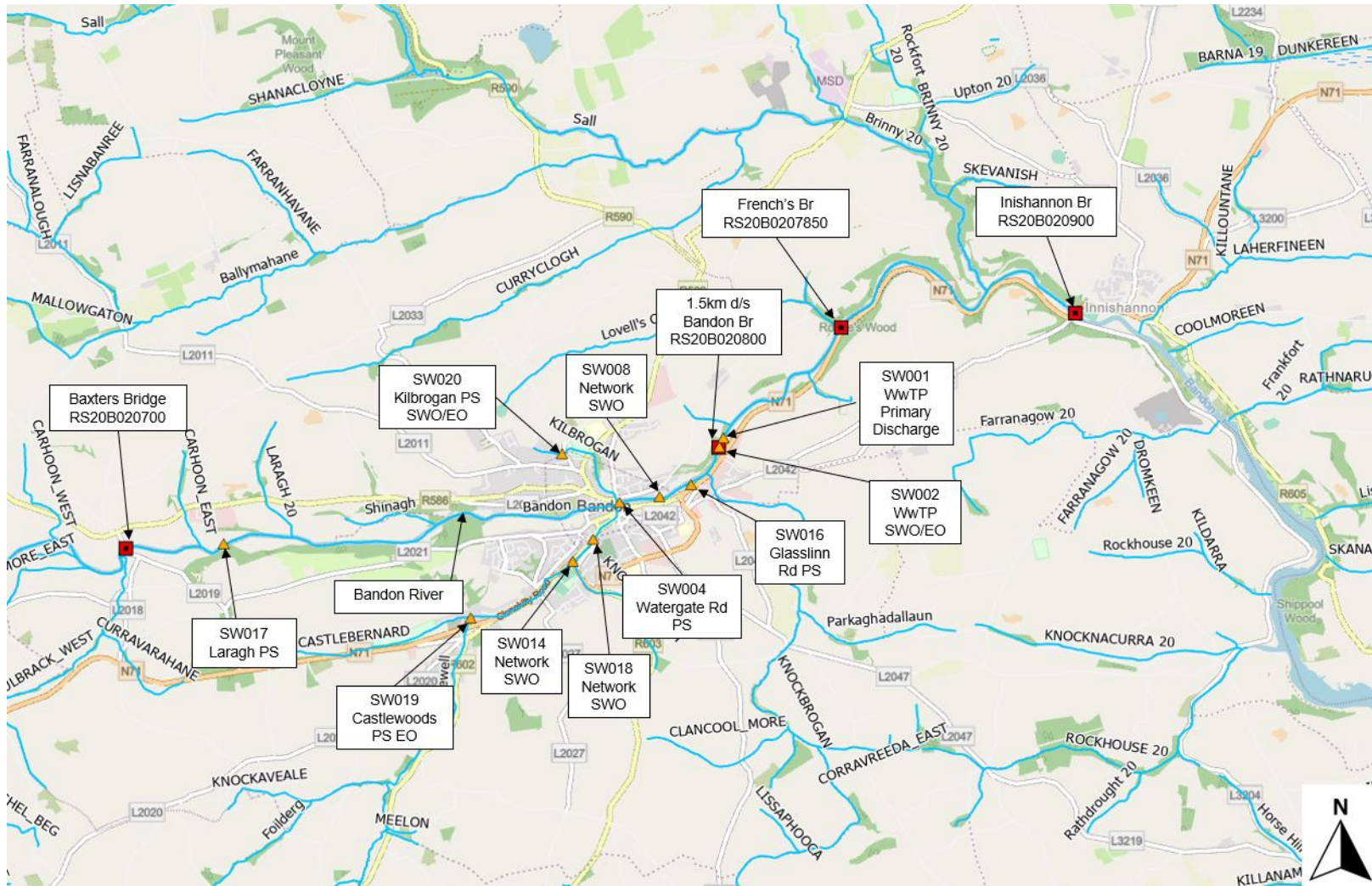


Figure 5.2 Monitoring Stations and Discharge Points (Source EPA Maps Accessed 15/09/2022)

5.3.2. Ecological Desktop & Field Survey

The ecological receptors of the site and surrounding area of the operational discharges are described below, informed by the desk study and site visit. On the basis of the survey results, and as described under 'Assessment Methodology', Key Ecological Receptors (KERs) are identified by determining the potential ZoI of the project for each potential receptor, in the context of the scale and nature of the project and the presence of a source-pathway-receptor connection. In the context of this Project, the survey focuses on aquatic species, or those terrestrial species which may interact with the aquatic environment.

5.3.2.1. Designated Sites

European Sites

Full details of the assessment on European Sites are provided in the combined AA Screening and NIS report prepared for the Bandon WWDL review application. "The Project" was screened in for AA on the basis of:

- Ascertaining the adequacy of wastewater treatment in the context of the conservation objectives of the Bandon River SAC (002171)

The Bandon River SAC (002171) is located in the upper Bandon River catchment ca. 29km upstream of the primary discharge point. The SAC is designated for Vegetation of flowing waters, Alluvial forests, Freshwater Pearl Mussel and Brook Lamprey. The Bandon/Caha Margaritifera SAC catchment encompasses the tributaries upstream of the SAC section of the River.

This site is of international value and is therefore considered a KER. The NIS determined that there will be no adverse effects on the conservation objectives or integrity of this or any other European Site.

Nationally Designated Sites

On review of mapping resources, the following proposed Natural Heritage Areas (pNHA's) were considered:

- Bandon Valley Above Innishannon pNHA (001740) which extends from 1.3km downstream of the primary discharge point for ca. 5km. It includes the river valley and adjacent woodlands and includes sections of inflowing Kilpatrick and Brinny tributaries.
- Bandon Valley West of Bandon pNHA (001034) which extends from 3km upstream of the primary discharge point for ca. 3km. It encompasses areas of woodland adjacent to, and offset from, the main river, including Bandon woods and Knockaveale Woods.

Sites designated as pNHA's are considered to have National value. While there is a paucity of information on pNHA's in general, these sites appear to have been designated based on the information summarised in Goodwillie (1986)¹⁰ which points to selection on the basis of aquatic habitats, dry woodlands, abundant bird life and its function as a wildlife corridor

¹⁰ https://www.npws.ie/sites/default/files/publications/pdf/Goodwillie_1986_ASI_Cork.pdf

in an area lacking semi-natural habitats. As there is a potential impact pathway *via* the River Bandon to both pNHAs, these sites are considered to be KER's.

5.3.2.2. *Habitats & Flora*

The River Bandon around Bandon Town has been modified by a recent drainage scheme. The banks comprise rock armour sloping down into the river channel which has been deepened. With reference to Fossitt (2000) the river is classed as Lowland Depositing River habitat (FW2). Flow is of a fast glide type and the visible river substrate comprised similar rock material to the banksides.

The outfalls from the WwTP (SW001, SW002) Watergate Street Pumping Station (SW004), the Network SWO (SW008) and Glasslinn Road Pumping Station (SW016) enter this modified river section.

Two Network SWO's (SW014 and SW018) enter a tributary of the Bandon River, the Bridewell stream, in a heavily modified channelised section which joins the Bandon River at Bandon Bridge. The EO at Castlewoods Pumping Station (SW019) enters the Castlebernard stream, just upstream of the Bridewell Stream. The outfall from Kilbrogan Pumping Station (SW020) enters the Kilbrogan stream, a small stream which flows in a south-easterly direction through greenfield lands (scrub, amenity grassland, woodland) to join the River Bandon immediately downstream of Bandon Bridge.



Figure 5.3 River Bandon (facing upstream toward Bandon Br)



Figure 5.4 Watergate Street PS SWO/EO SW004



Figure 5.5 WwTP SWO/EO SW002



Figure 5.6 Glasslinn Road PS SWO/EO SW016



Figure 5.7 WwTP Primary Discharge SW001

Due to the extensive rock-armour, there is no natural riparian vegetation. The rock armour has colonised with a variety of species including great willowherb *Epilobium hirsutum*, yarrow *Achillea millefolium*, false oat grass *Arrhenatherum elatius*, hogweed *Heracleum sphondylium*, bramble *Rubus fruticosus* agg., nettle *Urtica dioica*, pendulous sedge *Carex pendula*, willow *Salix* spp., redshank *Persicaria maculosa*, dandelion *Taraxacum officinale* agg, reed canary grass *Phalaris arundinacea* and ragwort *Jacobaea vulgaris*. The invasive species *Buddleia davidii* has colonised extensive areas of the rock armour bank. Himalayan balsam *Impatiens glandulifera* was also noted. Both banks are tree-lined with beech *Fagus sylvatica*, poplar *Populus* sp, alder *Alnus glutinosa*, pedunculate oak *Quercus robur*, sycamore *Acer pseudoplatanus* and ash *Fraxinus excelsior*.

At the IDA estate Laragh Pump Station overflow (SW017), the river channel has not been impacted by the drainage works. The left hand bank, comprises agricultural fields with a narrow scrub and willow tree margin along the river edge. The right hand bank is a steep slope covered with mature woodland (Bandon woods). This is a dry mixed broadleaved woodland with the canopy dominated by beech, oak and ash, with understory species including cherry laurel *Prunus laurocerasus* and hazel *Corylis avellana*, and the ground flora including bramble, ivy *Hedera hibernica*, hard fern *Blechnum spicant*, broad buckler fern *Dryopteris dilatata* and scaly make fern *Dryopteris affinis*. At the edge of the river a narrow strip of species tolerant of wet conditions are common, including willow, Himalayan balsam and wild angelica *Angelica sylvestris*.



Figure 5.8 Laragh PS SWO/EO SW017

No instream vegetation could be seen in the River Bandon at the time of visiting. The fast flows and channelised nature of the river in the section influenced by the drainage scheme are likely to preclude the establishment of any significant floating mats of vegetation, though this habitat was common prior to the drainage scheme works (Ryan Hanley, 2012). Due to access restrictions, not all areas of the river between the IDA Estate and Bandon Town could be viewed, however given the more natural river channel in this reach, floating river vegetation is likely to occur, as well as in the reach downstream of Bandon town. The lower River Bandon is not designated for the Annex I habitat Floating River Vegetation [3260] as described in the EU Interpretation manual. NPWS (2019)¹¹ highlight that the common and widespread form of this habitat dominated by water crowfoot is considered to have low conservation value and indicate damage, with SAC's designated for rarer sub-types of this habitat. None of the habitats recorded during the current survey within the river or riparian margins align with the criteria for Annex I habitats.

The NBDC was searched for records of notable plant species. Canadian waterweed *Elodea canadensis* and water fern *Azolla filiculoides*, both aquatic invasive species, are recorded from the study area. Canadian waterweed was found immediately downstream of Bandon (latest record 2009). Water fern has been recorded (latest record 2022) from a drain just north of the main river channel within Bandon town.

The discharges are directly to the River Bandon. The river habitat, in terms of its physical attributes and vegetation, while modified around Bandon town, is of high quality upstream and downstream of Bandon in reaches within the ZoI of the discharges. The River Bandon habitat is therefore considered to be a KER of County Importance.

5.3.2.3. Fauna

Several waterbirds, or birds that could be associated with the river environment, have been recorded from the study area. Notable species were the Annex I birds Kingfisher and Little Egret, protected under the EU Birds Directive, and the red-listed bird of

¹¹ NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol2_Habitats_Article17.pdf

conservation concern Black-headed Gull. Studies carried out for the drainage scheme highlight the same species (Ryan Hanley, 2012). In that study they note that Little Egret is unlikely to breed in this section of the river but that Kingfisher may breed, though no nests were identified during their survey. They state that Black-headed Gull uses a wide range of habitats and was recorded throughout the study area. While the database search returned many other waterbird records, including many Annex II waterbird species, these were broad scale precision historical bird atlas records for species associated with the coastal wetlands to the south and east. Kingfisher, Little Egret and other waterbirds using the River Bandon could be sensitive to any eutrophication impacts affecting their ability to fish or forage, and are considered to be a KER of Local Importance (Higher Value).

The NBDC holds records of Otter roadkill in Bandon Town (2012), and records from Baxters Bridge (upstream) and Innishannon (downstream) of otter spraints (both 2017). Signs of otter were recorded during previous studies for the sewerage scheme (2016) and drainage scheme (2012). While no signs of otter were found during the current survey, lack of access to private lands precluded a detailed survey. It is evident however from the range of existing records that a local Otter population is well established in the River Bandon. Otter using the river are versatile feeders but could be affected by severe eutrophication impacts damaging fish stocks. This population is considered to be a KER of Local Importance (Higher Value).

There are records of invasive American Mink scats at Baxters Bridge and downstream of Innishannon (both 2017). As an invasive species, they are not considered as an ecological receptor in the context of this assessment.

There are no records of Crayfish in the River Bandon catchment. There are records of Frog in the wider area, but they are not associated with the main river channel, and therefore not considered to be within the zone of influence of the project. Crayfish and Frog are not considered as ecological receptors due to their presence outside of the ZoI of the discharges.

The River Bandon, excluding the section through Bandon Town impacted by drainage works, contains excellent habitat for all life stages of brown trout and excellent spawning and nursery habitat for salmon, sea trout and lamprey species. Within the section impacted by drainage works, habitat for salmonid fish and lamprey has been reduced due to the loss of natural river substrates previously present. Salmon redds were previously recorded in the reach of river from Bandon Bridge to Innishannon Bridge (Ryan Hanley, 2012). The Brideswell and Kilbrogan tributaries may have some limited potential to support salmonid species and lamprey.

Overall, the River Bandon is known for good salmon and sea trout angling (O'Briain *et al*, 2019¹²). A total of 36 no. sites were surveyed by IFI in September 2019 in order to determine their fish stocks (O'Briain *et al*, 2019). Eight fish species were recorded at 36 sites surveyed on the River Bandon catchment in 2018. Brown trout was the most abundant species, present at 94% (34) sites surveyed. Salmon were the next most abundant fish species and were recorded at 64% (23) sites. Other species recorded included eel, stone loach, minnow and three-spined stickleback. While the main channel

¹² O'Briain, R., Matson, R., Gordon, P., Lopez, S., Cierpal, D., Connor, L., Corcoran, W., Coyne, J., Gavin, A., McLoone, P., Twomey, C. and Kelly, F.L. (2019) Sampling Fish in Rivers 2019 – Bandon River Catchment, Factsheet No. 2019/03. National Research Survey Programme. Inland Fisheries Ireland

around Bandon was not fished, nearby tributaries were assigned Moderate, Good and High fish status based on these surveys.

IFI have also undertaken timed electro-fishing surveys of the River Bandon as part of Catchment-Wide- Electro-Fishing Surveys (IFI, 2022¹³) to assess the distribution and abundance of salmon fry in selected catchments nationally. Based on a survey in 2016, the River Bandon is not meeting the threshold index (17 salmon fry/5min) above-which it is considered that the rivers could open for angling on a catch and release basis.

Salmon, trout, lamprey and eel are protected under the Fisheries Act (1959, as amended), with salmon and lamprey additionally protected under the Habitats Directive. These species would all be sensitive to eutrophication impacts. The salmon, trout, lamprey and eel populations in the river are KER's evaluated as being of County Importance.

Atkins (2016a) surveys for the sewerage scheme planning application included a Freshwater Pearl Mussel survey (stage 1 and stage 2) which did not detect any Freshwater Pearl Mussel in the surveyed area. Former surveys for the drainage scheme (Ryan Hanley, 2012) undertaken in 2011 found a dead shell, believed to have been washed down from upstream, but no live Pearl Mussel. Freshwater Pearl Mussel are known from the Bandon River SAC further upstream however, and there may be ex-situ populations downstream of the SAC (but upstream of Bandon). Connectivity to the discharges is indirectly established due to the role salmonid species play in the mussels life cycle during their upstream migration. On a precautionary basis, Freshwater Pearl Mussel populations potentially present downstream of the SAC, but upstream of Bandon, are considered KER's of County Importance.

Table 5.2 Summary of Ecological Evaluation

Ecological Receptor	Ecological Valuation
Designated Sites	
Bandon River SAC	International
Bandon Valley Above Innishannon pNHA	National
Bandon Valley West of Bandon pNHA	National
Habitats & Flora	
Lowland Depositing River FW2	County importance
Fauna	
Otter	Local importance (higher value)
Kingfisher, Little Egret & Waterbirds	Local importance (higher value)
Salmon, trout, lamprey & eel	County importance
Freshwater Pearl Mussel (outside of SAC)	County importance

¹³ IFI (2022) Report on Salmon Monitoring Programmes 2021. Funded under the Salmon Conservation Fund. IFI/2022/1-4590 <https://www.fisheriesireland.ie/sites/default/files/2022-03/report-of-salmon-monitoring-programmes-2021-funded-under-the-salmon-conservation-fund.pdf>

Ecological Receptor	Ecological Valuation
Other aquatic fauna (other fish & invertebrates)	Local importance (lower value)

5.4. Description of Likely Significant Effects

5.4.1. Overview of Potential Impacts

The primary impact under consideration is the potential pollution of surface waters arising from the agglomeration operational discharges. Such impacts could include nutrient enrichment triggering algal or plant growth, deposition of sewage litter, growth of sewage fungus, deposition of organic sediments or zones of altered dissolved oxygen, pH or temperature levels.

According to the 2021 AER, the primary discharge from the Bandon WwTP is compliant with its current ELV's which are appropriate for the current p.e. Biological water quality monitoring indicates that water quality achieves a Q4 score upstream and downstream of the agglomeration discharges, indicating no long-term effect on the benthos occurring downstream of the ongoing Bandon discharges. Water chemistry data (**Table 5.1**) also indicates that predominately Good status conditions are met. As described earlier, on the basis of future loads and proposed ELV's and the WwTP's design DWF, there is assimilative capacity in the River Bandon under measured upstream and notionally-clean background scenarios for BOD, Ammonia and Ortho-phosphate that meet the EQS limits for Good status whilst retaining further downstream assimilative capacity. In this context, the primary discharge at the proposed ELV's will maintain Good status conditions in the river.

Sewer overflows are identified as a significant pressure on the receiving waterbodies in Bandon, and the network upgrade works are removing and upgrading the system of overflows. Provision has been made for storage and/or screening of SWO's. SWO's are a necessary part of sewerage networks and serve to prevent uncontrolled spillages arising within the agglomeration and to prevent the biological processes necessary to treat effluent being compromised by inundation with excess water. The principal consideration to take account of in the assessment of the impact of overflows for water quality is that overflows will only occur in the event of sustained rainfall. The initial flushing flow arising from the first 5 mm of rain in a rainfall event is contained in the foul sump initially and will not be passed through to the storm tanks unless the capacity of the foul pumps is exceeded. This initial surface runoff flow will have the highest level of pollutants as it will wash in debris from impermeable surfaces and may dislodge settled solids in the sewer network. Flows entering a storm tank will then pass through a re-screen between the foul sump and storm sump. This will further retain a significant proportion of the organic matter, solids and rags in the foul sump. Flows entering a stormwater holding tank will then be retained in the storm tank providing an opportunity for suspended solids to settle out. As flow recedes, the storm tank contents are passed forward to the WwTP for treatment. If the storm tank reaches capacity a highly diluted screened effluent is discharged. It is not possible to fully retain all stormwater due to septicity that arises with storage and the inability of treatment plant biological processes to cater for large volumes of dilute wastewater. Diluted, settled, and screened effluent which could be discharged during storm conditions, will enter a river which will have increased flows driven by sustained rainfall. In this context, the discharges to the large River Bandon channel will be diluted and dispersed effectively.

The risks of sewer or outfall failure associated with extreme events resulting in the activation of EO's, while a theoretical risk (as the failure of any infrastructure in catastrophic situations is theoretically possible), is not reasonably predicted to occur. Their inclusion in the agglomeration prevents the risk of uncontrolled emissions arising from other points in the network and spilling onto land or water in an unpredictable manner. All appropriate design measures and mitigation to prevent Emergency Overflows that can be applied has been incorporated in the design and operation of the discharges.

5.4.2. Assessment Of Effects

This assessment focuses on the KER's identified for the Project *i.e.*, those ecological receptors of local (higher) value and above, considering the nature of the effects that could arise and whether mitigation is required.

The wastewater discharge, considered in the context of background pressures, meets all the relevant Surface Water Regulation EQS's for Good status. Biological water quality monitoring demonstrates that the river, in the context of the current operational discharges, maintains Good status indicating no long-term effects on the benthos downstream. However, localised impacts of sewer overflows meant that these discharges were identified as a significant pressure on the river. The removal of 10 no. overflows and the improvements to the network will significantly reduce the volume and quality of intermittent discharges entering the river, addressing this localised pressure.

The maintenance of Good status conditions is sufficient to ensure that both the river habitat and the most pollution-sensitive aquatic species using the River Bandon (*i.e.* salmonids which require Q4 biological water quality conditions) are not affected by the discharges. Consequently, any less sensitive species will also remain unaffected as nutrient input *via* treated effluent from the WwTP, or diluted intermittent discharges, into the River Bandon system would not impact water quality at a scale that would significantly affect the health, habitat or food sources of these species. Bird and mammal fauna identified as KER's which may rely on the river and its aquatic fauna for habitat and food, will consequently also remain unimpacted by the discharges. Freshwater Pearl Mussel outside the SAC, linked indirectly *via* the upstream migration of salmonids have no potential to be adversely affected as water quality conditions will not affect their host fish.

Operational discharges do not have the potential to negatively impact upon any of the habitats or fauna identified as KER's *i.e.*, the river habitat, aquatic fauna, otter or birds that rely on the river. The pNHAs, which include the river habitat and its species considered herein, will also consequently remain unaffected. The combined AA Screening and NIS Report (December, 2022) has demonstrated that the conservation status of the upstream SAC will not be affected.

5.5. Mitigation Measures

No significant effects to KER's have been identified. Mitigation measures to avoid or reduce the potential impacts of the Project on KER's are therefore not required.

To ensure continued satisfactory operation of the Bandon agglomeration in line with the discharge licence the authors recommend the following:

- Ensure that the capacity of the WwTP is not exceeded;
- Ensure all discharges continue to operate in compliance with the ELVs; and

- Continue monitoring the effluent and receiving waters, on a consistent and regular basis.

5.6. Residual Impacts

Residual ecological impacts are those that remain once the proposals have been implemented. The main aim of ecological mitigation is to avoid, minimise or offset impacts following the mitigation hierarchy. As no potential significant effects have been identified, and no mitigation measures prescribed, there are no residual significant effects.

5.6.1. Cumulative Impacts

Cumulative effects may arise from the effects (significant or otherwise) of the Project in-combination with other plans or projects are provided below.

5.6.1.1. Plans

Plans of relevance include IW's **Water Services Strategic Plan (WSSP)**, the Cork County Development Plan, and the National River Basin Management Plan.

In 2015, IW published the WSSP, a 25-year Plan which as well as detailing current and future challenges affecting water services, identifies priorities to be addressed in the medium term. Solutions in these priority areas are delivered through capital and other projects outlined in IW's Investment Plan, a multi annual plan covering a five-year horizon, currently 2020-2024. The Bandon Watermain and Sewer Network Project is included on the current investment plan and is due to be completed by the end of Q1 2023. The Bandon WwTP upgrade and Glasslinn Road Pumping Station upgrade, and the Bandon IDA Laragh Pumping Station and rising main works have been completed.

Irish Water **Capital Investment Plan 2020-2024** – Proposals to upgrade and secure water services and water treatment services countrywide. This plan will result in positive cumulative effects with The Project.

The **Cork County Development Plan 2022-2027** has been recently published. This new plan amalgamates the former municipal area regional plans into the main county plan. The plan has several relevant objectives and statements relating to wastewater:

- WM 11-1: EU Water Framework Directive and the River Basin Management Plan
 - *f) Support the prioritisation of the provision of water services infrastructure in: 1. Metropolitan Cork, the Key Towns and Main Towns to complement the overall strategy for economic and population growth while ensuring appropriate protection of the environment. 2. All settlements where services are not meeting current needs, are failing to meet the requirements of the Urban Wastewater Treatment Directive, and where these deficiencies are – interfering with Councils ability to meet the requirements of the Water Framework Directive; or – having negative impacts on Natura 2000 sites; and*
 - *g) Development may only proceed where appropriate wastewater treatment is available which meets the requirements of environmental legislation, the Water Framework Directive and the requirements of the Habitats Directive*

- Emission Limit Values (ELVs)
 - 11.5.15 *In many instances, the Emission Limit Value standards set by the EPA when licensing treatment plants are significantly higher than the requirements of the Urban Wastewater Directive (UWWD). Some of these ELV standards cannot consistently be achieved even by relatively modern plants without significant upgrades. This is a national issue not unique to Cork but it occurs in several locations across the County.*
 - 11.5.16 *In assessing the capacity of a WWTP to cater for future development where an ELV issue pertains, the assessment has been based on the hydraulic and organic loadings of the treatment plant relative to its design capacity on the assumption that the ELV issue will be resolved in an approach that will be determined/ agreed at a national level between Irish Water and the EPA.*
- Section 11.9.5 The assimilative capacity of the County's waterbodies is not infinite, and it is considered important, when assessing individual development proposals involving abstraction or dilution of discharges, that sufficient assimilative capacity is retained so as to allow for the continued growth of the overall settlement and avoiding the unsustainable exploitation of the watercourse.
- Bandon WwTP is listed as having adequate capacity to cater for planning population growth.

Information on the **River Basin Management Plan (2018-2021)**, Draft River Basin Management Plan (2022-2027), and associated information on the catchments available on www.catchments.ie was reviewed:

- The RBMP sets out the measures that are necessary to protect and restore water quality in Ireland. The overall aim of the plan is to ensure that Ireland's natural waters are sustainably management and that freshwater resources are protected so as to maintain and improve Ireland's water environment. The Draft 3rd cycle plan identifies that based on 2013-2018 data, 53% of surface waters are in good or high ecological status while the remaining 47% are in unsatisfactory ecological status.
- Continued investment in wastewater infrastructure is highlighted as one of the key actions in the plans. The 3rd cycle plan identifies the Lower Bandon as an Area For Action (AFA) with a Restoration objective. The catchment assessment points to IW's infrastructural improvements in Bandon, near completion, as an action to address the significant pressure of the overflows to the River Bandon.

The above plans have themselves been assessed in accordance with Article 6(3) of the Habitats Directive and Part XAB of the Planning and Development Act, 2000 and the implementation of those plans will not result in adverse effects to the integrity of any European site(s). The plans support the operation of compliant discharges from the Bandon agglomeration which maintain Good water quality conditions within the receiving waterbody in the context of background pressures. The plans also support the prioritisation of actions to deal with significant pressures affecting the catchment, which include the ongoing infrastructural improvements in Bandon, as well as addressing other catchment pressures such as agriculture, forestry, other urban waste water

agglomerations and hydromorphology. Hence considered cumulatively with the Project, there is no potential for negative cumulative effects on any ecological receptor.

5.6.1.2. Projects

Cork Co.Co. planning system was reviewed for any recently proposed or permitted projects that could lead to in-combination impacts with the Project. A residential development by Castle Rock Homes (214059) was recently approved, while a new application for a residential development has been submitted by Bandon Structures Ltd (224960). Another notable development is for a business park by Top Scale Investments which is at FI stage (224280).

A range of other small development residential, business and agricultural developments within the Bandon agglomeration, which may seek connection to the sewerage network, have been recently granted or are seeking planning consent. IW reviews available capacity for treatment prior to any connection to the network and therefore any local development connecting to the WwTP will be within the treatment capacity which meets WFD requirements. Hence, considered cumulatively with the Project, there is no potential for negative cumulative effects on any ecological receptor.

5.7. Monitoring

Monitoring of effluent and the receiving watercourse is specified by the EPA discharge licence (Reg: D0136-01). As specified in the licence, water quality will continue to be monitored to determine the impact of the discharge from the upgraded WwTP to ensure it complies with relevant legislation and the limits specified by the licence.

5.8. Conclusion

The resultant improvement in water quality of the River Bandon is predicted to have a slight positive long-term impact on the identified Key Environmental Receptors *i.e.*, the river habitat, aquatic sensitive water dependent fauna, otter, and birds that rely on the river.

No negative effects upon KERs are predicted to arise from the operational discharges associated with the Bandon agglomeration.

There will be no cumulative effects arising with any other plans or project.

6. WATER

6.1. Introduction

This Chapter, prepared by AWN Consulting Ltd., assesses and evaluates the likely significant effects associated with the operational discharges on the water environment. An overarching component of this Chapter will be assessing the impact of the operational discharges against the pertinent objectives of relevant Directives and Regulations, including but not limited to the WFD [2000/60/EC], UWWT Directive [91/271/EEC] and the European Communities Environmental Objectives (Surface Waters) Regulations 2009, as amended [S.I. No. 272 of 2009, S.I. No. 77 of 2019 & S.I No. 288 of 2022].

In assessing likely potential and predicted effects, account is taken of both the importance of the attributes and the predicted scale and duration of the likely effects.

Full details of the Project can be found in **Chapter 3**. Information on upgrade works to the Bandon agglomeration can be found in **Section 1.2**.

The purpose of this Chapter is to:

- Describe and evaluate the baseline water environment relevant to the 10 no. operational discharges;
- Identify and assess all potentially significant effects on the surface water environment associated with the operational discharges;
- Set out the mitigation measures required to ensure compliance with relevant legislation and to address any potentially significant effects;
- Provide an assessment of the significance of any residual effects; and
- Where relevant, identify any monitoring requirements.

6.1.1. Statement of Authority

This report was prepared by Colm Driver (BSc MSc PGeo EurGeol), and Teri Hayes (BSc MSc PGeo EurGeol). Colm is a Senior Hydrogeologist with over 5 years of experience in environmental consultancy and water resources studies. Colm is a professional member of the Institute of Geologists Ireland and European Federation of Geologists). He is also an active member of the Irish Group of the Association of Hydrogeologists (IAH).

Teri is a hydrogeologist with over 25 years of experience in water resource management and impact assessment. She has a Masters in Hydrogeology and is a former President of the Irish Group of the Association of Hydrogeologists (IAH) and has provided advisory services on water related environmental and planning issues to both public and private sector bodies. She is a professional member of the Institute of Geologists Ireland and European Federation of Geologists and has qualified as a competent person as recognised by the EPA in relation to contaminated land assessment (IGI Register of competent persons www.igi.ie). Her specialist area of expertise is water resource management eco-hydrogeology, hydrological assessment, and environmental impact assessment.

6.2. Methodology

6.2.1. General

This Chapter evaluates the effects, if any, which the operational discharges will have on Hydrology as defined in the EPA '*Guidelines on the Information to be contained in Environmental Impact Assessment Reports*' (EPA, 2022). The Draft EPA document entitled '*Advice Notes for Preparing Environmental Impact Statements*' (EPA, 2015) is also followed in this hydrological assessment and classification of environmental effects. In addition, the document entitled '*Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*' by the TII, 2009 (previously NRA) is referenced where the methodology for assessment of impact is appropriate.

The rating of potential environmental effects on the hydrological environment is based on the standard EIAR impact predictions which takes account of the quality, significance, duration, and type of effect identified (in accordance with impact assessment criteria provided in the EPA Guidelines (2022) publication).

The duration of each effect is assigned as either momentary, brief, temporary, short-term, medium term, long-term, or permanent. Momentary effects are considered to be those that last from seconds to minutes. Brief effects are those that last less than a day. Temporary effects last less than one year. Short term effects are seen as effects lasting one to seven years; medium-term effects lasting seven to fifteen years; long-term effects lasting fifteen to sixty years; and permanent effects lasting over sixty years.

The TII criteria for rating the magnitude and significance of impacts and the importance of hydrological attributes during the EIA stage are also relevant in assessing the impact and are presented in **Appendix 1 – Criteria for Rating Site Attributes – Estimation of Importance of Hydrology Attributes**.

6.2.2. Policy Context & Legislation

The WFD requires '*Good Water Status*' for all European waters to be achieved through a system of river basin management planning and extensive monitoring by 2015 or, at the least, by 2027. '*Good status*' means both '*Good Ecological Status*' and '*Good Chemical Status*'. In 2009, the South Western River Basin District Management Plan (SWRBDD) River Management Plan (RMP) 2009-2015 was published. In the SWRBDD RMP, the impacts of a range of pressures were assessed including diffuse and point pollution, water abstraction and morphological pressures (e.g., water regulation structures).

This second-cycle RBMP aims to build on the progress made during the first cycle. Key measures during the first cycle included the licensing of urban waste-water discharges (with an associated investment in urban waste-water treatment) and the implementation of the Nitrates Action Programme (Good Agricultural Practice Regulations).

Water bodies identified as being '*At Risk*' of not achieving their environmental objectives need to have targeted measures implemented to achieve objectives under this Plan. The manner and the timeframe in which these targeted measures are implemented need to be prioritised to take account of the finite resources available and of the time and resources needed to develop appropriate measures.

During the development of this Plan, a prioritisation exercise was undertaken by the local authorities, the EPA, and other stakeholders to identify those water bodies that require

immediate action within this plan cycle to 2021. During the catchment characterisation, the EPA identified those water bodies either 'At Risk' of not achieving their objectives or 'Under Review'. The outcome of this prioritisation process was the selection of 190 Areas for Action across the 5 Local Authority regions. Within these 190 areas, a total of 726 water bodies were selected for initial actions during this RBMP cycle. There are 832 water bodies identified as being 'At Risk' of not achieving their environmental objectives under this Plan that have not been included in the Areas for Action. For most of these water bodies, targeted actions will be undertaken in the third cycle RBMP from 2022-2027. The draft 3rd cycle RBMP has been reviewed in the context of ensuring mitigation measures comply with current and expected future measures required to be implemented for protection of water body status within the context of the operational discharges from the Bandon agglomeration.

The strategies and objectives of the WFD in Ireland have influenced a range of national legislation and regulations. These include the following:

- European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003);
- European Communities (Drinking Water) Regulations 2014 (S.I. 122 of 2014) and amended in 2017 (S.I. No. 464/2017);
- European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009) & 2015 (S.I. No. 386 of 2015) & S.I. No. 77/2019 - European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019, & S.I. 288 of 2022;
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010) & 2016 (S.I. No. 366 of 2016);
- European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2010 (S.I. No. 610 of 2010);
- European Communities (Good Agricultural Practice For Protection of Waters) Regulations 2022 (S.I. No. 113 of 2022); and
- European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011 (S.I. No. 489 of 2011)

6.2.3. Sources of Information

This assessment was considered in the context of the available baseline information, potential impacts, consultations with statutory bodies and other parties, and other available relevant information. In collating this information, the following sources of information and references were consulted:

- EPA – website mapping and database information. Envision water quality monitoring data for watercourses in the area.
- River Basin Management Plan for Ireland 2018-2021.
- Draft River Basin Management Plan for Ireland 2022-2027.
- Cork 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).
- National Parks and Wildlife Services (NPWS) – Protected Site Register.

6.2.4. EIAR Scoping

The scope of this Chapter and assessment contained therein has taken full regard of the submissions made during consultation on the Scoping Report, as presented in **Section 2.3** of this EIAR.

6.3. Receiving Environment

6.3.1. Existing Environment

The agglomeration operational discharges to the River Bandon are presented in **Section 3.3**. These include the primary discharge from the upgraded WwTP (SW001); 5 no. Dual Function Overflows which can function as SWOs or EOs, 1 no. EO and 3 no. network SWOs.

All operational discharges (with the exception of SW017) enter the Bandon_090 waterbody which has a WFD 2016-2021 designation of Good status. SW017 enters the Bandon_080 which also has a WFD 2016-2021 designation of Good status. For both waterbody this is an improvement from the 2013-2018 WFD designation of Moderate status.

There are no significant pressures identified for the Bandon_080. Significant pressures for the Bandon_090 have been determined, within the draft 3rd cycle Catchment Report, as domestic waste water, other unknown anthropogenic pressures, urban run-off, and urban waste water.

There is a drinking water abstraction point at Innishannon located *ca.* 4.5km downstream of the primary discharge point. A Drinking Water Risk Assessment was carried out by Irish Water and was included in the 2015 AER, and it was determined that the overall risk of the WwTP on the Drinking Abstraction is classified as Low Risk. It is considered based on the Bandon WwTP and Glasslinn Road Pumping Station Upgrade which was completed to improve the treatment processes at the WwTP, thereby resulting in an improved effluent discharge quality, along with the removal of 10 no. SWOs from the agglomeration by the end of Q1 2023, and the assimilative capacity in the receiving waters, that the overall risk of the WwTP to this Drinking Abstraction remains as a Low Risk, even based on the WwTPs increased loadings.

The Bandon_100 which lies *ca.* 1.8km downstream of the primary discharge point is designated as a river that intersects with a nutrient sensitive area. The Upper Bandon Estuary nutrient sensitive estuary (P limited) is located *ca.* 5km downstream of the primary discharge point. Based on the distance of this waterbody downstream of the agglomeration, along with the fact that the p.e. of the agglomeration is greater than 10,000, a TP ELV of 2mg/l is proposed. It should be noted that this downstream waterbody is not TN limiting as per the EPA's Urban Waste Water Treatment Directive (UWWTD) (91/271/EEC) Article 5 Report (*i.e.*, Review of nutrient sensitive areas (freshwater and marine) as required by the Urban Waste Water Treatment Directive (91/271/EEC), 2020) and therefore a TN ELV is not deemed required.

Scoping has identified the impact of the operational discharges on the receiving surface waters as being the only likely potential significant environmental impact on water quality. As a consequence, the existing environment to be assessed is limited to the River Bandon.

6.3.2. Receiving Surface Waters

The agglomeration discharges directly to the River Bandon (Bandon_080 and Bandon_090), refer to **Figure 6.1**, and **Chapter 3** for a full description of the operational discharges from the Bandon Agglomeration.

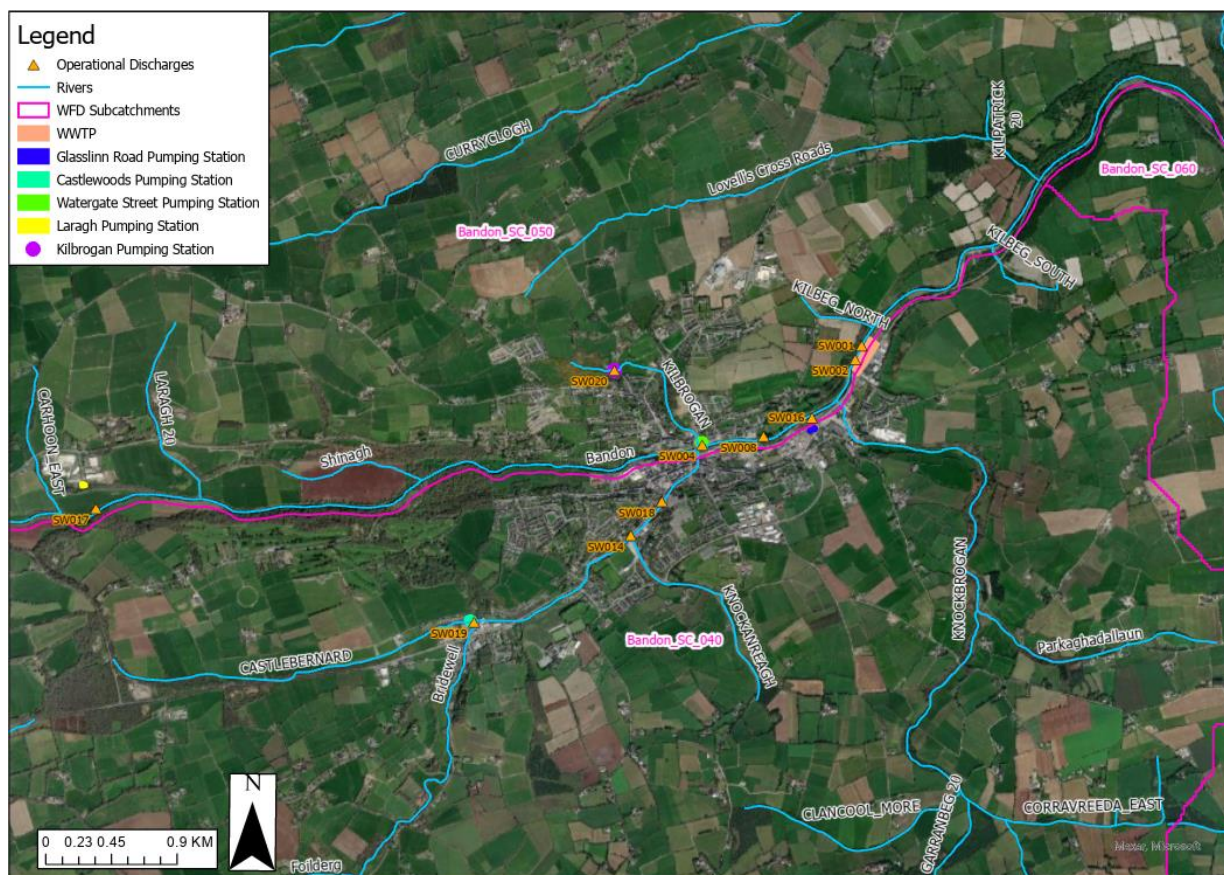


Figure 6.1 Local Hydrological Environment (EPA, 2022)

6.3.2.1. Surface Water Quality

The operational discharges are located within the former SWRBD (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). It is situated in Hydrometric Area No. 20 (Bandon-Ilen) of the Irish River Network. It is located within the Bandon-Ilen WFD Catchment and Bandon Sub-Catchments (Bandon_SC_050, 20_5 & Bandon_SC_040, 20_2).

Figure 5.2 presents the EPA quality monitoring points in the context of the operational discharges and other regional drainage settings.

Surface water quality is monitored periodically by the EPA at various regional locations along principal and other smaller watercourses. With reference to the site setting, the nearest EPA monitoring station is situated along the River Bandon (RS20B020800, which is located ca. 20m upstream of SW002). The EPA assesses 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 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. There are three (3) no. water quality monitoring stations located along the River Bandon upstream and downstream of the Bandon Wastewater Treatment Plant (WwTP) which have quality ratings available within the last ten years. The first of these (Baxter's Bridge RS20B020700) obtained a Q4 – Good Status (in 2020), the second station further downstream (1.5km d/s Bandon Bridge at Bandon's WwTP, RS20B020800) was Q4 – Good Status at last measurement (2020) and the third station is further downstream (Inishannon Bridge, RS20B020900) obtained a Q4 – Good Status in 2020.

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. Currently, the EPA classifies the WFD Ecological Status for the Bandon waterbody (IE_SW_20B020780, Bandon_080) as having '*Moderate Status*' (2013-2018) and '*Good Status*' (2016-2021) by expert judgement with a current WFD River Waterbody risk score of *Under Review*. Furthermore, the EPA classifies the WFD Ecological Status for the Bandon waterbody (IE_SW_20B020800, Bandon_090) as having '*Moderate Status*' (2013-2018) and '*Good Status*' (2016-2021) by expert judgement with a current WFD River Waterbody risk score of *Under Review*.

Water chemistry is monitored by Cork Co. Council / EPA at:

- RS20B020800 (1.5km d/s Bandon Br) - ca. 120m upstream of SW001;
- RS20B020700 (Baxter's Br Bandon_070) - ca. 1km upstream of SW017; and
- RS20B020850 (Bandon-French's Wood) - ca. 1.8km downstream of SW001.

The most recent 18 months of data for key parameters are shown in **Table 5.1** in **Chapter 5**. Results were compared with the EQSs specified in the Surface Waters Regulations 2009 (as amended). Generally, at least Good status conditions are met upstream and downstream of the discharge with occasional exceedances. The Bandon River is not a salmonid river for which the Salmonid River Regulations (S.I. 293 of 1988) apply, however it is noted that the suspended solids results downstream of Bandon meet the requirement specified in these regulations.

The Bandon_100 which lies ca. 1.8km downstream of the primary discharge point is designated as a river that intersects with a nutrient sensitive area. The Upper Bandon Estuary nutrient sensitive estuary (P limited) is located ca. 5km downstream of the primary discharge point. **Figure 6.2** presents the nutrient sensitive areas in the proximity of the agglomeration.

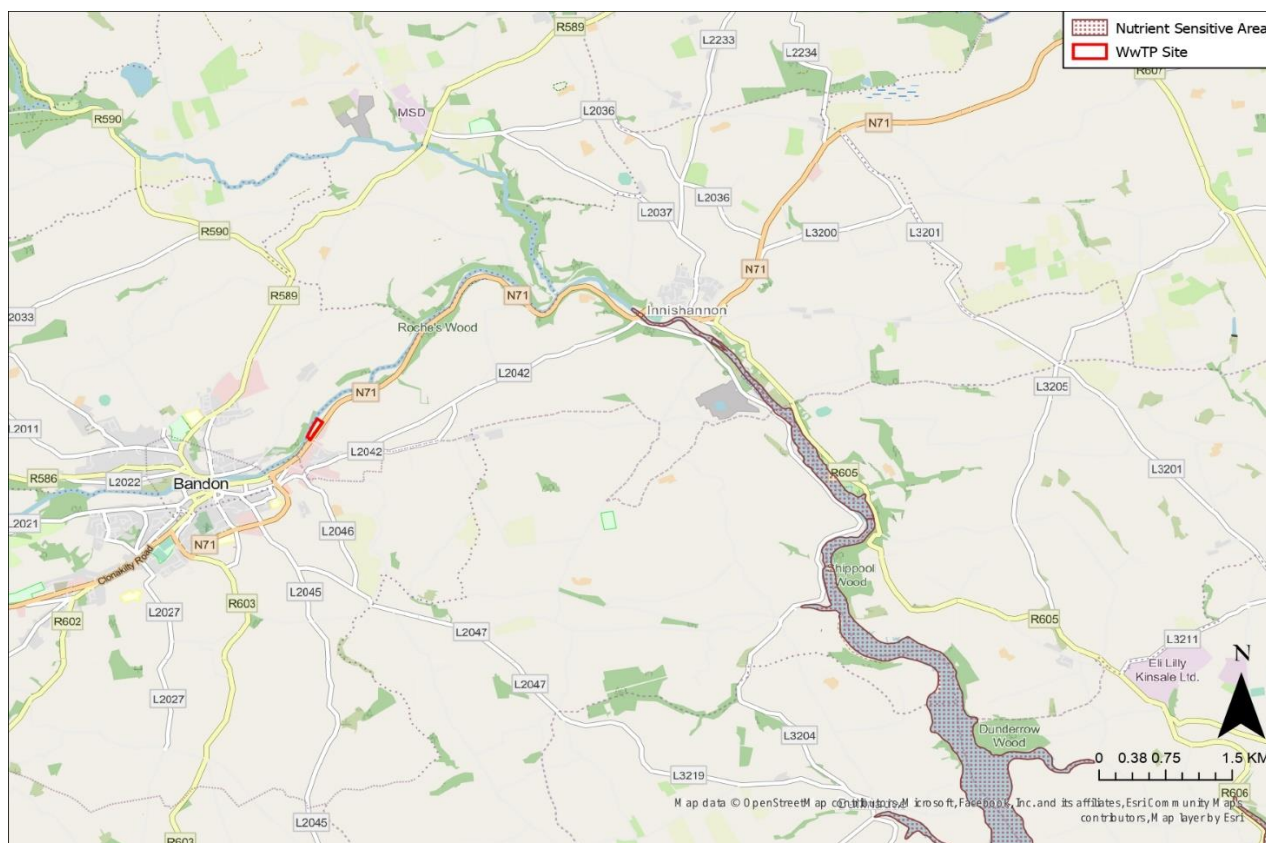


Figure 6.2 Nutrient Sensitive Area

6.3.2.2. Overflows

Surface water flooding associated with heavy rainfall and exceedance of the drainage system is a problem in Bandon town. The Bandon Watermain and Sewer Network Project will increase flow capacity in the system, reduce sewage discharges to the River Bandon and will reduce surcharging of drainage pipe networks in the town. The Bandon Watermain and Sewer Network Project is due to be completed by the end of Q1 2023.

After the completion of the Bandon Watermain and Sewer Network Project, which will remove 10 no. SWOs from the agglomeration, there will be 5 no. Dual Function Overflows (SW002, SW004, SW016, SW017 and SW020) which will operate as a SWO or an EO, 1 no. EO (SW019) and 3 no. SWOs (SW008, SW014 and SW018) in the agglomeration.

All SWOs have been designed to operate to meet the definition of 'Storm Water Overflow' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995.

The risks of sewer or outfall failure associated with extreme events resulting in the activation of EOs, while a theoretical risk (as the failure of any infrastructure in catastrophic situations is theoretically possible), is not reasonably predicted to occur. Their inclusion in the agglomeration prevents the risk of uncontrolled emissions arising from other points in the network and spilling onto land or water in an unpredictable manner. All appropriate design measures and mitigation to prevent EOs that can be applied has been incorporated in the design and operation of the discharges.

6.3.2.3. Rating of site importance of the hydrological features

Based on the NRA methodology (refer to **Appendix 1 - Criteria For Rating Site Attributes – Estimation Of Importance Of Hydrology Attributes, Table 2**), for rating the importance of hydrological features, the importance of the hydrological features at this site is rated as **High Importance**.

The River Bandon is the receiving waterbody for the operational discharges. It is a source of local potable water (downstream) and is used for salmon fishing.

6.4. Description of Likely Significant Effects

The potential impacts from the operational discharges from the Bandon agglomeration are outlined below and the assessment of effects defined based on the description of effects as set out in the EPA EIA Report Guidelines (2022) and the NRA criteria detailed in **Appendix 1 - Criteria For Rating Site Attributes – Estimation Of Importance Of Hydrology Attributes**.

6.4.1. Operational Discharges

There are 10 no. operational discharges associated with the Bandon WWDA Licence Review (SW001, SW002, SW004, SW008, SW014 and SW016 - SW020). These are described in full in **Chapter 3**.

An assimilative capacity assessment was carried out by Nicholas O'Dwyer (**Appendix 2 – Waste Assimilative Capacity Calculations**) to examine the dilution and the capacity of the River Bandon to receive the treated discharge without impacting the waterbody. The definition of assimilative capacity, as used by the EPA, is *'the ability of a body of water to cleanse itself; its capacity to receive waste waters or toxic materials without deleterious effects and without damage to aquatic life or humans who consume the water'*.

Based on the proposed ELVs, the calculations based on a conservative discharge scenario (*i.e.*, Q95 flow (1.57 m³/s) of the River Bandon and the DWF of the WwTP) show that the assimilative capacity would not exceed the established threshold values for Biological Oxygen Demand (BOD), Total Ammonia and Ortho-phosphate in the receiving River Bandon waterbody in order to achieve *'Good'* status.

Regarding the current assigned Good WFD status for River Bandon waterbody, it is not expected that treated effluent from the upgraded Bandon WwTP will affect this classification. Furthermore, the quality of the treated effluent is monitored on the basis of actual discharge activities as per the associated EPA licence.

Discharges into the River Bandon will be at a controlled rate to ensure that there is no increase in flow during these discharges so there will be no change to the morphology of the river and any increase in downstream flooding will be avoided.

Furthermore, the Project will contribute to strengthening the protection of the drinking water supply as the operational discharges from the Bandon agglomeration will receive secondary treatment and will have Phosphorus levels reduced to comply with the proposed ELVs.

6.4.2. Overflows

As mentioned above, all SWOs have been designed to meet the definition of 'Storm Water Overflow' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended, and the criteria as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995.

During storm events, surface water and a portion of foul water can accumulate which results in storm overflows which ultimately discharges into the River Bandon. As outlined in **Chapter 3**, SWO's are a necessary part of sewerage networks and serve to prevent uncontrolled spillages from arising within the agglomeration and to prevent the biological processes necessary to treat effluent from being compromised by inundation with excess water. The principal consideration to take account of in the assessment of the impact of overflows for water quality is that overflows will only occur in the event of sustained rainfall.

Any discharges to the receiving water are significantly diluted by stormwater.

The initial flushing flow arising from the first 5 mm of rain in a rainfall event is contained in the foul sump initially and will not be passed through to the storm tanks/sump unless the capacity of the foul pumps is exceeded. Overflows to the storm water storage tank/sump will be screened. This will further retain a significant proportion of the organic matter, solids and rags in the foul sump. Flows entering the stormwater holding tank/sump will then be retained in the storm tank providing an opportunity for suspended solids to settle out.

If the storm tank reaches capacity, a highly diluted screened effluent is discharged. It is not possible to fully retain all stormwater due to septicity that arises with storage and the inability of treatment plant biological processes to cater for large volumes of dilute wastewater. In this context, the discharges *via* SWOs to the River Bandon channel will be diluted and dispersed effectively.

As mentioned previously the risks of sewer or outfall failure associated with extreme events resulting in the activation of EOs (*via* SW002, SW004, SW016 SW017 and SW019 - SW020), while a theoretical risk (as the failure of any infrastructure in catastrophic situations is theoretically possible), is not reasonably predicted to occur. Their inclusion in the agglomeration prevents the risk of uncontrolled emissions arising from other points in the network and spilling onto land or water in an unpredictable manner. All appropriate design measures and mitigation to prevent EOs that can be applied has been incorporated in the design and operation of the discharges.

These overflows are temporary (short-lived) and have no long-term negative impact on the waterbody quality.

6.4.3. Summary of Operational Discharges

A summary of operational discharge impacts following EPA (2022) EIA guidelines are provided below.

The Bandon agglomeration is listed as a pressure on its receiving waterbody. The removal of 10 no. SWOs, the proposed more onerous ELV for Ortho-phosphate, the inclusion of a TP ELV of 2mg/l and the proposed design and operation of the overflows, will result in a reduction in overall nutrient input into the river system. Given the proposed stringent

ELVs and the network upgrades, the operational discharges will support the appropriate water chemistry conditions and will therefore not hinder the maintenance of 'Good Status' under the WFD.

The removal of 10 no. overflows and the improvements to the network will significantly reduce the volume and improve the quality of intermittent discharges entering the river, addressing any localised impacts.

6.5. Mitigation Measures

There are no specific mitigation measures in relation to Water required.

6.6. Residual Impacts

Residual impacts are those that remain once the proposals have been implemented. The main aim of mitigation is to avoid, minimise or offset residual impacts following the mitigation hierarchy.

In terms of the operational discharges, this assessment has considered the current water status of all relevant water bodies (**Section 6.3.2.** above), and potential impacts have been considered (**Section 6.4** above). With the design measures (as described in **Chapter 3**) in place, it is concluded that there will be no degradation of the current water body status (chemically, ecologically, and quantitatively) or its potential to meet the requirements and/or objectives and measures in the second [current] RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027. It is noted that the Bandon agglomeration is listed as a pressure on its receiving waterbody. The primary discharge (SW001) will be adequately treated *via* proper treatment measures (*i.e.*, Primary & Secondary treatment with phosphorous removal) within the WwTP. This along with the proposed more stringent ELV for Ortho-phosphate will have a slight long-term positive impact to the WFD water quality status of the receiving watercourse.

During storm conditions, any discharges from SWOs will be diluted, settled, and screened prior to being discharged. The stormwater will enter the river which will itself have increased flows driven by sustained rainfall. In this context, the discharges *via* the SWOs to the River Bandon channel will be diluted and dispersed effectively and will have no long-term negative impact to the WFD water quality status of the receiving watercourse.

In terms of EOs, while a theoretical risk (as the failure of any infrastructure in catastrophic situations is theoretically possible), they are not reasonably predicted to occur. Should they occur however, these overflows will be temporary (short-lived) and have no long-term negative impact on the waterbody quality.

A site-specific detailed WFD Screening Assessment was carried out for the operational discharges and is attached as **Appendix 3 – Water Framework Directive Screening Assessment**. The WFD Screening Assessment has shown that there is no potential for change in the water body status and risk as a result of the operation discharges.

In summary, no potential significant negative effects have been identified from the operational discharges from the Bandon agglomeration. However, locally there will be a slight positive, long-term effect for the reasons as outlined above.

6.6.1. Cumulative Impacts

The operational discharges from the Bandon agglomeration will be compliant with the pertinent objectives of relevant Directives and Regulations, including but not limited to the WFD [2000/60/EC], UWWT Directive [91/271/EEC], Habitats Directive [92/43/EC], Birds Directive [79/409/EEC] and European Communities Environmental Objectives (Surface Waters) Regulations 2009, as amended [S.I. No. 272 of 2009, S.I. No. 77 of 2019 & S.I. No. 288 of 2022].

Refer to **Chapter 5, Section 5.6** for further details.

There are no cumulative impacts with other plans and projects predicted.

6.7. Monitoring

Section 3.5.3 of this E.I.A.R details general “*Measures to Prevent Unintended Discharge*”. The measures will act to prevent significant negative effects on Water.

Specific monitoring will be carried out in accordance with the WWDL requirements.

6.8. Conclusion

This Chapter has assessed the impact of the operational discharges against the pertinent objectives of relevant Directives and Regulations. The Bandon WwTW has been designed to ensure that the emissions from the agglomeration will comply with and will not result in the contravention of EU Legislation and National Regulations.

The discharge standard will not compromise the achievement of the objectives and EQSs established for any European sites’ water dependant species and natural habitats and designations in the wider environs or downstream of the agglomeration.

The operation of the upgraded WwTP and associated network is expected to have a positive impact in terms of a reduction in the levels of nutrients being discharged in the River Bandon. The discharge activities will not cause a deterioration in the chemical status in the River Bandon.

No negative effects on the water environment are predicted to arise from the operational discharges associated with the Bandon agglomeration. However, it is predicted that there will be a slight positive long-term effect on the receiving waterbody *i.e.*, River Bandon.

7. POPULATION & HUMAN HEALTH

7.1. Introduction

This Chapter of the EIAR, prepared by Enviroguide Consulting, considers the potential effects of the Project on human beings, living, working, and visiting in the vicinity of the Bandon agglomeration. It details the potential direct and indirect effects of the Project on Population and Human Health. It also examines the socio-economic impacts, focusing on pertinent issues such as residential amenity, economic activity, tourism, and population levels.

One of the principal concerns for any development is that the local population experiences no reduction in the quality of life as a result of the development on either a permanent or temporary basis.

The Chapter on Population and Human Health is broad ranging and covers the existence, wellbeing, and activities of people living in the area through the format of considering people as '*groups*' or '*populations*'. The assessment of impacts on human beings involves the identification of relevant key populations that may be affected by the proposal and quantifiable documentary research. Health, as defined by the World Health Organization (WHO), is "*a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*".

Key populations have been identified as persons residing and engaging in activities near the operational discharges, persons with a stake in the general economy of the local and regional area, and persons enjoying the recreational and cultural amenities of the area.

7.1.1. Statement of Authority

This Chapter was prepared by Louise Hewitt, Environmental Consultant, Enviroguide Consulting. Louise has a Master of Science (Hons) in Environmental Resource Management from University College Dublin and a Bachelor of Science (Hons) in Biology from Maynooth University. Louise has worked as an Environmental Consultant with Enviroguide since 2021 and has experience preparing Environmental Impact Assessment (EIA) Screening Reports, Introduction, Population and Human Health and Archaeology and Cultural Heritage Chapters of EIARs.

This Chapter was reviewed by Janet O'Shea who has 16 years professional environmental experience. Janet who is Technical Director of EIA holds a BSc in Environmental Health and Diploma in Environmental Impact Assessment. Janet is a Lead Environmental Auditor (IEMA Approved), a Chartered Waste Manager (MCIWM) and Chartered Environmentalist (C. Env). Janet has authored and reviewed various EIAR Chapters including Population and Human Health since 2014. Janet has been part of the Design Team for multiple large-scale development and has project managed the preparation of EIAs for various large-scale developments.

7.2. Methodology

A desk-based study was undertaken in October 2022 to assess information regarding population, age structure, economic activity, employment, and unemployment within the vicinity of the operational discharges.

The 2022 Census of Ireland was held on Sunday the 3rd of April 2022. The preliminary results were released on the 23rd of June 2022; however, the full suite of results will be published over several months starting in April 2023. The preliminary 2022 census results have been reviewed; however, they do not contain the required region-specific information for the purposes of this assessment of demographic profile. As such, the more robust and complete 2016 census results have been used in this assessment (accessed October 2022). The remaining information analysed as part of the desktop study was accessed in October 2022. The scope of the evaluation is based on a review of data available from the Central Statistics Office (CSO), legislation, guidance documents and any relevant EIARs that are in the public domain. The aim of the desktop study was to determine the current baseline environment.

The potential impact of the Project on the local population is assessed in this EIAR in relation to:

- Population;
- Socio Economic status;
- Tourism and Amenity;
- Air quality;
- Water;
- Noise;
- Traffic; and
- Risk.

In line with the EPA *"Guidelines on the information to be contained in Environmental Impact Assessment Reports"* (EPA, 2022), the terms are defined in **Section 2.5** when quantifying the quality of effects. Refer also to **Table 2.2** in **Chapter 2**.

7.2.1. Study Area

The Project is primarily located in the Bandon Electoral Division (ED) with some parts of the agglomeration boundary extending into the Kilbrogan and Ballymodan EDs, all of which are located in the Bandon Kinsale Local Electoral Area (LEA) (**Figure 7.1**). For the purpose of this Chapter the town of Bandon has been selected as the study area. Bandon is a town in County Cork which is located approximately 25km southwest of Cork City.

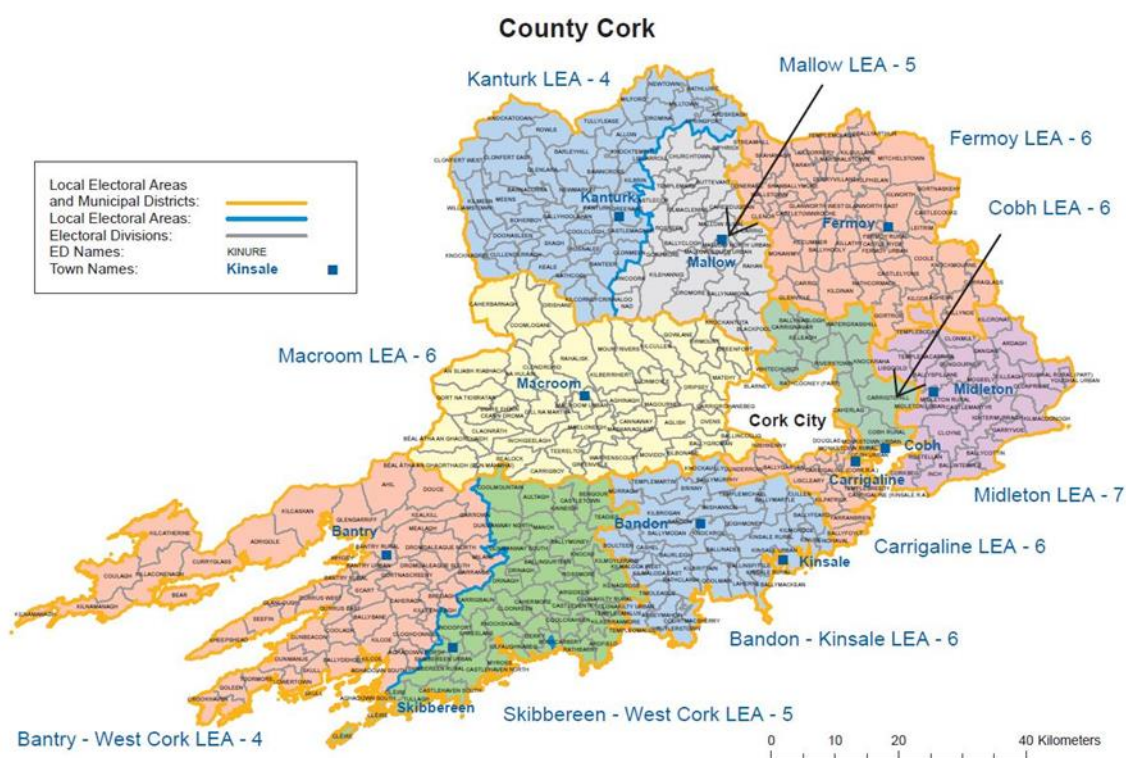


Figure 7.1 Map of Local Electoral Areas/Electoral Divisions

7.2.2. Information Sources

The principal sources of information are as follows:

- Census and employment information published by the Central Statistics Office (CSO). Available at <https://data.cso.ie/>;
- Cork County Development Plan 2022-2028, Available at: <https://www.corkcoco.ie/en/resident/planning-and-development/cork-county-development-plan-2022-2028>;
- Ordnance Survey Ireland (OSI) mapping and aerial photography.

The Institute of Public Health in Ireland has issued a document "*Health Impact Assessment Guidance*" which details the link between human health and the built environment (**Figure 7.2**). This document also details the negative health impacts associated with unemployment. Unemployment affects both physical and mental health and is an important determinant of health inequalities in adults of working age. Unemployed people have a higher risk of lower levels of psychological wellbeing ranging from symptoms of depression and anxiety to self-harm and suicide. Unemployment can also impact other health determinants, for example housing, and nutrition. Based on this information, employment generated as a result of the Project has been assessed throughout this Chapter.

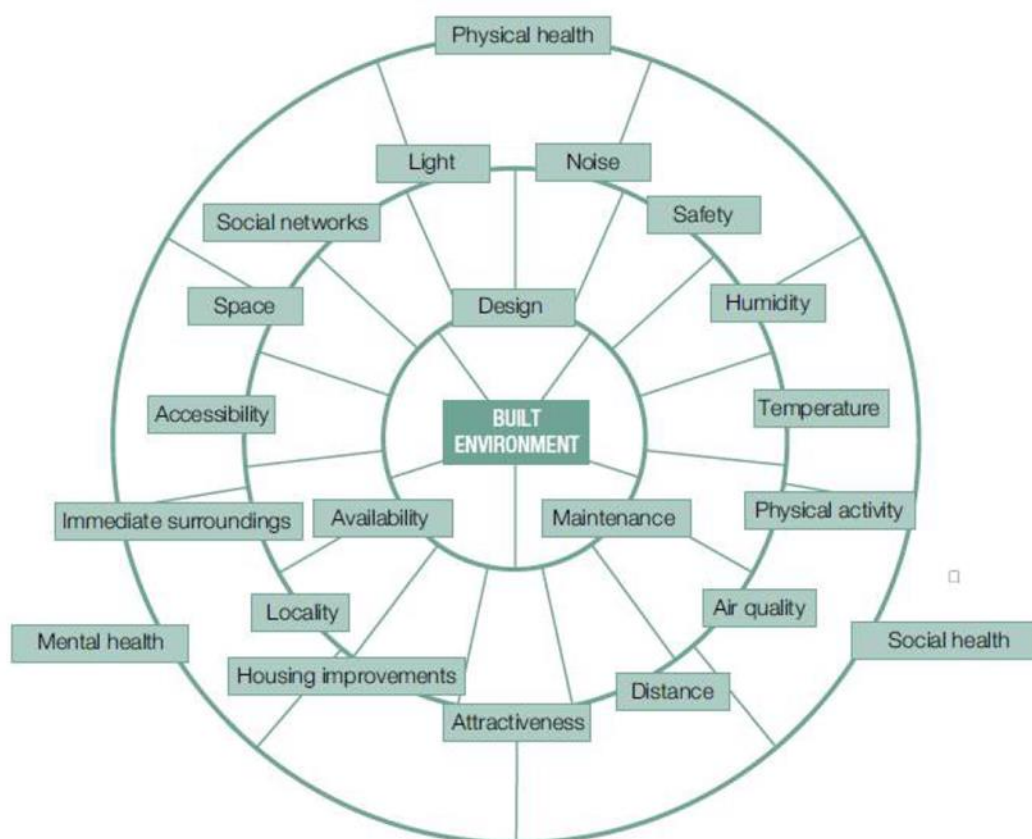


Figure 7.2 Health Impact of the Built Environment

The European Commission (EC) has published the “*Guidance on The Preparation of the Environmental Impact Assessment Report*” (EC, 2017). This document defines human health as “*a very broad factor that would be highly Project dependent. The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air*”.

7.2.3. EIAR Scoping

The scope of this Chapter and assessment contained therein has taken full regard of the submissions made during consultation on the Scoping Report, as presented in **Section 2.3** of this EIAR.

7.3. Receiving Environment

7.3.1. Population and Demographic Analysis

In terms of the County, Region and the State, population structure and change are more strongly influenced by migration and emigration rates than by birth and death rates. The mid to late 1980s in Ireland was a period of heavy population outflow, mainly due to the poor economic and employment situation in the country at that time.

The most recent population estimates (June 2022) published by the CSO indicate that the combination of a net inward migration and high birth rates has resulted in the population of Ireland exceeding 5 million for the first time since 1851. Population projections for Ireland up to 2046 anticipate a population of approximately five million under the most pessimistic scenario and over 6.7 million under the most optimistic scenario. Population projections for Northern Ireland up to 2034 anticipate a population of approximately two million.

As 2022 population data for towns is not available, the most recent population data for Bandon is from the 2016 Census which recorded the town's population at 6,957. The Cork County Development Plan has estimated the population of Bandon to increase to 8,773 by 2028.

Table 7.1 Population Change in Bandon from 2006 To 2011 to 2016 Census

Area	2006 Census Data	2011 Census Data	2016 Census Data	Proposed 2028 Population
Bandon	5,822	6,640	6,957	8,773

According to the Preliminary 2022 Census results, County Cork has experienced a growth of 7.07% in population from 542,868 in 2016 to 581,231 in 2022.

Table 7.2 Population Change in County Cork from 2016 to 2022 Census

Area	Population 2016 Census Data	Preliminary 2022 Census Data	Change in Number of Persons	Percentage change in Population
Cork	542,868	581,231	+ 38,363	+ 7.07

As demonstrated above the population of County Cork has increased steadily since 2011 as per Census results 2011, 2016 and preliminary County data from Census 2022. Although there is no information from the 2022 Census for Bandon it is expected that the town will experience a similar growth in population as County Cork for 2022. The Cork County Development Plan 2022-2028 (the Plan) has estimated the population of Bandon to reach 8,773 by 2028 and an additional 694 housing units will be required for the period 2022-2028 to facilitate this growth (**Table 7.3**).

Bandon has been identified as a "Main Town" in the Plan with Volume 5, Section 1.4 outlining the vision and context for Bandon:

"The Plan supports the delivery of key pieces of infrastructure needed to facilitate its continued growth as the Gateway to West Cork".

The town also has a high number of people in the labour force with a wide variety of industrial groups. Bandon is located within a commutable distance to Cork City (34-minute drive approximately 25km) which is a major centre of employment (See **Section 7.3.3** of this Chapter for more detail).

As described in **Section 1.2.2**, the Bandon Sewerage Scheme will ensure that there is adequate treatment capacity within the Bandon WwTP which will facilitate the estimated population growth and ensure that future developments in the area are not constrained due to wastewater treatment capacity.

Table 7.3 Population, Households and Net New Houses for Bandon (Cork County Development Plan 2022-2028)

	Housing Requirement			Housing Supply		
	Population Census 2016	Population Target (to 2028)	New Units Required (to 2028)	Housing Supply from Residential and Mixed Use Zoning including Compact Growth Sites	Housing Supply from Residential Additional Provision Sites	Housing Supply from Residential Reserve
Bandon	6,957	8,773	694	694	183	50

7.3.2. Population and Age

CSO data records that there were 6,957 people living in Bandon in 2016 and 417,211 in County Cork. **Table 7.4** shows the breakdown of the population in Bandon compared with County Cork and the State.

Overall, the population of Bandon reflects the general population trends in both the wider area of County Cork and the State. No age group in Bandon deviates by more than 1% when compared with the averages for County Cork and the State (excluding the number of people aged 25-34 which is greater than the average in County Cork by 2.3%). **Table 7.4** shows that people aged 5-24 make up the majority of the population in Bandon (26.41%) and this is in line with the values for County Cork (26.59%) and the State (26.28%). The next largest group are those aged 35-44 years (16.82%) followed by people aged 25-34 (14.37%) and people aged 45-54 (12.91%). People aged 55 years and older make up 21.53% of the population.

Table 7.4 Population Categories by Age For Bandon, County Cork And The State

Age Range	Bandon		County Cork		State	
	No. of People	% of People	No. of People	% of People	No. of People	% of People
0-4 years	554	7.96	31,337	7.51	331,515	6.96
5-24 years	1,837	26.41	110,957	26.59	1,251,489	26.28
25-34 years	1000	14.37	50,259	12.05	659,410	13.85
35-44 years	1170	16.82	68,029	16.31	746,881	15.68
45-54 years	898	12.91	57,769	13.85	626,045	13.15
55-64 years	681	9.79	44,744	10.72	508,958	10.69
65-74 years	471	6.77	32,186	7.71	373,508	7.84
75 years and over	346	4.97	21,930	5.26	264,059	5.55

Age Range	Bandon		County Cork		State	
	No. of People	% of People	No. of People	% of People	No. of People	% of People
Total	6,957		417,211		417,211	

7.3.3. Economic Activity and Employment

The labour force is defined as the number of people above the legal working age that are available to work. The labour force participation rate is the number of people who are employed and unemployed but looking for a job, divided by the total working-age population.

In 2016, there were 2,304,037 persons in the labour force in Ireland. This represented an increase of 71,834 (3.2%) on 2011 statistics. The substantial increase in retired persons (up 19.2% to 545,407) has impacted on the labour force participation rate, which fell to 61.4%.

Table 7.5 shows the percentage of the total population aged 15+ who were in the labour force during the 2016 Census. This figure is further broken down into the percentages that were at work or unemployed. It also shows the percentage of the total population aged 15+ who were not in the labour force, *i.e.*, those who were students, retired, unable to work or performing home duties.

When assessing the percentage of people in the labour force it is noted that 62.28% of the population of Bandon are in the workforce, which is similar to the values seen in County Cork (61.62%) and the State (61.35%).

The number of people classed as an *Employer or own account worker* in Bandon (6.24%) is lower than the average for County Cork (10.19%) and the State (8.35%). The number of people classed as an *Employee* in Bandon (47.18%) is higher than the average for County Cork (45.58%) and also higher than the State (44.96%). The number of people classed as *Assisting a relative* and *Unemployed looking for first regular job* in Bandon is similar to the averages for County Cork and the State (**Table 7.5**).

The number of people classed as *Unemployed having lost or given up previous job* (7.80%) is higher than the average for County Cork (5.12%) but is similar to the State average (7.08%).

The number of *Students or pupils* in Bandon (9.98%) is slightly lower than the average for County Cork (11.17%) and the State (11.37%). The number of *Retired* people in Bandon is slightly lower than the average for County Cork (14.18%) and the State (14.52%). The number of people *Looking after home/family* or *Unable to work due to permanent sickness or disability* in Bandon is similar to the averages for County Cork and the State and does not deviate by more than 1.5%.

Table 7.5 Economic Status of The Population Aged 15+ In 2016 (Source: CSO)

Status		Bandon	% of People	County Cork	% of People	State	% of People
% of population aged 15+ who are in the labour force		No. of People	% of People	No. of People	% of People	No. of People	% of People
% of which are	Employer or own account worker	336	6.24	32759	10.19	313,404	8.35
	Employee	2539	47.18	146591	45.58	1,688,549	44.96
	Assisting relative	6	0.11	540	0.17	4,688	0.12
	Unemployed looking for first regular job	51	0.95	1827	0.57	31,434	0.84
	Unemployed having lost or given up previous job	420	7.80	16460	5.12	265,962	7.08
Total population aged 15+ who are in the labour force		3,352	62.28	198,177.0	61.62	2,304,037	61.35
% of population aged 15+ who are not in the labour force		No. of People	% of People	No. of People	% of People	No. of People	% of People
% of which are	Student or pupil	537	9.98	35933	11.17	427,128	11.37
	Looking after home/family	497	9.23	27965	8.70	305,556	8.14
	Retired	675	12.54	45612	14.18	545,407	14.52
	Unable to work due to permanent sickness or disability	297	5.52	12926	4.02	158,348	4.22
	Other economic status	24	0.45	1007	0.31	14,837	0.40

Total population aged 15+ who are not in the labour force	2,030	37.72	123,443.0	38.38	1,451,276	38.65
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Table 7.6 shows the highest level of education reached in Bandon. The majority of people have reached an *Upper secondary* (16.57%), *Lower secondary* (12.62%) or *Technical/Vocational* (10.50%) level of education.

Table 7.6 Highest Level of Education Reached In Bandon

Highest Level of Education Completed	No. of People	% of People
Upper secondary	892	16.57
Lower secondary	679	12.62
Technical/vocational	565	10.50
Economic status - total at school, university, etc.	537	9.98
Economic status - other	440	8.18
Honours bachelor degree/professional qualification or both	385	7.15
Primary	383	7.12
Ordinary bachelor degree/professional qualification or both	331	6.15
Postgraduate diploma or degree	288	5.35
Advanced certificate/completed apprenticeship	281	5.22
Not stated	245	4.55
Higher certificate	227	4.22
No formal education	107	1.99
Doctorate (Ph.D.)	22	0.41
Total education ceased and not ceased	5382	

Table 7.7 details the Broad Industrial Groups that make up the Labour Force of Bandon. Of the 3,352 people in the workforce 18.56% of people are employed in *Manufacturing*, 14.53% are employed in *Wholesale and retail trade; repair of motor vehicles and motorcycles* and 12.53% are *Unemployed, having lost or given up previous job*. The remaining categories each make up between 0% and 8.14% of the population of Bandon.

Table 7.7 Broad Industrial Group in Bandon

Broad Industrial Group	No. of People	% of People
Manufacturing	622	18.56
Wholesale and retail trade; repair of motor vehicles and motorcycles	487	14.53
Unemployed, having lost or given up previous job	420	12.53
Human health and social work activities	273	8.14
Education	206	6.15
Industry not stated	188	5.61
Accommodation and food service activities	187	5.58
Professional, scientific, and technical activities	145	4.33
Construction	125	3.73
Public administration and defence; compulsory social security	112	3.34
Administrative and support service activities	100	2.98
Information and communication	93	2.77
Transportation and storage	81	2.42
Financial and insurance activities	68	2.03
Other service activities	68	2.03
Unemployed looking for first regular job	51	1.52
Arts, entertainment, and recreation	49	1.46
Agriculture, forestry, and fishing	39	1.16
Electricity, gas, steam, and air conditioning supply	18	0.54
Real estate activities	10	0.30
Water supply; sewerage, waste management and remediation activities	5	0.15
Activities of households as employers producing activities of households for own use	4	0.12

Broad Industrial Group	No. of People	% of People
Mining and quarrying	1	0.03
Activities of extraterritorial organisations and bodies	0	0.00
Total in labour force	3,352	

The closest social welfare office to the Bandon WwTP which has figures available for the number of people on the Live Register / unemployed is the Bandon Intreo Centre. The monthly unemployment release contains a series of monthly unemployment rates and volumes. These series are based primarily on the Labour Force Survey and are compiled in accordance with agreed international practice. These statistics are the definitive measure of monthly unemployment. The Live Register is used to provide a monthly series of the numbers of people (with some exceptions) registering for Jobseekers Benefit or Jobseekers Allowance or for various other statutory entitlements at local offices of the Department of Social Protection. **Table 7.8** details the most recent information available from the CSO from April 2022 to September 2022 on the number of persons on the Live Register. The number of people on the Live Register has increased by 5% from April 2022 to September 2022.

Table 7.8 Number of People on The Live Register In Bandon

Month	April 2022	May 2022	June 2022	July 2022	August 2022	September 2022
Number of Persons on Live Register	492	475	551	628	630	519

7.3.4. Tourism and Amenities

Bandon is located on the N71 which connects Bandon to Cork Airport, which is located 26km northeast. The town is situated on the River Bandon and is a popular spot for angling. The Farmers Market in Bandon is held every Saturday and hosts local, and artisan produce. The West Cork Heritage Centre is located on North Main Street in Bandon and incorporates some of the historical town walls (Discover Ireland, 2022). The town also has many outdoor sports facilities including Bandon Golf Course, Bandon Rugby and Football Club, Bandon GAA Club and Bandon Tennis Club.

The River Bandon is not a designated salmonid waterbody, however, the river hosts a number of species important for fishing and is primarily a salmon and sea trout river. The river also has resident brown trout. The primary angling association in the area is Bandon Angling Association which offers a professional service with qualified guides along an 8 mile stretch of the River Bandon.

Bandon is located approximately 25km and a 34-minute drive from Cork City. Cork is Ireland's second largest city and has a rich historical and archaeological heritage. Cork City Gaol is a former 19th century prison, now a museum, located in Cork City which offers guided and self-guided tours year-round. The English Market is an indoor food market

located in the city centre which has been officially trading since 1788. The market offers a mix of quality meats and fish, herbs, spices, fruit, vegetables, baked delicacies, and speciality cheeses. Fota Wildlife Park is a 100-acre wildlife park located on Fota Island, near Carrigtwohill, County Cork, Ireland and has an annual attendance of approximately 460,000 visitors. It is currently the second largest visitor attraction in Ireland outside of Leinster.

7.3.5. Travel and Commuting

Table 7.9, **Table 7.10** and **Table 7.11** show commuter information from Bandon including time of commute, duration of commute and means of transport. The total number and percentage of people is detailed in the following tables along with a further breakdown of the age groups: Population aged 15 years and over at work, Children at school aged between 5 and 12 years, Students at school or college aged between 13 and 18 years, and Students at school or college aged 19 years and over.

Most people in Bandon leave home for work, school, or college between 08:31 and 09:00 (27.73%). The second most popular time to leave home is between 08:01 and 08:30 with 17.42% of people leaving at this time followed by 11.75% of people between 07:31 and 08:00. A further 24.83% of people leave before 07:31 and 14.5% of people leave home after 09:01.

Table 7.9 Time Leaving Home in Bandon

	All persons	Percentage	Population aged 15 years and over at work	Children at school aged between 5 and 12 years	Students at school or college aged between 13 and 18 years	Students at school or college aged 19 years and over
Before 06:30	376	8.67	374	0	1	1
06:30 - 07:00	357	8.23	338	5	2	12
07:01 - 07:30	344	7.93	306	5	4	29
07:31 - 08:00	510	11.75	392	27	31	60
08:01 - 08:30	756	17.42	391	180	147	38
08:31 - 09:00	1203	27.73	412	476	273	42
09:01 - 09:30	275	6.34	144	107	9	15
After 09:30	354	8.16	326	1	2	25

	All persons	Percentage	Population aged 15 years and over at work	Children at school aged between 5 and 12 years	Students at school or college aged between 13 and 18 years	Students at school or college aged 19 years and over
Not stated	164	3.78	111	38	9	6
All departure times	4339		2794	839	478	228

A total of 43.72% of people commute for less than 15 minutes to work, school or college followed by 21.43% of people commuting between 15 and 30 minutes and 19.52% of people commuting between 30 and 45 minutes. Altogether this results in 84.67% commuting for less than 45 minutes. A total of 9.21% of people commute for longer than 45 minutes (**Table 7.10**).

Table 7.10 Duration of Travel Times In Bandon

	All persons	Percentage	Population aged 15 years and over at work	Children at school aged between 5 and 12 years	Students at school or college aged between 13 and 18 years	Students at school or college aged 19 years and over
< ¼ hour	1897	43.72	1,020	533	318	26
¼ hour - < ½ hour	930	21.43	593	202	105	30
½ hour - < ¾ hour	847	19.52	710	29	22	86
¾ hour - < 1 hour	251	5.78	198	7	7	39
1 hour - < 1½ hours	125	2.88	86	4	2	33
1½ hours and over	24	0.55	19	2	1	2
Not stated	265	6.11	168	62	23	12
Total time travelling	4,339		2,794	839	478	228

The majority of people in Bandon commute to work, school or college by *Motor car: Driver* (44.34%) followed by 23.95% of people commuting as *Motor car: Passenger*. This totals to 68.29% travelling by car either as a driver or passenger. The third most popular means of travel is *On foot* with 14.95% of people walking to work. In terms of public transport 7.45% of people travel by bus and 0.02% travel by Train, DART, or LUAS (**Table 7.11**).

Table 7.11 Means of Travel in Bandon

	All persons	Percent	Population aged 15 years and over at work	Children at school aged between 5 and 12 years	Students at school or college aged between 13 and 18 years	Students at school or college aged 19 years and over
Motor car: Driver	1957	44.34	1,871	0	15	71
Motor car: Passenger	1057	23.95	215	543	263	36
On foot	660	14.95	394	94	134	38
Bus, minibus or coach	329	7.45	51	147	54	77
Not stated	161	3.65	93	51	12	5
Van	141	3.19	139	2	0	0
Work mainly at or from home	75	1.70	74	0	0	1
Other, incl. lorry	14	0.32	13	1	0	0
Bicycle	10	0.23	8	1	0	1
Motorcycle or scooter	9	0.20	9	0	0	0
Train, DART or LUAS	1	0.02	1	0	0	0
All means of travel	4414	2,868	839	478	229	77

7.3.6. Landscape and Visual

Bandon is located on the N71 traversing County Cork and Kerry with the River Bandon flowing through the town. The predominant land use within the Bandon agglomeration is

residential, retail, and commercial. The land surrounding the town of Bandon is primarily agricultural land with forested land to the west.

7.3.7. Human Health

The Healthy Ireland Framework 2013-2025 defines health as 'everyone achieving his or her potential to enjoy complete physical, mental and social wellbeing. Healthy people contribute to the health and quality of the society in which they live, work and play'. This framework also states that health is much more than an absence of disease or disability, and that individual health, and the health of a country affects the quality of everyone's lived experience.

Health is an essential resource for everyday life, a public good and human development. A healthy population is a major asset for society and improving the health and wellbeing of the nation is a priority for Government. Healthy Ireland Framework 2013-2025 is a collective response to the challenges facing Ireland's future health and wellbeing. **Table 7.12** shows that 86.69% of people have declared themselves as having *Very Good* or *Good* health which is slightly lower than the same categories in County Cork (89.5%).

Table 7.12 Health Status in Bandon and County Cork

Health Status	Bandon No. of People	Percent	County No. of People	Percent
General health - Very good	3918	56.32	263057	63.05
General health - Good	2113	30.37	110351	26.45
General health - Fair	652	9.37	28786	6.90
General health - Bad	88	1.26	4276	1.02
General health - Very Bad	17	0.24	967	0.23
Not stated	169	2.43	9774	2.34
Total	6957		417211	

7.3.8. Social Health

According to the World Health Organisation (WHO), poor social and economic circumstances affect health throughout life. Good health involves reducing levels of educational failure, reducing insecurity and unemployment, and improving housing standards. Health is influenced, either positively or negatively, by a variety of factors. Some of these factors are genetic or biological and are relatively fixed. 'Social determinants of health' arise from the social and economic conditions in which people live. They are not so fixed such as type of housing and environments, access to health or education services, incomes generated and the type of work people do, can all influence a person's health, and the lifestyle decisions people make.

A range of factors have been identified as social determinants of health. These can include the wider socio-economic context, inequality, poverty, social exclusion, socio-economic

position, income, public policies, health services, employment, education, housing, transport, the built environment, health behaviours or lifestyles, social and community support networks and stress.

People who are less well off or who belong to socially excluded groups tend to fare badly in relation to these social determinants. Being at work on the other hand provides not only an income, but also access to social networks, a sense of identity and opportunities for development or progression.

Figure 7.3 presents the social determinants of health adapted from Dalghren and Whitehead (1991) and Grant and Barton (2006) as presented in Healthy Ireland.

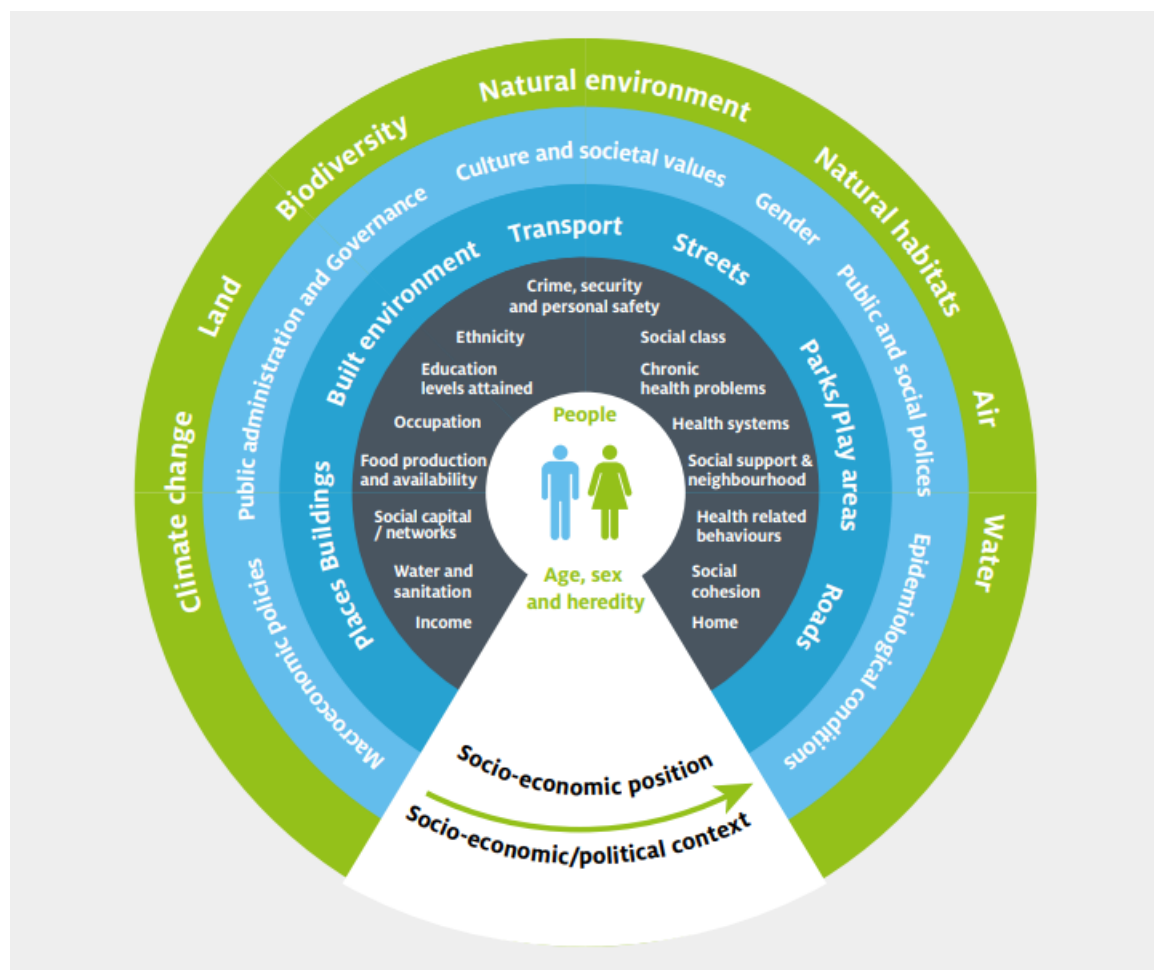


Figure 7.3 Social Determinants of Health (Healthy Ireland, DOH 2013)

Section 7.3.3 of this Chapter states that 62.28% of people in Bandon are in the labour force. This reflects the high number of people of a working profile living within the area as identified in **Table 7.5**.

The Project will allow for the continuation of employment. Approximately 1-2 no. people will remain employed for the duration of the operation of the WwTP and Pumping Stations which will have a neutral impact on the local economy and employment.

As detailed in **Table 7.12**, the majority of people in Bandon have self-identified themselves in the 2016 Census as having 'very good health' or 'good health'. The high employment levels, coupled with the self-identification of health status indicate that positive social health conditions exist.

7.3.9. Water Quality and Water-related Diseases

Water-related diseases, as defined by the Protocol on Water and Health, are “any significant adverse effects on human health, such as death, disability, illness or disorders, caused directly or indirectly by the condition, or changes in the quantity or quality, of any waters”. Consumption of contaminated water through drinking water, waste water or recreational water can cause serious human health effects.

The WHO has reviewed water-related infectious diseases in the pan-European region, which comprises 53 countries including Ireland. Diseases with the highest number of reported outbreaks are viral gastroenteritis, hepatitis A, *E. coli* diarrhoea and legionellosis. In the WHO European Region, waterborne diseases constitute a significant health burden, with approximately 18% of reported infectious disease outbreaks associated with the water exposure pathway.

Over 95% of Ireland’s drinking water can be described as “safely managed” with “Drinking-water from an improved water source that is located on premises, available when needed and free from faecal and priority chemical contamination” (WHO, 2016). The EPA has published a report titled “Drinking Water Quality In Public Supplies 2021” which found that Ireland’s drinking water was safe to drink with 99.7% of supplies complying with microbiological and chemical standards for drinking water. While water quality remains high, drinking water treatment in many supplies is still not as resilient as it needs to be to ensure the supply is safe into the future (EPA, 2022). The Bandon_100 which lies ca. 1.8km downstream of the primary discharge point is designated as a Drinking Water River in accordance with European Communities (Drinking Water) (No. 2) Regulations, 2007 (S.I No. 278 of 2007). There is a drinking water abstraction point at Innishannon located ca. 4.5 km downstream of the primary discharge point. As mentioned above, it is considered based the improved treatment processes at the WwTP resulting in an improved effluent discharge quality, along with the removal of 10 no. SWOs from the agglomeration by the end of Q1 2023, and the assimilative capacity in the receiving waters, that the overall risk of the WwTW to the Innishannon Drinking Abstraction remains as a Low Risk, even based on the WwTPs increased loadings.

7.3.10. Conclusion

- There is a high working age profile in Bandon which is reflected in the high percentage of people in the labour force (62.28%) and the lower than State average number of people who are retired (12.54%).
- Although people who are Unemployed, having lost or given up previous job make up the third largest broad industrial group in the labour force (**Table 7.7**), the number of people who are unemployed in Bandon is in line with the State average.
- The majority of people (43.72%) spend less than 15 minutes commuting to work, school or college in Bandon indicating that most people work or study in the surrounding area.
- There is a large reliance on cars as a means of travel with 68.29% of people travelling by car either as a driver or passenger. A total of 7.47% of people utilise public transport in the form of bus or rail.

- The majority of people have declared themselves as being in very good or good health (86.69%) in Bandon.

7.4. Description of Likely Significant Effects

Human Health and Safety

The existing sewer network in Bandon contains a number of SWOs which frequently discharge untreated wastewater to the River Bandon in the absence of any stormwater storage. Untreated wastewater contains bacteria and viruses that can cause infection and disease. If wastewater enters the drinking supply or contaminates surface water this can have a negative effect on the human health of the surrounding population. The Bandon Watermain & Sewer Network Project will involve the removal of a total of 10 no. SWOs and will increase the flow capacity in the sewer system. This will result in a greater volume of waste water in the agglomeration receiving treatment prior to discharge to the River Bandon in accordance with the EPA WWDL standards. This will reduce the risk of unintentional discharges to the River Bandon.

It is expected that all workers employed during the operational phase of the Project will comply with the relevant HSE guidelines and any Government protocols that will be in place at that point in time in relation to Covid-19. If all Covid-19 safety protocols and hygiene measures are adhered to it is considered that the Project poses no additional Covid-19 risk.

Based on the above information, there will be a slight, positive, long-term impact on human health. When compared with the existing baseline conditions and their effects on human health, the impact of new operational discharges on human health will be slight and positive. Potential human health risks from the discharge of untreated wastewater from overflows will be reduced as a result of the Project. The increase in the volume of wastewater receiving treatment at the Bandon WwTP will contribute to protecting the local environment and public health.

Water Quality & Population

The proposed ELVs for the primary discharge will support the appropriate water chemistry conditions and will therefore not hinder the targets of the WFD (Good Status). The removal of 10 no. SWOs as part of the Bandon Watermain & Sewer Network Project, along with the proposed ELV for Ortho-phosphate and TP, and the design and operation of the overflows, will result in a reduction in overall nutrient input into the river system. This will have a positive effect on water quality in the surrounding environment. The Project will ensure compliance with the UWWT Directive. The improvement in water quality reduces the potential for impacts from water-borne diseases and health risks (as described above). As the River Bandon is used for recreational purposes in the form of angling, the reduction in potential impacts from water-borne diseases and health risks will also apply to individuals utilising the river for angling.

The Project will contribute to strengthening the protection of the drinking water supply as the operational discharges from the Bandon agglomeration will receive secondary treatment and will have Phosphorus levels reduced to comply with the proposed ELVs.

Thus, an overall slight, positive, long-term impact is expected on the population of Bandon as a result of the improved water quality.

Socio-economic

The Project will allow for the continuation of employment as per the existing scenario. The WwTP runs automatically and is capable of being monitored remotely on a daily basis *via* the SCADA system. The WwTP is a manned site during normal working hours on Monday – Friday with 24 hours call out response where the amount of time spent on site will vary depending on various factors *e.g.*, weather or breakdowns in plant or maintenance works required such as cleaning of the intake screens *etc.* Approximately 1-2 people will continue to be employed during the operational phase having a neutral impact on the local economy and employment.

Air Quality – Odour

Odour has the potential to negatively affect the general amenity at surrounding sensitive receptors such as residential homes, hospitals, nursing homes, creches, businesses (retail/commercial), industry and schools. Potential Odour effects have been assessed in **Chapter 12** of this EIAR where it is concluded that there will be no significant odour impact as a result of the operational discharges and as such there will be no significant impact on Population and Human Health.

Noise and Vibration

Noise exposure can cause a variety of human health effects including annoyance, sleep disturbance, raised stress levels, work impacts for commercial receptors or individuals who work from home. Noise has been assessed in **Chapter 11** and this Chapter concluded that the operational discharges will not have a significant impact in relation to Noise and Vibration. As such there will be no significant impact on Human Health as a result of noise.

7.5. Mitigation Measures

All workers employed with the Project will fully comply with the relevant HSE guidelines and any Government protocols that may be in place at that point in time in relation to Covid-19.

No specific mitigation measures are required in relation to population and settlements, given the lack of direct, potentially significant effects resulting from the Bandon agglomeration operational discharges.

7.6. Residual Impacts

No negative residual impacts in the context of Population and Human Health are anticipated regarding the operational discharges from the Bandon agglomeration. The increase in the volume of waste water receiving treatment at the Bandon WwTP will result in slight, positive, long term residual impact on the Population and Human Health of the surrounding environment. The upgraded WwTP will also allow for future development to take place in the town of Bandon and depending on the nature of the development this could have a positive effect on population and human health in the form of socio-economic improvements, community amenities or residential developments to supply housing.

7.6.1. Cumulative Impacts

There are no cumulative impacts with other plans and projects predicted.

7.7. Monitoring

Section 3.5.3 of this EIAR has detailed general “*Measures to Prevent Unintended Discharge*”. The general measures below will be implemented which will subsequently act as monitoring measures to prevent significant effects on Population and Human Health.

- All flows will be monitored continuously and recorded at the electromagnetic flowmeters.
- Ensure the primary discharge is compliant with proposed/recommended ELVs; and
- Continue monitoring the effluent and receiving waters, on a consistent and regular basis in line with WWDL requirements

No specific monitoring measures are required in relation to Population and Human Health, given the lack of direct effects resulting from the operational discharges.

8. MATERIAL ASSETS

8.1. Introduction

Material Assets have been defined as '*Resources that are valued and that are intrinsic to specific places, they may be either human or natural origin and the value may arise for either economic or cultural reasons*' (EPA 2002).

This definition is further expanded by the EPA in 2022 in '*Guidelines on the information to be contained in Environmental Impact Assessment Reports*' which states;

'In Directive 2011/92/EU this factor included architectural and archaeological heritage. Directive 2014/52/EU includes those heritage aspects as components of cultural heritage. Material assets can now be taken to mean built services and infrastructure. Traffic is included because in effect traffic consumes roads infrastructure. Sealing of agricultural land and effects on mining or quarrying potential come under the factors of land and soils.'

The scope and definition of Material Assets within the context of the EIA process has been defined by the EIA Directive as including Archaeology, Architectural and Cultural Heritage. These elements are assessed separately in **Chapter 13** under Archaeology, Architectural and Cultural Heritage.

This Chapter of the EIAR, prepared by Enviroguide Consulting, provides an assessment of the potential impacts of the operational discharges on Material Assets or physical resources in the environment of human origin including built services and infrastructure comprising:

- Electricity Supply;
- Gas Supply;
- Information and Communications Technology;
- Surface Water Drainage Infrastructure;
- Water Supply and Demand;
- Wastewater Management; and
- Waste Management.

Natural resources (water, land, biodiversity, air, etc.) are addressed in their respective Chapters.

Traffic and Transport are addressed in **Chapter 9**.

In line with the EPA "*Guidelines on the information to be contained in Environmental Impact Assessment Reports*" (EPA, 2022), the terms are defined in **Section 2.5** when quantifying the quality of effects. See also **Table 2.2** in Chapter 2.

8.1.1. Statement of Authority

This Chapter was prepared by Enviroguide Principal Environmental Consultant Charlotte Lawler-Greene. Charlotte has a B.Sc. in Botany (Hons) from NUI Galway, an M.Sc. in Environmental Sciences from University of East Anglia and a Diploma in Health, Safety and Environmental Management from IT Carlow. Charlotte has 17 years professional experience as an Environmental Consultant and Compliance Specialist.

8.2. Methodology

The methodology adopted for the assessment takes cognisance of the following relevant guidelines:

- EPA (2022) Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR);
- EPA (2003) Advice Notes on Current Practice in the preparation of Environmental Impact Statements; and
- EPA (2002) Guidelines on the information to be contained in Environmental Impact Statements.

The scope of work undertaken for the assessment included a desk-based study of material assets. Built services and infrastructure associated with the existing development and the Project were considered in the assessment of potential impacts on material assets.

Information on built assets in the vicinity of the Bandon agglomeration was assembled by the following means:

- A desktop review of ESB Networks Utility Maps, IW Utility Plans, Gas Networks Ireland Service plans, EIR E-Maps; and
- Planning documents including EIA Screening, NIS, and Engineering Reports.

Assessment of the likely impact of features of the Project, including surface water runoff, foul water discharge and water usage was carried out in accordance with the following guidelines:

- IS EN752, "*Drain and Sewer Systems Outside Buildings*".

8.2.1. Prediction and Assessment of Impacts

In line with the EPA "*Guidelines on the information to be contained in Environmental Impact Assessment Reports*" (EPA, 2022), the terms are defined when quantifying the quality of effects. Impacts will vary from negative to neutral or positive and will vary in significance on the receiving environment. The significance of effects has been determined based on the severity of potential disturbance to existing material assets. Where significant potential impacts are identified, mitigation measures are proposed to minimise impacts.

8.3. Receiving Environment

8.3.1. Land-use and Local Settlement

As described in **Chapter 7**, the Project is located in the Bandon Electoral Division (ED) with some parts of the red line boundary extending into the Kilbrogan and Ballymodan EDs, all of which are located in the Bandon Kinsale Local Electoral Area (LEA) (refer to **Figure 7.1**). For the purpose of this Chapter the town of Bandon has been selected as the study area.

Bandon is a town in the west of County Cork and is located approximately a 25km and a 34-minute drive from Cork City. The town is located on the N71 which connects Bandon to Cork Airport, which is located 26km northeast.

The predominant land use within the Bandon agglomeration is residential, retail, and commercial. The land surrounding the town of Bandon is primarily agricultural land with forested land to the west (refer **Figure 1.1** in **Chapter 1**).

8.3.2. Land-use History

Bandon was initially populated by English and Scottish settlers. Parts of the original town wall remain, and the ruins of a 15th-century castle are nearby.

As 2022 population data for towns is not available, the most recent population data for Bandon is from the 2016 Census which recorded the town's population at 6,957. Historical mapping and aerial photography available from the Ordnance Survey of Ireland website (OSI, 2020) were reviewed and key observations of the study area are summarised in **Table 8.1** below.

Table 8.1 Historical Land Use

Date	Information Source	Site Description
1837-1872	OSI map 6 Inch First Edition Black & White	Bandon Town was a leading industrial centre with numerous businesses operating in the town including, Union Workhouse, Hospital, Army Barracks, Convent, Parochial School, Gas Works, Brewery, Distillery and Flour Mill. The River Bandon is located north of Main Street South and runs through the centre of the town. A historic quarry is located north of the town, and two historic quarries are also located just west of the town.
1829-1842	OSI map 6 Inch Colour	No significant changes.
1830-1930	OSI Cassini 6inch	Town limits extended and more infrastructure mapped including the Railway line and Station to the east. The Bandon Corn Mill is now listed as disused. The two quarries to the west and one quarry to the north are now listed as disused. Land to the west of the town directly north and south of the River Bandon has been listed as 'Liable to Flood'. Disused quarry to the north.
1888-1913	OSI map 25inch	No significant changes.
1995	Aerial photography	Bandon WwTP is developed and located to the east of the town on the banks of the River Bandon.

Date	Information Source	Site Description
		<p>An industrial area is developed to the north of the River Bandon (Kilbrogan area) and a further industrial area is developed south of the town (Clogheenavodig area).</p> <p>Residential development started to the west of the town.</p>
1999 - 2003	Aerial photography	No significant changes. Further residential development and town expansion on the outer fringes of the town.
2004-2006	OSI Aerial photography	No significant changes. Further residential development and town expansion on the outer fringes of the town.
2005-2011	OSI Aerial photography	No significant changes. Further infill development and peripheral expansion of the town limits.
2011-2013	Digital Globe	No significant changes. Further infill development and peripheral expansion of the town limits.
2013-2018	MapGenie Imagery	No significant changes. Further infill development and peripheral expansion of the town limits.
2022	<p>Google Maps Photography</p> <p><i>Imagery©2022 Google, Imagery©2022 CNES/Airbus, Maxar Technologies, Map Data ©2022</i></p>	No significant changes. Further infill development and peripheral expansion of the town limits.

8.3.3. Electricity Supply

Electricity to the town is mainly supplied by overhead lines and underground infrastructure and is serviced by the Bandon 110kV Substation which is situated nearby to Castlenalact Lake and Roche's Wood. The existing WwTP is powered by underground lines. EirGrid is responsible for operating and planning development of the transmission system and operating the transmission grid in County Cork. A new ESB substation was constructed at the Glasslinn Road Pumping Station as part of the upgrade works but is not being assessed as part of this EIAR. This was to accommodate the estimated increase in energy consumption required (80KVA to approximately 600KVA).

8.3.4. Gas

Gas Networks Ireland has been developing the gas network since 1978. The distribution and transmission network of gas pipeline consists of over 14,617km and links the UK and European gas markets to Ireland through two Interconnector pipelines with Scotland. Natural gas accounts for 30% of Ireland's primary energy requirements (Gas networks Ireland, 2022).

Bandon Town is serviced by piped Gas from Interconnector 1 (IC1) *via* Cork. IC1 is a gas pipeline running between Moffat, Scotland and Loughshinny, Ireland. There are no gas pipelines in the vicinity of operational discharges.

8.3.5. Information and Communications Technology (ICT)

No overhead telecommunication cables were observed during an aerial imagery assessment that service the WwTP. It is therefore assumed that any ICT cables are connected to the site underground. There are no other ICT cables of relevance to the operational discharges.

8.3.6. Water Supply

Water supply for Bandon Town is provided by the IW Baxter's Bridge Water Treatment Plant located approximately 5km west of the town which is sourced from the River Bandon. The supply undergoes full treatment prior to distribution.

8.3.7. Storm Water Drainage

The Bandon Watermain and Sewer Network Project is due to be completed at the end of Q1 2023 and will help increase flow capacity in the system, reduce sewage discharges to the River Bandon and help alleviate sewer flooding currently being experienced in the town. As this project relates to the potential effects to the environment of the operational discharges of the Bandon WwTP, the detailed aspects of the stormwater network upgrades are provided in **Chapter 3**.

8.3.8. Foul Water Drainage

As this project relates to the potential effects to the environment of the operational discharges from the Bandon WwTP, the aspects of the WwTP and network upgrades are provided in **Chapter 3**.

8.3.9. Waste Management

The subject matter of this EIAR relates to operational discharges and therefore has no solid waste management requirements.

8.4. Description of Likely Significant Effects

This section assesses the impact of the Project on the material assets of the area.

8.4.1. Operational Discharges

8.4.1.1. Settlement

As the principal infrastructure is already in place within the Study area of Bandon Town and have been consented under planning (An Bord Pleanála Ref: PL 04.247978 / Cork County Council Ref: 174106) or classed as exempt development, the Project will have no potential effects on the Land-use Zoning objectives for the area. There will be a 'permanent major positive' impact on local settlement as a result of the Project due to the improved treatment processes at the WwTP, servicing the needs of the Town and environs whilst minimising potential significant effects on the receiving surface water environment (the River Bandon). Refer to **Chapter 5 Biodiversity** and **Chapter 6 Water**.

No protected views, rights of way or planned pieces of strategic infrastructure or any important tourist sites will be affected by the Project. Overall, it is considered that there will be no significant negative long-term impacts on the built services and infrastructure as a result of the Project.

8.4.1.2. Storm Water Drainage

The upgrades approved in the Bandon Watermain and Sewer Network Upgrade and the Bandon Sewerage Scheme projects were designed to meet objectives within IW's Water Services Strategic Project to target capital investment that will progressively achieve compliance with the UWWT Directive and the WFD. While 10 no. SWOs in the agglomeration will be decommissioned, under the Bandon Watermain and Sewer Network Upgrade, there will be 8 no. SWOs (SW002, SW004, SW008, SW014, SW016 and SW017 SW018 and SW020) to the receiving water *i.e.*, River Bandon. Diluted, settled, and screened effluent that is discharged during storm conditions, will enter the river which will itself have increased flows driven by sustained rainfall. In this context, the discharges *via* the overflows to the large River Bandon channel will be diluted and dispersed effectively.

8.4.1.3. Foul Water Management

The upgraded Bandon WwTP has a design capacity of 14,456 p.e. and therefore has adequate capacity to treat the current load of 9,744 p.e (AER, 2021). The civil and structural works also allow for the upgrade of the capacity of the plant to the 30-year design horizon of 18,111 p.e. This will have a permanent major positive effect on foul water management for Bandon Town and provide additional treatment capacity to support the expansion of the town in the future.

8.4.1.4. Water Supply

It is not anticipated that the operational discharges will have any significant effects on water supply for Bandon Town.

8.4.1.5. Power

It is not anticipated that the operational discharges will have any significant effects on the power supply of Bandon Town.

8.4.1.6. *ICT*

There will be no effects on Information and Communications Technology from the operational discharges.

8.4.1.7. *Waste Management*

It is not anticipated that operational discharges will have any significant effects on solid waste management as there is no construction phase associated with the Project. As described in detail in **Chapter 3**, the subject matter of this EIAR only relates to operational discharges.

8.5. Mitigation Measures

There are no specific mitigation measures in relation to Material Assets required.

8.6. Residual Impacts

Compliance with the EPA WWDL requirements and the intrinsic design measures to prevent unintended discharges and compliance with the proposed ELVs will ensure that there will be no significant adverse residual impacts associated with the Project in relation to material assets.

A permanent major residual positive impact on foul water management for Bandon Town and its future growth remains.

8.6.1. Cumulative Impacts

There are no cumulative impacts with other projects or plans predicted.

8.7. Monitoring

No specific monitoring measures are required in relation to Material Assets, given the lack of direct effects resulting from the operational discharges.

Section 3.5.3 of this EIAR has detailed general "*Measures to Prevent Unintended Discharge*". The general measures below will be implemented which will subsequently act as monitoring measures to prevent significant effects on Material Assets.

- All flows will be monitored continuously and recorded at the electromagnetic flowmeters.
- Ensure the primary discharge is compliant with proposed ELVs; and
- Continue monitoring the effluent and receiving waters, on a consistent and regular basis in line with WWDL requirements

9. TRAFFIC & TRANSPORT

9.1. Introduction

This Chapter of the EIAR, prepared by Nicholas O'Dwyer Ltd, is concerned with the likely significant effects of the Bandon agglomeration operational discharges on Traffic and Transportation.

Given that the subject matter of this EIAR involves operational discharges only, which in themselves do not generate any traffic, a detailed traffic and transport assessment has been scoped out. As a result, no traffic counts were required to inform this assessment.

This Chapter presents the existing road network and access arrangements at the Bandon WwTP and the Glasslinn Road, Watergate Street, Laragh, Castlewoods, and Kilbrogan Pumping Stations.

9.1.1. Statement of Authority

This Traffic and Transport Chapter has been prepared by Graham Young. Graham is a Senior Engineer of the civil and structural consultancy, Nicholas O'Dwyer Ltd. His areas of professional expertise are in pipeline and roads civil works design, including traffic and Transport Impact Assessment and mitigation design. Graham Young has over 23 years of civil consultancy experience. Graham is a Chartered member of Engineers Ireland, with a bachelor's degree in Engineering (Civil, Structural and Environmental), and a postgraduate Diploma in Project Management. Graham has attended the National Roads Authority (NRA) three-day Road Safety Audit course.

9.2. Receiving Environment

Bandon is a town in the west of County Cork and is *ca.* 25km and a *ca.* 34-minute drive from Cork City, on the N71.

The Bandon WwTP is located at NGR 150425E, 055700N to the east of the town on the banks of the River Bandon and is accessed *via* the Cork road.

The Watergate Pumping Station is located at NGR 149316E, 055104N and is access *via* the L2041, Watergate Street.

Laragh Pumping Station is located at NGR 145152E, 054669N, in the Bandon IDA Business Park, which is off the R586 road.

The Glasslinn Road Pumping Station is located at NGR 150070E, 055290N, accessed *via* Glasslinn Road.

The Castlewoods Pumping Station is located at NGR 147728E, 053895N, in the Castlewoods housing estate which is located off of the N71.

The Kilbrogan Pumping Station is located at NGR 148713E, 055612N, accessed *via* Kilbrogan Street.

The WwTP runs automatically and are capable of being monitored on a daily basis *via* the SCADA system. As per the current situation, the proposed upgraded WwTP will be a manned site during normal working hours on Monday – Friday with 24 hours call out response where the amount of time spent on site will vary depending on various factors *e.g.*, weather or breakdowns in plant or maintenance works required such as cleaning of

the intake screens, etc. In general, there are 1-2 people on site during normal operation of the plant. There is also a maintenance team on site for roughly one week a month to carry out any repairs or any other scheduled larger maintenance that may be required.

Figure 9.1 to **Figure 9.5** illustrates vehicular access to the Bandon WwTP site, Watergate Street, Glasslinn Road, Laragh, Castlewoods and Kilbrogan Pumping Stations.

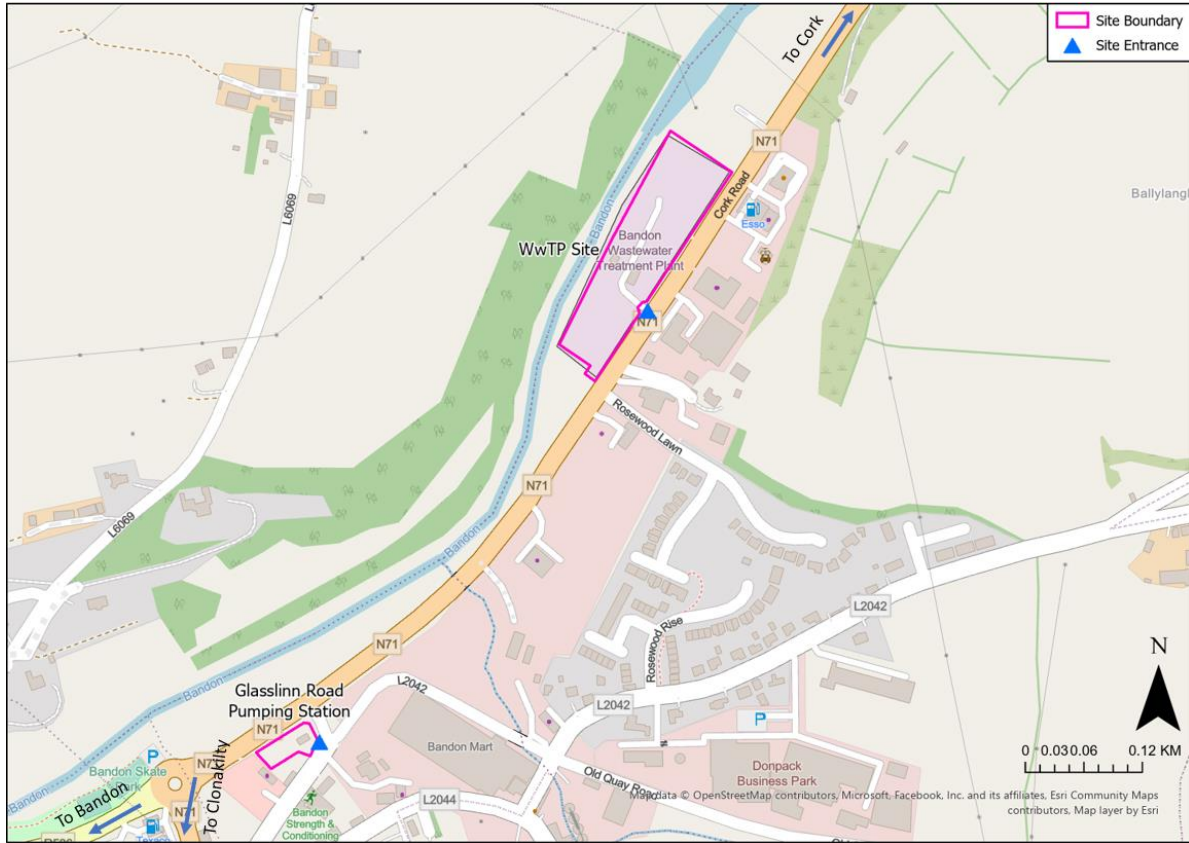


Figure 9.1 Access Arrangements to the Bandon WwTP and Glasslinn Road Pumping Station

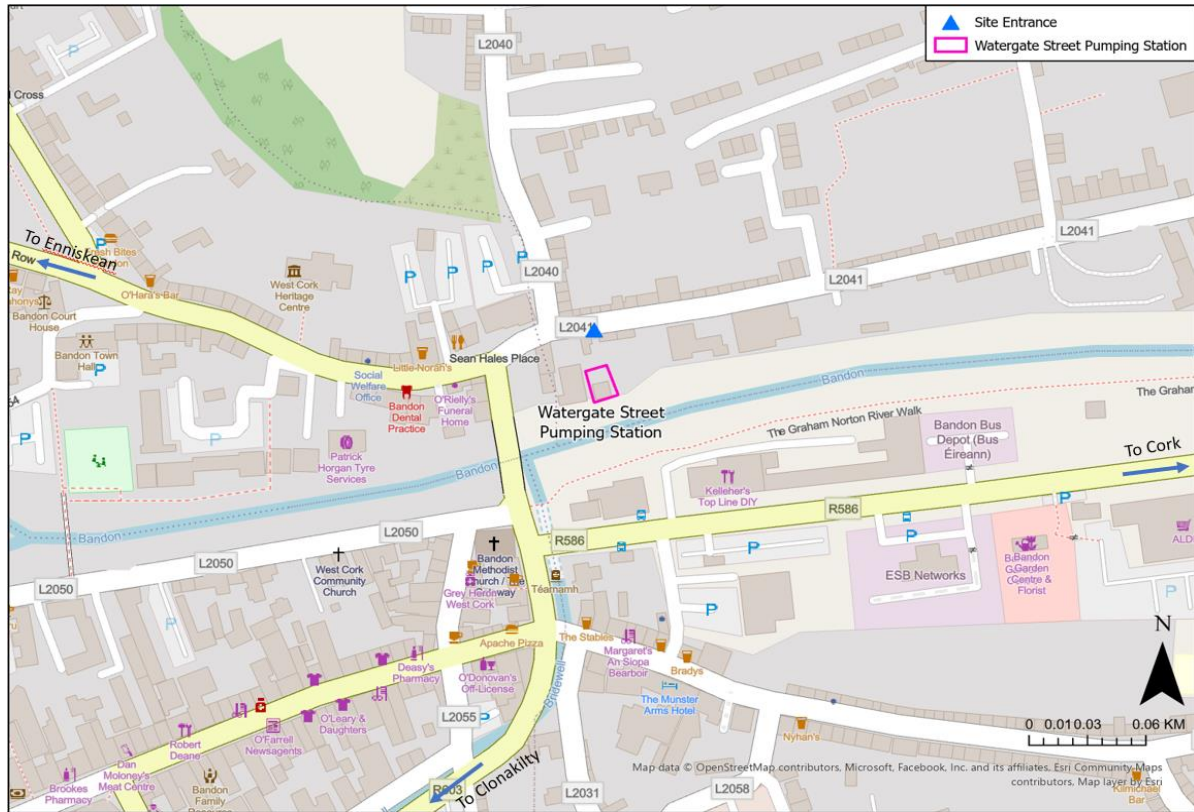


Figure 9.2 Access Arrangements to the Watergate Street Pumping Station



Figure 9.3 Access Arrangements to the Laragh Pumping Station

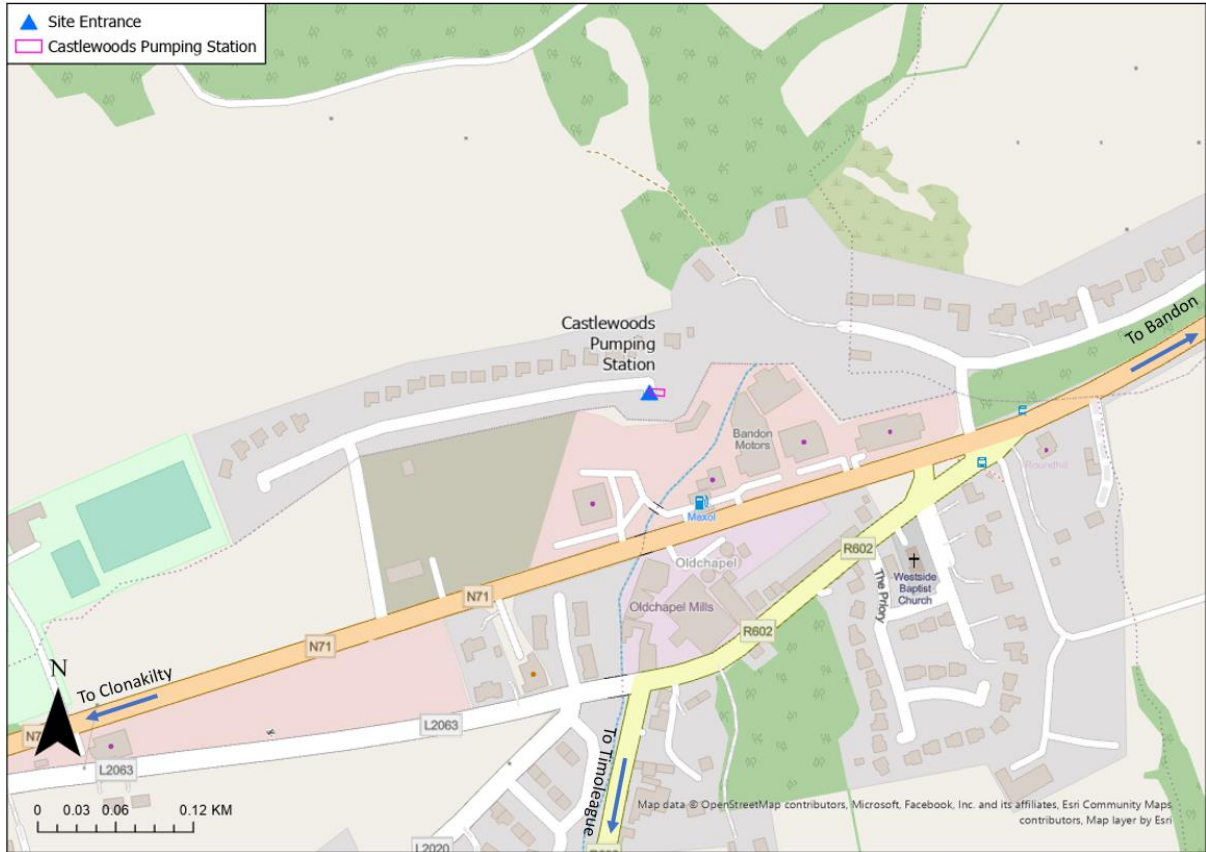


Figure 9.4 Access Arrangements to the Castlewoods Pumping Station

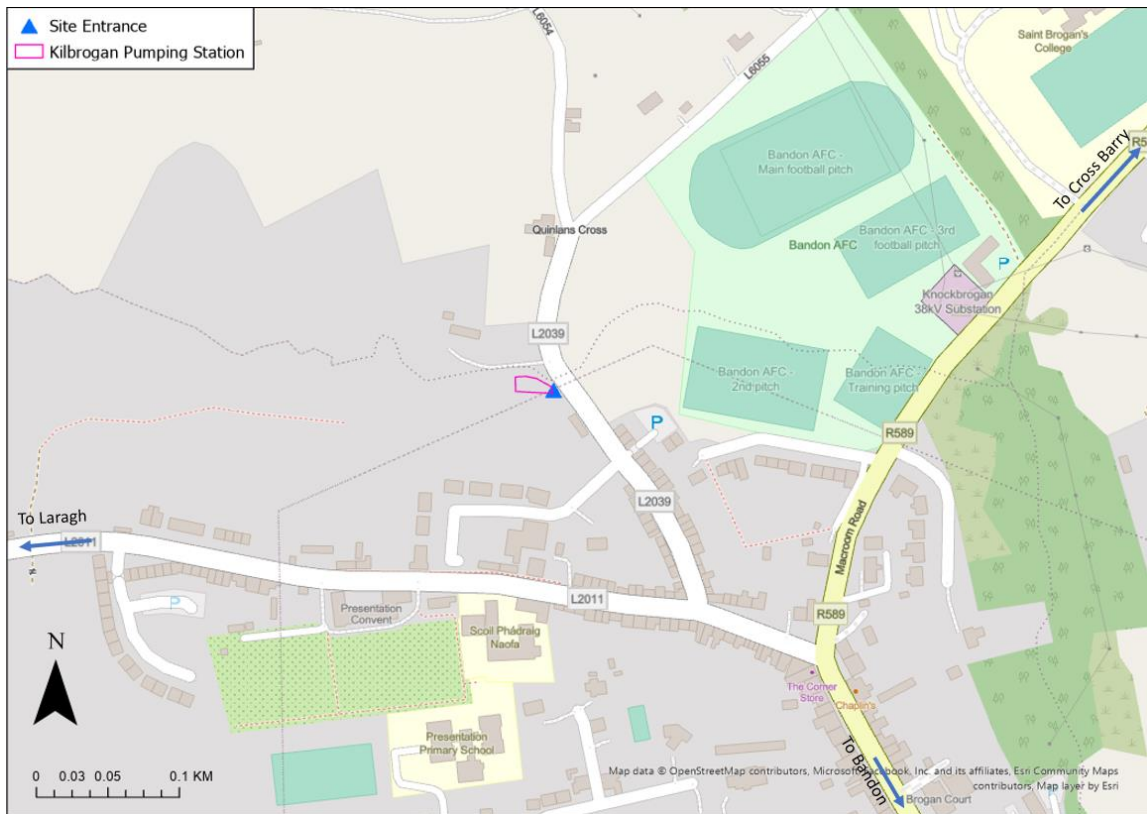


Figure 9.5 Access Arrangements to the Kilbrogan Street Pumping Station

9.3. Description of Likely Significant Effects

Given that the Bandon WwTP and Pumping Stations are already in operation, there will be no significant change to traffic movements on the existing network or to the existing access arrangements during their operation. The operational discharges in themselves do not generate any traffic movements. Therefore, there are no potential negative significant effects on the transport network and traffic.

9.4. Mitigation Measures

In the absence of potential negative significant effects on the transport network and traffic itself, there is no scope for mitigation.

9.5. Residual Impacts

There are no residual impacts predicted.

9.5.1. Cumulative Impacts

There are no cumulative impacts with other projects or plans predicted.

9.6. Monitoring

No specific monitoring measures are required in relation to traffic and transport, given the lack of direct effects resulting from the operational discharges.

9.7. Conclusion

Due to the nature of the operational discharges, significant impacts to Traffic and Transport are not envisaged.

10. AIR QUALITY & CLIMATE

10.1. Introduction

This Chapter of the EIAR, prepared by AWN Consulting Ltd., is concerned with the potential impact of the Bandon agglomeration operational discharges on Air Quality and Climate. This includes a description of the assessment criteria, a brief overview of the existing environment and an assessment of potential impacts.

10.1.1. Statement of Authority

This assessment was completed by Ciara Nolan, a Senior Environmental Consultant in the air quality section of AWN Consulting Ltd. She holds an MSc. (First Class) in Environmental Science from University College Dublin and has also completed a BSc. in Energy Systems Engineering. She is an Associate Member of both the Institute of Air Quality Management (AMIAQM) and the Institution of Environmental Science (AMIEEnvSc). She has over 5 years of experience working in environmental consultancy focussing on air quality. She has prepared air quality and climate impact assessments for a range of projects including commercial, residential, industrial, pharmaceutical and data centre developments.

10.2. Assessment Criteria

10.2.1. Air Quality

Impacts to air quality are assessed against compliance with the Ambient Air Quality Standards Regulations 2011 (S.I. no. 180 of 2011). This incorporates EU directive 2008/50/EC which outlines ambient air quality limit values for a range of pollutants including nitrogen dioxide, particulate matter, lead, sulphur dioxide, benzene, and carbon monoxide. Impacts are assessed against compliance with the relevant limit values. Where non-compliance is determined significant impacts to air quality, and subsequently human health, can occur. Any potential impacts are typically mitigated to ensure that compliance with the relevant limit values is maintained and that residual impacts are non-significant.

10.2.2. Climate

Ireland has annual greenhouse gas (GHG) emission targets which are set at an EU level and need to be complied with in order to reduce the impact of climate change. Impacts to climate as a result of GHG emissions are assessed against the targets set out by the EU under *Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013*, which has set a target of 30% reduction in non-emissions trading scheme (ETS) sector GHG emissions by 2030 relative to 2005 levels. The 2021 Climate Action Plan details the required governance arrangements for implementation including carbon-proofing of policies and the establishment of carbon budgets which allow for sectorial assessment criteria. The sectorial emission ceilings for 2030 were published in July 2022.

10.3. Receiving Environment

10.3.1. Air Quality

Ireland has been divided into four air quality zones for air quality management and assessment purposes. Dublin City and its environs are defined as Zone A, Cork City and environs are defined as Zone B, Zone C comprises 23 towns with a population greater than 15,000 and Zone D comprises the remainder of Ireland. Bandon and the area of the operational discharges fall within Zone D.

Data from EPA monitoring reports¹⁴ over the past number of years indicates that there is generally a good level of air quality in Zone D locations, with monitored pollutant concentrations in compliance with the Ambient Air Quality Standards Regulations 2011 limit values. The EPA note that road transport emissions are contributing to increased levels of NO₂ with the potential for breaches in the annual NO₂ limit value in future years at locations within urban centres and roadside locations. In addition, burning of solid fuels for home heating is contributing to increased levels of particulate matter (PM₁₀ and PM_{2.5}).

10.3.2. Climate

The EPA has stated that in 2021, the GHG emissions for Ireland that are covered under the Effort Sharing Regulation (ESR, EU 2018/842) were 46.19 Mt CO₂eq which is 2.71 Mt CO₂eq more than the annual limit for 2021¹⁵. EPA projections indicate that Ireland can achieve compliance under the ESR over the 2021-2030 period provided there is full implementation of the 2021 Climate Action Plan¹⁶. The EPA projections indicate that implementation of all climate plans and policies, plus further new measures, are needed for Ireland to meet the 51 per cent emissions reduction target and put the country on track for climate neutrality by 2050.

10.4. Description of Likely Significant Effects

10.4.1. Air Quality

The Project involves a number of discharges to waterbodies in the form of a primary discharge (SW001), 5 no. Dual Function Overflows (SW002, SW004, SW016, SW017 and SW020), 1 no. EO (SW019), and 3 no. networks SWOs (SW008, SW014 and SW018). As explained, Dual Function Overflows can act as a SWO and an EO depending on the circumstances. Due to the nature of the operational discharges, there are no air quality emissions to atmosphere associated with the Project. Therefore, there is no predicted impact to air quality as a result of the operational discharges under normal operations.

The development will allow for an EO from the WwTP (SW002). Provision for a permanent back-up generator ensures power to the WwTP in the event of an interruption in the power supply to the site. Similar there is the provision for a standby power supply at Glasslinn Road Pumping Station (SW016). A connection for a generator is also available at the Castlewoods Pumping Station (SW019) and Kilbrogan Pumping Station (SW020). There will be some emissions to atmosphere in relation to the back-up generators in the form of

¹⁴ Environmental Protection Agency (2021) Air Quality in Ireland 2020 (& previous annual reports)

¹⁵ Environmental Protection Agency (2022) Ireland's Provisional Greenhouse Gas Emissions 1990 – 2021

¹⁶ Environmental Protection Agency (2022) GHG Emissions Projections Report - Ireland's Greenhouse Gas Emissions Projections 2021 - 2040

NO₂, PM and CO emissions. However, emissions from the generators will have an imperceptible impact on local air quality due to the small number required (1 no. at each of the aforementioned Pumping Stations) and they will only be required for use during emergency events, which will be a very rare occurrence.

It can be concluded that the Project will have an imperceptible impact on Air Quality.

10.4.2. Climate

As stated above, the Project involves a number of operational discharges to the aquatic environment. There will be no GHG emissions associated with the operation of the development due to the nature of the development. Therefore, there is no predicted impact to climate as a result of the Project during normal operations.

Emissions of CO₂ from the permanent back-up generators associated the WwTP and Glasslinn Road Pumping Station are not predicted to have any significant impact to climate. Similarly, emissions of CO₂ from the generators which may be connected at the Castlewoods Pumping Station and Kilbrogan Pumping Station are not predicted to have any significant impact to climate. These generators will be required for use in emergency events only, when there is an interruption to the power supply for the site, which will be a very rare occurrence. Therefore, CO₂ emissions when compared to emissions targets will be imperceptible.

10.5. Mitigation Measures

In the absence of potential negative significant effects, no mitigation is required.

10.6. Residual Impacts

There are no residual impacts predicted.

10.6.1. Cumulative Impacts

There are no cumulative impacts with other projects or plans predicted.

10.7. Monitoring

No specific monitoring measures are required, given the lack of direct effects resulting from the operational discharges.

10.8. Conclusion

Due to their nature, no significant Air Quality and Climate impacts are predicted from the operational discharges.

11. NOISE & VIBRATION

11.1. Introduction

This Chapter of the EIAR, prepared by AONA Environmental Consulting Ltd., is concerned with the potential impact of the Bandon agglomeration operational discharges on Noise & Vibration.

This includes a brief overview of the proximity of the nearest residential properties to the operational discharges and an assessment of potential noise impacts. There are no construction works proposed as part of the development as it is existing infrastructure or already permitted.

11.1.1. Statement of Authority

This assessment has been prepared by Mervyn Keegan. Mervyn Keegan is a Director of the environmental consultancy, AONA Environmental Consulting Ltd. Mervyn Keegan's areas of professional expertise are in Noise Control & Acoustics and Air Quality & Odour consultancy, including Air Quality & Climate impact assessment and mitigation design. Mervyn Keegan has over 23 years of environmental consultancy experience. Mervyn is a full member of the Institute of Acoustics, the Institute of Air Quality Management and the Institute of Environmental Sciences, with a Bachelor of Science Degree (Applied Sciences), a Master of Science Degree (Environmental Science) and a Diploma in Acoustics in Noise Control. AONA Environmental Consulting Ltd. is an independent consultancy specialising in Environmental Impact Assessment and Licensing. Mervyn Keegan has prepared in excess of 50 Noise & Vibration and Air Quality & Climate impact assessments per annum for a range of developments in the Republic of Ireland, Northern Ireland and the UK in the last 15 years and is an expert in the awareness and understanding of the relevant legislation and guidance that pertains to best practise in such assessments. Mervyn Keegan has appeared as an Expert Witness at oral hearings, public inquiries and legal hearings. Mervyn Keegan has produced Noise, Air Quality & Odour Impact Assessment reports to assess the impacts of a range of development types including roads, residential developments, industrial developments, quarries and mines and wind energy developments among others.

11.2. Receiving Environment

The proximity of the nearest residential properties to the operational discharges which are the subject matter of the EIAR are listed in **Table 11.1** below.

Table 11.1 Proximity of The Nearest Residential Properties to The Operational Discharges Relating to The Bandon WWDA review

Discharge Name	Type	Asset	Discharge Location (NGR)	Proximity to the nearest residential property
SW001	Primary Discharge	WwTP	150411E, 055785N	~290m
SW002	Dual Function Overflow (SWO & EO)	WwTP	150368E, 055690N	~270m
SW004	Dual Function Overflow (SWO & EO) Watergate Street Pumping Station	Watergate Street Pumping Station	149316E, 055104N	~38m
SW008	Storm Water Overflow	Network	149738E, 055164N	~85m
SW014	Storm Water Overflow	Network	148826E, 054484N	~35m
SW016	Dual Function Overflow (SWO & EO)	New Glasslinn Road Pumping Station	150070E, 055290N	~85m
SW017	Dual Function Overflow (SWO & EO)	Laragh Pumping Station	145152E 054669N	~520m
SW018	Storm Water Overflow	Network	149039E, 054717N	~30m
SW019	Emergency Overflow	Castlewoods Pumping Station	147749E, 53889N	~40m
SW020	Dual Function Overflow (SWO & EO)	Kilbrogan Pumping Station	148713E, 055617N	~55m

11.3. Description of Likely Significant Effects

No mechanical plant will be required to operate the operational discharge points. Therefore, the operational discharges will be completely inaudible at both the nearest noise sensitive locations and the nearest public amenity area or walkway, other than the sound of the flow of the primary effluent/stormwater, which is akin to the sound of the existing flows in the Bandon River. Therefore, the potential noise and vibration impact from the operational discharges will be negligible.

Noise emissions from back-up generators are not predicted to have any significant noise impacts. The generators will be required to be used in emergency events only, when there is an interruption to the power supply for the WwTP, Glasslinn Road Pumping Station, Castlewoods Pumping Station, or Kilbrogan Pumping Station, which will be a very rare occurrence. If the generators were required to provide power supply, their use would be expected to last a maximum of a few hours. The impact is therefore considered to be negligible.

Otherwise, occasional noise impacts that may arise from the operational discharges will be limited to works associated with maintenance of the outfalls which may include occasional operation of plant and equipment to remove trapped detritus from the discharge point pipework. It is expected that whilst such maintenance works may generate short-

term periods with audible noise levels in the surrounding proximity, it would be expected that these works would last a maximum of a few hours and may only occur once or twice a year during the daytime period. The impact of these activities is therefore considered to be negligible.

Future and / or on-going noise monitoring is not deemed necessary.

11.4. Mitigation Measures

In the absence of potential negative significant effects, no mitigation is required.

11.5. Residual Impacts

There are no residual impacts predicted.

11.5.1. Cumulative Impacts

There are no cumulative impacts with other projects or plans predicted.

11.6. Monitoring

No specific monitoring measures are required, given the lack of direct effects resulting from the operational discharges.

11.7. Conclusion

Due to their nature, no significant Noise and Vibration impacts are predicted from the operational discharges.

12. ODOUR

12.1. Introduction

This Chapter of the EIAR, prepared by AWN Consulting Ltd, is concerned with the potential impact of the Bandon agglomeration operational discharges on Odour. This includes a description of the assessment criteria used and an assessment of potential impacts.

12.1.1. Statement of Authority

This assessment was completed by Ciara Nolan, a Senior Environmental Consultant in the air quality section of AWN Consulting Ltd. She holds an MSc. (First Class) in Environmental Science from University College Dublin and has also completed a BSc. in Energy Systems Engineering. She is an Associate Member of both the Institute of Air Quality Management (AMIAQM) and the Institution of Environmental Science (AMIEEnvSc). She has over 5 years of experience working in environmental consultancy focussing on air quality. She has prepared air quality (including odour) and climate impact assessments for a range of projects including commercial, residential, industrial, pharmaceutical and data centre developments.

12.2. Assessment Criteria

The impact to nearby receptors as a result of potential odorous releases depends on the intensity of the odour and the length of time the population may perceive the odour. The EPA has issued guidance in relation to odour assessments entitled "*Odour Emissions Guidance Note (AG9)*"¹⁷. This guidance recommends that odour standards should vary from 1.5 – 6.0 OU_E/m³ as a 98th %ile of one hour averaging periods at the worst-case sensitive receptor based on the offensiveness of the odour and with adjustments for local factors such as population density. WwTP processes fall into the "*Most Offensive*" category which has an odour threshold of 1.5 OU_E/m³ as a 98th %ile of one hour averaging periods at the worst-case sensitive receptor. This odour threshold can be applied to the discharge locations as a conservative approach. However, as the water will be treated prior to discharge it is unlikely to be particularly odorous.

12.3. Receiving Environment

There are a number of sensitive residential properties within 500m of the discharge locations; primarily within Bandon Town in relation to SW001, SW002, SW004, SW016, SW018 and SW020, along Watergate Street in relation to SW008, along the N71 in relation to SW014 and SW019 and along the R586 in relation to SW017 (refer to **Table 11.1** in **Chapter 11**).

12.4. Description of Likely Significant Effects

It is not predicted that there will be odorous emissions associated with these discharges. The primary discharge SW001 will be treated prior to release thereby minimising the potential for odour.

¹⁷ Environmental Protection Agency (2019) *Odour Emissions Guidance Note (AG9)*

When the water discharges *via* the SWOs a highly diluted screened effluent is discharged. It is not possible to fully retain all stormwater due to septicity that arises with storage and the inability of treatment plant biological processes to cater for large volumes of dilute wastewater. Diluted, settled, and screened effluent which could be discharged during storm conditions, will have increased flows driven by sustained rainfall. In this context, the discharges *via* SWOs will be highly diluted and will not be odorous. Any odours associated with the Project will be imperceptible.

In relation to EOs, in the unlikely event where they occur, they will be short (few hours) in duration. Odours associated with emergency discharges will be imperceptible.

12.5. Mitigation Measures

In the absence of potential negative significant effects, no mitigation is required.

12.6. Residual Impacts

There are no residual impacts predicted.

12.6.1. Cumulative Impacts

There are no cumulative impacts with other projects or plans predicted.

12.7. Monitoring

No specific monitoring measures are required, given the lack of direct effects resulting from the operational discharges.

12.8. Conclusion

Due to their nature, no significant Odour impacts are predicted from the operational discharges.

13. ARCHAEOLOGY, ARCHITECTURAL & CULTURAL HERITAGE

13.1. Introduction

This Chapter of the EIAR, prepared by Courtney Deery Archaeological Consultants, is concerned with the likely significant effects of the Bandon agglomeration operational discharges on Archaeology, Architectural & Cultural Heritage.

This Chapter includes a description of the assessment criteria, a brief overview of the existing environment, and an assessment of potential impacts.

13.1.1. Statement of Authority

This Chapter was prepared by Lisa Courtney. Lisa is a director of Courtney Deery Heritage Consultancy and has over 25 years of field and research experience in environmental impact assessment reporting. Lisa holds a BA (Hons) in Archaeology and Economics and a Msc (Ag) in Environmental Resource Management from University College Dublin and has obtained certificates from the University of Oxford in Condition Surveys of Historic Buildings (2017) and the assessment of setting of heritage assets (2013). Lisa holds a higher diploma in Planning and Environmental Law (2020). Lisa is a member of the Institute of Archaeologists of Ireland (IAI) and a member of the International Council of Monuments and Places (ICOMOS). Lisa has carried out reports for large-scale infrastructural projects and conservation initiatives, her experience demonstrates a capability of characterising the existing historic and archaeological environment and evaluating its significance.

13.2. Assessment Criteria

Cultural heritage sites are considered to be a non-renewable resource and cultural heritage material assets are generally considered to be location sensitive. In this context, any change to their environment, such as construction activity and ground disturbance works, could affect these sites. The likely significance of all effects is determined in consideration of the magnitude of the effects and the baseline rating of the cultural heritage asset (*i.e.*, its sensitivity or value). Having assessed the magnitude of effect with respect to the sensitivity/value of the asset, the overall significance of the effect is then classified as imperceptible, slight, moderate, significant, or profound.

This assessment relates to operational discharges only, and therefore there are no construction activities and / or ground disturbance works to consider.

13.3. Receiving Environment

The walled historic town of Bandon developed in the 17th century under the patronage of Richard Boyle, Earl of Cork. It is a recorded monument (CO110-019014-) and the town defences, sections of the town wall, are considered to be of national importance and recognised collectively as a national monument.

Only a short stretch of the town wall remains on the northern side of the River Bandon, this is located to the rear of a house on the east side of North Main Street and there is possible evidence of the wall in the core of the northern boundary wall to the graveyard at Christ Church.

South of the river there are more extensive remains, located between St Patrick's Hill and Casement Road and along the east side of Church Street. The best-preserved sections of the town wall are as it approaches the river to the north, running due south from the riverbank for 18m and then for a further 70m in a southwest direction, the wall itself is low at approximately 1m in height. No other defensive structures such as town gates are visible within the town.

The character of the town today is largely 19th century and apart from Christ Church, no building of a 17th-century date survives. However, internal elements of 17th-century structures have been revealed through renovation works such as at No. 83 North Main Street. Here it was found that the building incorporated a structural oak frame, and its construction is consistent with an early 17th-century date (RMP CO110-110). A substantial masonry stack (a possible chimney) was located at the ground and first floor levels and a basement undercroft are among several other early features which were detected. These findings would suggest that the earlier historic fabric is concealed beneath more recent façades in the town and there are indeed earlier structures incorporated into the buildings which now line Main Street.

As part of the Bandon Flood Relief Scheme (2016-2019) a number of licences and Ministerial Consents were granted in order to archaeologically investigate and monitor the works that lie within the historic town and in its environs (Licence numbers: 16E0490, 16D0074 and 16R0161 and E4481 (C578)). This scheme commenced in 2016 and archaeological assessments took place throughout 2017-2019. The works for the scheme were two-fold, involving works: (i) in the River Bandon from the centre of the historic town to 3.6km to the east; and (ii) on dry land in the historic town centre and its environs.

13.3.1. Planning Context

As described in **Section 1.2**, a number of projects have been undertaken in recent years to upgrade and extend the Bandon WwTW.

Bandon Wastewater Treatment Plant and Glasslinn Road Pumping Stations Upgrade Project

In the planning and environmental report (Atkins 2016b) it was concluded by the consulting archaeologist that the upgrade works were unlikely to give rise to archaeological impacts and would not impact any recorded or known archaeological site; the archaeological potential of the proposed works were considered negligible based on a desktop review of the available sources. No archaeological mitigation measures were deemed necessary.

For the WwTP and Glasslinn Road Pumping Station upgrades, in the EIA screening report (Atkins 2016c), it was concluded that all new plants and structures proposed for the site would be constructed within the footprint of an existing site (where the Pumping Station and the WwTP are located) and within existing boundaries. Thus, the impact on the archaeological heritage was deemed neutral.

Bandon Watermain and Sewer Network Project

Planning permission was not required for these works.

Bandon IDA Laragh WwTP Upgrade Project

The planning documentation does not specify any reports regarding archaeology and cultural heritage.

13.4. Description of Likely Significant Effects

The subject matter of this EIAR is the operational discharges to the River Bandon. Due to the nature of the operational discharges, the discharges will take place within the existing and newly improved built infrastructure as a result of the previously listed projects.

No physical impacts are anticipated on archaeological and cultural heritage assets as a result of the operational discharges. Additionally, as these physical upgrades were previously environmentally assessed, there should be no outstanding archaeological issues or constraints that need to be considered further for this project.

13.5. Mitigation Measures

In the absence of potential negative significant effects, no mitigation is required.

13.6. Residual Impacts

There are no residual impacts predicted.

13.6.1. Cumulative Impacts

There are no cumulative impacts with other projects or plans predicted.

13.7. Monitoring

No specific monitoring measures are required, given the lack of direct effects resulting from the operational discharges.

13.8. Conclusion

Due to their nature, no significant Archaeology, Architectural & Cultural Heritage impacts are predicted from the operational discharges.

14. LAND, SOILS & GEOLOGY

14.1. Introduction

This Chapter of the EIAR prepared by AWN Consulting Ltd, is concerned with the potential impact of the Bandon agglomeration operational discharges on Land, Soils and Geology, including Hydrogeology. This includes a description of the assessment criteria, a brief overview of the existing environment and an assessment of potential impacts.

14.1.1. Statement of Authority

This report was prepared by Marcelo Allende (BSc, BEng), a Senior Environmental Consultant (Hydrologist) at AWN Consulting Ltd. with over 17 years of experience in Environmental Consulting as well as hydrological and hydrogeological technical studies. Marcelo holds a degree in Water Resource Civil Engineering from the University of Chile. He has worked on a wide of range of projects including multi-aspect environmental investigations, geo-environmental impact assessments, groundwater resource management, hydrological and hydrogeological conceptual and numerical modelling, strategic and site specific flood risk assessments, 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 also has detailed knowledge of environmental guidance, legislation, regulations & standards and expertise in GIS (expert level) and MATTE studies at COMAH establishments. He is currently a member of the International Association of Hydrogeologists (IAH, Irish Group) and a member of Engineers Ireland (MIEI).

14.2. Methodology

The baseline assessment has been carried out in accordance with the following guidance and established best practice:

- EPA Advice notes on current practice in the preparation of Environmental Impact Statement (EPA, 2003) and Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2022a);
- TII/National Roads Authority Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (TII/formerly NRA, 2009);
- Water Framework Directive (WFD) - Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy. This relates to the improvement of water quality across Ireland including rivers and groundwater bodies;
- River Basin Management Plan 2018-2021 (including regional plans by Local Authority Waters Programme (Waters and Communities 2020)). Draft River Basin Management Plan 2022-2027; and
- Institute of Geologists Ireland (IGI) -Geology in Environmental Impact Statements, a guide (IGI, 2002) and Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013).

Groundwater resource management in Ireland is dealt with in the following key pieces of legislation and guidelines:

- European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. No. 9 of 2010);
- European Communities Environmental Objectives (Groundwater) Amendment Regulations 2016 (S.I. No. 366 of 2016); European Communities Environmental Objectives (Groundwater) (Amendment) Regulations 2022 S.I. No. 287 of 2022;
- European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003); and
- EPA *'Towards Setting Guideline Values for the Protection of Groundwater in Ireland Interim Report'*, (EPA 2003).

14.3. Receiving Environment

The Bandon WwTP is located along the Cork Road (N71), next to the River Bandon.

According to the Geological Survey of Ireland (GSI) website, the WwTP site is underlain by urban and alluvial deposits as well as coarse loamy drift with siliceous stones. The bedrock geology underlying the agglomeration is mapped as Kinsale Formation (rock unit code: CDKINS) which is described as *'grey mudstones and mud dominant heterolithic lithologies'* and Old Head Sandstone Formation (rock unit code: DUOHSF) which is described as *'flaser-bedded sandstone and minor mudstone'*. The bedrock geology underlying the agglomeration has been classified by the GSI as a *'Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones (LI)'*. There are no gravel aquifers mapped within 1km radius of the of the Project (GSI, 2022). Groundwater vulnerability in the agglomeration ranges from *'Moderate'* to *'Rock at or Near Surface'*. Local groundwater would therefore be considered as a sensitive receptor due to this rating.

The WFD, 2000/60/EC, was adopted in 2000 as a single piece of legislation covering rivers, lakes, groundwater and 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.

Presently, there is one (1) no. groundwater body (GWB) in the region of the Project. According to the EPA maps, the Bandon GWB (IE_SW_G_086) underlies the Project site. The Bandon GWB is classified under the WFD Water Status system as *'Good'* (2013-2018 & 2016-2021).

The GSI Well Card Index is a record of wells drilled in Ireland, water supply and site investigation boreholes. It is noted that this record is not comprehensive as licensing of wells is not currently a requirement in the Republic of Ireland. This current index does not show any wells drilled or springs at the site or surrounding area, with the exception of an industrial well in Clogheenavodig (drilled in 1979) and an old dug well in Ballylangley (drilled in 1957). The area is serviced by Local Authority mains therefore it is unlikely that any wells are used for potable supply. The site is not located near any public groundwater

supplies or group schemes. There are no groundwater source protection zones in the immediate vicinity of the site.

On the basis of the natural protection provided by the soil and poor hydraulic connectivity in the aquifer, there is no likely pathway through the soil and aquifer to Kinsale Harbour or Western Celtic Sea.

There are no sensitive soil receptors, no identified areas of geological heritage or groundwater supplies in the vicinity of the Project.

14.4. Description of Likely Significant Effects

A site-specific WFD Screening Assessment was carried out for the operational discharges and is attached as **Appendix 3 - Water Framework Directive Screening Assessment**.

Overall, this WFD Screening Assessment has shown that there is no potential for change in the groundwater water body status and no risk as a result of the operational discharges.

Due to the nature of the operational discharges, no potential impacts to the land, soil, geological or hydrogeological environment were identified as there is no discharge to ground or active dewatering associated with the discharges.

It can be concluded that the Bandon agglomeration operational discharges, will have an imperceptible impact on Land, Soil, and the Geological and Hydrogeological environment.

14.5. Mitigation Measures

In the absence of potential negative significant effects, no mitigation is required.

14.6. Residual Impacts

There are no residual impacts predicted.

14.6.1. Cumulative Impacts

There are no cumulative impacts with other projects or plans predicted.

14.7. Monitoring

No specific monitoring measures are required, given the lack of direct effects resulting from the operational discharges.

14.8. Conclusion

Due to their nature, no significant Land, Soil, Geological or Hydrogeological impacts are predicted from the operational discharges.

15. LANDSCAPE & VISUAL

15.1. Introduction

This Chapter of the EIAR, prepared by Stephenson Halliday, is concerned with the likely significant effects of the Bandon agglomeration operational discharges on Landscape and Visual factors. It includes a description of the assessment criteria, a brief overview of the existing environment and an assessment of potential impacts.

15.1.1. Statement of Authority

This Chapter has been prepared by Daniel Leaver, an Associate Director in Stephenson Halliday with over 25 of experience in the field of Landscape Architecture. Dan is a Chartered Landscape Architect with considerable experience of the coordination, delivery and technical review of LVIAs. He is an experienced project manager and has been involved in work in the UK, Ireland and overseas. Projects have included the assessment of a wide range of developments, including residential and commercial, minerals, waste disposal and energy including renewables, opencast sites, rail, highways and other infrastructure projects.

15.2. Assessment Criteria

The assessment of landscape and visual effects has been informed by the ¹⁸Landscape Institute's Guidelines for Landscape and Visual Impact Assessment (3rd Edition, 2013). This review has been undertaken through a combination of desk study of plans and relevant reports and the use of aerial photos, Google Earth, and Street View.

15.2.1. Planning Context

The following policies from the Cork County Development Plan 2022 are considered relevant to the Project as follows:

GI 14-9: Landscape

- a) *Protect the visual and scenic amenities of County Cork's built and natural environment.*
- b) *Landscape issues will be an important factor in all land-use proposals, ensuring that a pro-active view of development is undertaken while protecting the environment and heritage generally in line with the principle of sustainability.*
- c) *Ensure that new development meets high standards of siting and design.*
- d) *Protect skylines and ridgelines from development.*
- e) *Discourage proposals necessitating the removal of extensive amounts of trees, hedgerows and historic walls or other distinctive boundary treatments.*

¹⁸ *Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA 3). Landscape Institute (LI) and the Institute for Environmental Management and Assessment (IEMA) (2013)*

GI 14:10: Draft Landscape Strategy

Ensure that the management of development throughout the County will have regard for the value of the landscape, its character, distinctiveness and sensitivity as recognised in the Cork County Draft Landscape Strategy and its recommendations, in order to minimize the visual and environmental impact of development...

15.3. Receiving Environment**15.3.1. Landscape**

The Cork County Draft Landscape Strategy identifies the study area as Landscape Character Area (LCA) 6a: Broad Fertile Lowland Valleys. LCA 6a is deemed to be of County importance and to have a generally high sensitivity and high value. It is noted that the operational discharge points are contained within urban or peri-urban environments and do not impinge to any great extent on the surrounding countryside.

The strategy makes the following recommendation relevant to the Project:

- *Protect and preserve the Lee Valley and the Bandon River and their surrounding floodplains as unique landscape features in this Landscape Character Type and as valuable resource for scenic and amenity values.*

15.3.2. Visual

All but two of the operational discharge points are located within the banks of the River Bandon and, as such, below the general level of the surrounding landscape; SW018 discharges to the River Bandon from the R603 New Road while SW014 discharges to the River Bandon from the N71 National Secondary Road. The banks of the river are generally well vegetated with mature tree and shrub vegetation and / or built form which screens the infrastructure from wider views. Views are therefore limited to a very local area in the vicinity of each discharge point.

All discharge points, with the exception of SW016 and SW018, use the previously existing overflows. SW016 is a new outfall within very close vicinity to the previous outfall and any changes to location and form are minimal in nature. SW018 is a new outfall albeit any changes would be perceived as very limited in scale and extents.

Three of the discharge points (SW001, SW002 and SW016) are located along the route of the N71 National Secondary Road between Bandon and Inishannon which is designated as part of the County's network of scenic routes (S64).

15.4. Description of Likely Significant Effects**15.4.1. Landscape**

There are no changes to the existing site landscapes in terms of vegetation removal or changes to topography and the infrastructure is of a very similar scale and nature to that of any previous structures. All but one of the discharge points were already present at or very near the current locations hence there is no significant change to land use. It is therefore considered that the existing landscape would be tolerant to the infrastructure type.

Overall, it is considered that any changes to LCA 6a would be of such small scale and limited extents such that they would be barely perceptible at a landscape scale, hence it is considered that landscape effects would not be greater than negligible. It is also, therefore, concluded that the scenic resource of the River Bandon would be retained intact. The changes as a result of the new SW018 outfall would be perceived from within a busy townscape setting and would be of very limited scale and extent and effects would again not be greater than negligible.

15.4.2. Visual

Views of the majority of the operational discharge points are predominantly screened by existing topography, built form and vegetation and, where they are present there would be little or no change to views. There is potential for discharge points SW004, SW014 and SW018 to be viewed from within the townscape of Bandon. SW004 and SW014 have retained their previous locations and form and there would be no changes in views, whilst the latter would barely be perceptible to road and footway users due to the very limited scale and extent of changes. The discharge points with potential visibility to users of the N71 road are all screened by existing topography and vegetation. There would therefore be no changes to the visual amenity of users of the N71 road. Overall, it is considered that any potential changes to visual amenity would be of such small scale and limited extents that they would be barely perceptible. It is thus considered that visual effects would not be greater than negligible.

15.5. Mitigation Measures

In the absence of potential negative significant effects, no mitigation is required.

15.6. Residual Impacts

There are no residual impacts predicted.

15.6.1. Cumulative Impacts

There are no cumulative impacts with other projects or plans predicted.

15.7. Monitoring

No specific monitoring measures are required, given the lack of direct effects resulting from the operational discharges.

15.8. Conclusion

Due to their nature, no significant Landscape and Visual impacts are predicted from the operational discharges.

16. RISK OF MAJOR ACCIDENTS AND/OR DISASTERS

16.1. Introduction

This Chapter has been prepared by Nicholas O'Dwyer Ltd. and presents a consideration of risk of major accidents and/or disasters relevant to operational discharges as required in the EIA Directive and described in the EPA's EIAR 2022 Guidelines.

The aim is to determine any potential major accidents and/or natural disasters that the Project could (i) cause, and (ii) be vulnerable to; the potential for these major accidents and/or natural disasters to result in significant adverse environmental effects; and to determine appropriate measures required to prevent or mitigate likely significant adverse effects. It is noted that the Bandon WwTW has been designed to specific criteria to minimise or eliminate potential risk.

16.1.1. Statement of Authority

This Chapter has been prepared by Krista Farrugia, a Principal EIA Consultant in Nicholas O'Dwyer Ltd., with 19 years of experience in the field of EIA. As a consultant, Krista has coordinated EIAs, including Risk Assessment chapters, for 16 years. Krista has also conducted risk assessment for projects outside of EIA, as requested by the Competent Authority in Malta. Krista was also responsible for review of risk assessments in her role as Environment Protection Officer for three years with the Malta Environment and Planning Authority (MEPA). Krista holds a Master of Science in Integrated Environmental Management from the University of Bath, a Post Graduate Diploma in Wildlife Biology and Conservation from Edinburgh Napier University, and a Bachelor of Science (Hons) in Chemistry and Biology from the University of Malta. She is a Practitioner with the Institute of Environmental Management with extensive experience in EIA.

16.2. Methodology

Generally, an environmental risk occurs when there is a means, or pathway by which a hazard (source) results in a negative impact to the surrounding environment, *i.e.*, receptor/s. Risk assessment includes identification, classification, and evaluation.

The following reference materials were used to inform and guide the assessment:

- EU (2017) Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report;
- EPA (2022) Guidelines on the information to be contained in Environmental Impact Assessment Reports;
- EPA (2014) Guidance on Assessing and Costing Environmental Liabilities;
- DoEHLG (2010) Guidance Document 1: A Guide to Risk Assessment in Major Emergency Management;
- Dept of Defence (2017) A National Risk Assessment for Ireland 2017;
- Cork County Council Emergency Plan (2021); and
- ISO31010 Risk Assessment Techniques.

16.2.1. Risk Identification

Risks were identified through review of EIAR environmental factor Chapters and consultation with experts, as required. As set out in the EU guidance document, risks are identified both in respect of (i) the potential vulnerability of the Project (in this case in the context of the operational discharges) to major accidents and disasters; and (ii) the potential for the Project to cause accidents and/or disasters.

16.2.2. Risk Classification

16.2.2.1. Risk Assessment Criteria

The risk criteria applied in this assessment are based on a consequence/likelihood matrix consistent with *ISO31010: Risk Management: Risk Assessment Techniques*, a supporting standard for the international risk standard ISO31000. Reference was made to the DoEHLG and the EPA (2014) guidance documents; the following risk criteria were adapted for the purposes of this assessment. **Table 16.1** lists the criteria used for assessing environmental consequences. **Table 16.2** presents the criteria to determine the likelihood of an event occurring.

Table 16.1 Criteria for Assessing Scale of Environmental Consequences

Rating	Classification	Effects on natural environment
1	Insignificant	No contamination; localised, short-term effects to land, biodiversity, ecosystem services, water resources, human health
2	Minor	Limited contamination, short duration, localised effects to land, biodiversity, ecosystem services, water resources, human health
3	Moderate	Moderate, medium-term impacts with widespread effects to land, biodiversity, ecosystem services, water resources, human health
4	Major	Medium- to long-term, serious environmental effects with some impairment to ecosystem function, widespread impacts
5	Catastrophic	Permanent, severe impacts to land, biodiversity, ecosystem services, water resources, human health

Table 16.2 Criteria for Assessing Likelihood of Event Occurring

Rating	Classification	Effects description
1	Rare	Consequence may only occur in exceptional circumstances
2	Unlikely	Consequence could occur at some time
3	Occasionally	Consequence should occur at some time
4	Likely	Consequence will probably occur in most circumstances
5	Almost certain	Consequence is expected to occur in most circumstances

16.2.3. Risk Evaluation

The risk matrix was developed with reference to the guidelines, listed above in particular the EPA (2014) and the DoEHLG (2010) guidance documents. **Table 16.3** presents the matrix that was applied in carrying out the risk assessment.

Table 16.3 Risk Matrix

	Environmental Consequence				
Likelihood	1: Insignificant	2: Minor	3: Moderate	4: Major	5: Catastrophic
1: Rare	Low	Low	Low	Low	Low
2: Unlikely	Low	Low	Low	Moderate	Moderate
3: Occasional	Low	Low	Moderate	Moderate	High
4: Likely	Low	Moderate	Moderate	High	High
5: Almost Certain	Low	Moderate	High	High	High

16.3. Overview

The Project involves the operational discharges from the Bandon agglomeration to the River Bandon, and therefore solely assesses potential operational risks related to these discharges.

The Bandon WwTP has been designed to IW design standards that ensure that the discharge parameters are compliant with proposed ELVs as detailed in **Section 3.4**. As described in **Chapter 3**, a WAC was carried out to verify that the proposed ELVs are fit for purpose and have been appropriately assigned to ensure that the receiving waterbody has the capacity to accommodate the discharge from the upgraded WwTP without causing a breach in the relevant standards as outlined in National and European legislation.

However, should unexpected and unplanned for events occur during the operation of the WwTP, there is a risk of contamination of the receiving water body (the River Bandon) that could then result in environmental impacts and impacts on ecosystem services.

The following design measures and mitigation to prevent unintended discharges have been incorporated in the design and operation of the WwTP:

- All SWOs meet the definition of '*Storm Water Overflow*' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG '*Procedures and Criteria in Relation to Storm Water Overflows*', 1995.
- Provision of 900m³ of storm storage at the WwTP.
- Provision of 250m³ of storm storage at the Glasslinn Road Pumping Station.
- Provision of 80m³ of storm storage at the Laragh Pumping Station.
- Provision of backup generators and bunded fuel tanks at the Bandon WwTP and at Glasslinn Pumping Station.
- Connection for generator available at Castlewoods Pumping Station and Kilbrogan Pumping Station.
- The design of the Bandon Laragh IDA Pumping Station includes an Uninterruptible Power Supply (UPS) to allow all instrumentation, controllers, alarms and data storage systems to operate for up to 30 minutes following a power outage.
- At the WwTP, a standby pump will activate automatically upon failure of duty pump.
- At all Pumping Stations, a standby pump will activate automatically upon failure of duty pump.
- UPS backup for telemetry/plant controllers at WwTP.
- Alarms for WwTP fed to SCADA with alarms sent to operators.
- High level/pump failure/power outage alarms at network Pumping Stations with alerts sent to operator.
- An Emergency Response Plan and Procedures, Operation and Maintenance Procedures for all equipment will be in place and implemented by the appointed plant operator, as required.
- All operators will be fully familiar with all operational plans and procedures pertaining to the plant and network *etc.*

- All flows will be monitored continuously and recorded at the electromagnetic flowmeters which will be installed at the WwTP.
- The remedial network upgrade works will retain additional reserve storage capacity in foul network and will lead to reduced overflows from the SWOs.

The Bandon WwTW have been designed to prevent unintended discharges from the works and to ensure that all emissions from the agglomeration comply with or will not result in the contravention, of any national or European legislation.

16.4. Existing Environment

16.4.1. Natural Disasters

Given its geographical location, Ireland is relatively less vulnerable to natural disasters such as earthquakes or tsunamis. However, recently there has been an increase in the number of severe weather events, particularly those leading to flooding and flash flood incidents. As recorded by the Office of Public Works (OPW), 2012¹⁹, flooding has historically been an issue at Bandon Town. Flooding is primarily due to heavy rainfall in the catchment of the River Bandon and its tributary, the Bridewell River, which meets the River Bandon downstream of Bandon Bridge. The situation can be worsened by high tides in the River Bandon estuary, which is located approximately 6km east of the town.

16.4.2. Major Accidents

The following lists EPA Industrial Licenced Facilities within the Bandon agglomeration:

- P0188-02 - Anglo Beef Processors Ireland T/A ABP Bandon – Industrial Emissions Licence (IEL) & Integrated Pollution Prevention Control (IPPC), located ca. 860m northwest of the WwTP; and
- P0477-01 – Acorn Water Limited – Industrial Emissions Licence (IEL) & Integrated Pollution Prevention Control (IPPC), located ca. 120m southeast of the WwTP.

The occurrence of a major emission, fire or explosion could result in a major accident or disaster, which could be immediate or delayed and could result in off-site impacts.

16.5. Risk Assessment

A risk assessment was carried out using the classification and evaluation criteria described in **Table 16.1** to **Table 16.3**. **Table 16.4** presents the risk assessment in the absence of mitigation measures (or assuming complete failure of measures); presents the risk assessment with mitigation measures in place. It should be noted that all mitigation measures will be implemented.

¹⁹ JBA Consulting. 2012. Bandon Flood Relief Scheme: Report on Flood Risk Management Options. Office of Public Works.

Table 16.4 Risk Levels Without Mitigation

Event	Environmental Consequence	Likelihood	Resultant Risk Level
Clogged inlet screens resulting in direct untreated effluent discharge to the river	Minor, localised effects of short-term duration, limited contamination	Likely	Moderate
Plant failure resulting in direct untreated effluent discharge to sensitive waters	Minor, localised effects of short-term duration, limited contamination	Occasionally	Low
Power failure leading to WwTP shutdown resulting in direct untreated effluent discharge to sensitive waters	Minor, localised effects of short-term duration, limited contamination	Occasionally	Low
Fire or explosion on site	Major, potentially serious resulting in high contamination and of potentially extended duration	Unlikely	Moderate
Flooding of WwTP due to severe weather conditions resulting in uncontrolled releases of untreated wastewater into River Bandon	Minor, localised effects of short-term duration, limited contamination	Unlikely	Low
Incident at nearby industrial site resulting in an off-site impact, which could include fire/explosion, or equipment/infrastructure failure if high concentrations of contaminants enter the system	Major, potentially serious resulting in high contamination and of potentially extended duration	Unlikely	Moderate

Low to very low risk would determine that the risk levels are acceptable, however, potential moderate and high-risk scenarios require further mitigation, apart from the inbuilt design that is related to the operational discharges. The events and the effects on the risk level are assessed in **Table 16.5**.

Moderate risks were identified with respect to potential clogging of inlet screens without the design mechanisms in place (which would alert the system and divert the discharge to the holding tank until the screens were unclogged). Industrial accidents can result in spills or overflows that can be discharged to the sewer system, which could cause significant damage including (i) by creating an explosive or flammable situation, or (ii) killing the biological process. Potential damage to the biological treatment process as a result of an event whereby highly concentrated toxic influent is sent to the WwTP was also identified as a moderate risk given that it is unlikely, however, with potentially serious consequences. A fire or explosion is unlikely, but effects could result in damage to the WwTP or Pumping Stations, as well as potential contamination of the watercourse unless runoff is contained. Potential flooding will result in a limited consequence as dilution of any untreated discharge will limit effect from contamination, with effects of a short duration.

Table 16.5 Risk Levels with Mitigation

Event	Mitigation measures	Environmental Consequence	Likelihood	Resultant Risk Level
Clogged inlet screens resulting in direct untreated effluent discharge to designated sensitive water body	Self-cleaning screens; Stormwater Holding Tank in case of clogging until maintenance can be carried out to unplug the screens.	Minor, localised effects of short-term duration, limited contamination	Unlikely	Low
Incident at nearby industrial site resulting in an off-site impact, which could include fire/explosion, or equipment/infrastructure or system failure if high concentrations of contaminants enter the system	Dilution to a treatable concentration; lower tier Seveso site, which requires the site to prepare an Internal Emergency Plan, which details the systems that exist to deal with emergencies	Moderate, with potentially medium-term impacts and widespread effects	Rare	Low

Event	Mitigation measures	Environmental Consequence	Likelihood	Resultant Risk Level
	and the expected response.			
Fire or explosion on site	Emergency Response Plans	Moderate, with potentially medium-term impacts and widespread effects	Unlikely	Low

16.6. Conclusion

As provided in **Table 16.5**, the resultant risk level for the potential events, as relating to operational discharges, are considered to be low with all mitigation and design measures in place. However, IW will regularly assess the risk of major accidents and/or disasters.

17. INTERACTIONS

This Chapter of the E I A R has been prepared by Nicholas O'Dwyer Ltd. and considers the potential for interactions and inter-relationships between the factors of the environment, that have been examined individually throughout this E I A R, which could result in an impact being either positive or negative, as well as having varying levels of significance.

The preceding chapters of this E I A R assessed the likely significant effects that may occur as a result of the Bandon agglomeration operational discharges in terms of Biodiversity, Water, Population and Human Health, Material Assets, Traffic and Transport, Air Quality and Climate, Noise and Vibration, Odour, Archaeology, Architectural and Cultural Heritage, Land, Soils and Geology, and Landscape and Visual.

The Chapter is directed by Article 3 section 1 (e) of Directive 2014/52/EU on the Assessment of the Effects of Certain Public and Private Projects on the Environment. The EPA Guidelines on Information to be contained in Environmental Impact Assessment Reports (2022) and Advice Notes for Preparing Environmental Impact Statements (Draft, September 2015) were also considered.

Article 3 of the Directive states:

1. The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:

(a) population and human health;

(b) biodiversity, with particular attention to species and habitats protected under Directive

92/43/EEC and Directive 2009/147/EC;

(c) land, soil, water, air and climate;

(d) material assets, cultural heritage and the landscape;

(e) the interaction between the factors referred to in points (a) to (d)

For the assessment of interacting effects, a matrix has been provided in **Table 17.1** identifying, through professional judgment, the specific topics within the E I A R where the effects potentially interact/inter-relate with each other.

Table 17.2 provides the likely interactive effects for the Bandon agglomeration operational discharges based on the individual assessments as contained in **Chapters 5 – 15**, and best scientific knowledge.

This Chapter of the E I A R addresses the interactions between the various environmental aspects of the Bandon operational discharges (*i.e.*, SW001, SW002, SW004, SW008, SW014 and SW016 - SW020) covered in **Chapters 5 - 15**.

Table 17.1 Interactive Effects Summary Matrix

Interaction With	Biodiversity	Water	Population & Human Health	Material Assets	Traffic & Transport	Air Quality & Climate	Noise & Vibration	Odour	Archaeology, Architecture & Cultural Heritage	Land, Soils & Geology	Landscape & Visual
Biodiversity		✓	✓								
Water			✓								
Population & Human Health											
Material Assets											
Traffic & Transport											
Air Quality & Climate											
Noise & Vibration											
Odour											
Archaeology, Architecture & Cultural Heritage											
Land, Soils & Geology											
Landscape & Visual											
✓ = Interactive Effect											

Table 17.2 Interactive Effects of The Operational Discharges

Operational Discharge	Environmental Factors	Summary of Effect	Further Information
SW001	Water Biodiversity Population & Human Health	<p>The primary discharge standards will not compromise the achievement of the objectives and EQSs established for any European sites water dependant species and natural habitats and designations (<i>e.g.</i>, Bandon River SAC) in the wider environs or downstream of the agglomeration.</p> <p>The operation of the upgraded WwTP, and network, is expected to have a positive impact in terms of a reduction in the levels of nutrients being discharged in the River Bandon. The discharge activities will not cause a deterioration in the chemical status of the River Bandon.</p> <p>Improvements to water quality will have a positive impact on water based recreational activities and amenity.</p> <p>The overall Risk of the Bandon WwTP to the downstream Innishannon Drinking Abstraction is classified as a Low Risk given the high dilution factor available in the receiving water and the design and operation of the upgraded WwTP.</p>	Slight positive, long-term effect. Refer to Chapters 5, 6 and 7.
SW002 SW004 SW008 SW014 SW016 SW017 SW018 SW019 SW020	Water Biodiversity Population & Human Health	<p>Elimination in so far as possible of unintended discharges from the agglomeration.</p> <p>The Dual Function Overflows and their operational design will not compromise the achievement of the objectives and EQSs established for any European sites water dependant species and natural habitats and designations (<i>e.g.</i>, Bandon River SAC) in the wider environs or downstream of the agglomeration.</p> <p>The risks of sewer or outfall failure associated with extreme events resulting in the activation of EOs, while a theoretical risk (as the failure of any infrastructure in catastrophic situations is theoretically possible), is not reasonably</p>	Slight positive, long-term effect. Refer to Chapters 5, 6 and 7.

Operational Discharge	Environmental Factors	Summary of Effect	Further Information
		<p>predicted to occur. All appropriate design measures and mitigation to prevent Emergency Overflows that can be applied has been incorporated in the design and operation of the discharges.</p> <p>The overall Risk of the Bandon WwTW to the downstream Innishannon Drinking Abstraction is classified as a Low Risk given the high dilution factor available in the receiving water and the design and operation of the upgraded works.</p> <p>Potential improvements to water quality and improved opportunities for water based recreational activities and amenity.</p>	

Biodiversity, Water and Population & Human Health are the factors identified where interaction of effects may occur as a result of the operational discharges.

Potential interactions are summarised as follows:

- **Biodiversity & Water:** The removal of 10 no. overflows and the improvements to the network will significantly reduce the volume and quality of intermittent discharges entering the river, addressing this localised pressure.

The maintenance of Good status conditions is sufficient to ensure that both the river habitat and the most pollution-sensitive aquatic species using the River Bandon (*i.e.* salmonids which require Q4 biological water quality conditions) are not affected by the discharges.

The operational discharges will not compromise the achievement of the objectives and EQSs established for any European sites water dependant species and natural habitats and designations (*e.g.*, River Bandon SAC) in the wider environs or downstream of the agglomeration.

The upgrade works to the WwTP and associated effluent discharge standards proposed and the operational design of the overflows will ensure that the operational discharges from the agglomeration (i) contribute towards maintaining at least Good status of the Bandon_090 and (ii) will ensure that there is no environmental risk posed to the receiving water environment and its associated designation as a result of the discharges from the agglomeration.

- **Water & Population & Human Health:** Improvements to the water quality of the Bandon River, as described in **Chapter 6**, will positively impact on Population & Human Health.

In terms of the downstream Innishannon drinking water abstraction point it is considered that the improved effluent discharge quality, along with the removal of 10 no. SWOs from the agglomeration by the end of Q1 2023, and the assimilative capacity

in the receiving waters, that the overall risk of the WwTP to this downstream Drinking Abstraction will remain as a Low Risk, even based on the WwTPs increased loadings.

The WFD Screening assessment (**Appendix 3**) has shown that there is no potential for a negative impact in the water body status or risk as a result of the operational discharges.

Therefore, there will be no significant negative impacts on Population and Human Health. A slight positive effect has been identified on water quality, which will in turn have a slight positive effect on Population and Human Health. Potential impacts on Population & Human Health are addressed in **Chapter 7**.

18. SCHEDULE OF MITIGATION MEASURES

Following an examination, analysis, and evaluation of the direct and indirect effects of the Bandon operational discharges in the foregoing Chapters, it was determined that the operational discharges would have no likely significant negative effects on any environmental factors. Therefore, no mitigation measures are required.

To ensure the satisfactory operation of the Bandon WwTW in line with the current WWDL D0136-01, and future reviewed licence requirements, the authors of this EIAR have put forward the following recommendation to be implemented:

- Ensure that the design capacity (14,456 p.e.) of the WwTP is not exceeded.
- All flows will be monitored continuously and recorded by flowmeters at the upgraded Bandon WwTP.
- Ensure the primary discharge is compliant with its proposed/recommended ELVs.
- Monitor the effluent discharge and ambient water quality as per Schedule A: Discharges & Discharge Monitoring, and Schedule B: Ambient Monitoring of the WWDL.
- All workers attending the WwTP and associated Pumping Stations will comply in full with the relevant HSE guidelines and any Government protocols that may be in place at that point in time in relation to COVID-19.

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20. ABBREVIATIONS

AER	Annual Environmental Report
AA	Appropriate Assessment
ACA	Architectural Conservation Area
AMIAQM	Associate Member of the Institute of Air Quality Management
AMIEEnvSc	Associate Member of the Institution of Environmental Science
BOD	Biochemical Oxygen Demand
CO ₂	Carbon Dioxide
CFB	Central Fisheries Board
CSO	Central Statistics Office
CIEEM	Chartered Institute of Ecology and Environmental Management
COD	Chemical Oxygen Demand
CA	Competent Authority
COMAH	Control of Major Accident Hazards
CJEU	Court of Justice of the European Union
DANI	Department of Agriculture for Northern Ireland
DCH&G	Department of Culture, Heritage and the Gaeltacht
DoEHLG	Department of Environment, Housing and Local Government
DHPLG	Department of Housing, Planning and Local Government
DWF	Dry Weather Flow
ERBD	Eastern River Basin District
EcIA	Ecological Impact Assessment
EQR	Ecological Quality Ratios
ED	Electoral Division
ESB	Electricity Supply Board
EO	Emergency Overflow
ELV	Emission Limit Value
ETS	Emissions Trading Scheme
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
EQS	Environmental Quality Standards
EC	European Commission
EEC	European Economic Community

ESB	Electricity Supply Board
EU	European Union
FWPM/FWM	Freshwater Pearl Mussel
GIS	Geographic Information System
GSI	Geological Survey of Ireland
GHG	Greenhouse Gas
GWB	Ground Waterbody
GLVIA	Guidelines for Landscape and Visual Impact Assessment
HSE	Health Service Executive
IEL	Industrial Emission Licence
ICT	Information and Communications Technology
IFI	Inland Fisheries Ireland
IAI	Institute of Archaeologists of Ireland
IEMA	Institute of Environmental Management and Assessment
IGI	Institute of Geologists Ireland
ICM	Integrated Catchment Modelling
IPC	Integrated Pollution Control
IAH	International Association of Hydrogeologists
ICOMOS	International Council of Monuments and Places
ISO	International Organisation Standardisation
IAH	Irish Group of the Association of Hydrogeologists
IW	Irish Water
KER	Key Ecological Receptors
Km	Kilometre
kV	Kilovolt
LVIA	Landscape and Visual Impact Assessment
LCA	Landscape Character Area
LEA	Local Electoral Area
l/s	litres per second
MIEI	Member of Engineers Ireland
m ³ /s	metres cubed per second
Mt CO ₂ eq	million tonnes carbon dioxide equivalent
NBAP	National Biodiversity Action Plan
NBDC	National Biodiversity Data Centre

NDP	National Development Plan
NGR	National Grid Reference
NPWS	National Parks and Wildlife Service
NPF	National Planning Framework
NRA	National Roads Authority
NIS	Natura Impact Statement
NOD	Nicholas O'Dwyer Limited
NO ₂	Nitrogen Dioxide
OHSAS	Occupational Health and Safety Assessment Series
OU _e /m ³	Odour Units present in one meter cubed
OPW	Office of Public Works
OSI	Ordinance Survey Ireland
PM _{2.5}	Particulate Matter (<2.5 microns in diameter)
PM ₁₀	Particulate Matter (<10 microns in diameter)
p.e.	Population Equivalent
pNHA	Proposed Natural Heritage Area
PWS	Public Water Supply
RSES	Regional Spatial and Economic Strategy
RBMP	River Basin Management Plan
RMP	River Management Plan
SWRBD	South Western River Basin District
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
S.I	Statutory Instrument
SPA	Special Protection Area
SWO	Storm Water Overflow
SCADA	Supervisory Control And Data Acquisition
SS	Suspended Solids
TII	Transport Infrastructure Ireland
UK	United Kingdom
UPM	Urban Pollution Management
UWWT	Urban Wastewater Treatment
UWWTD	Urban Wastewater Treatment Directive
WTP	Water Treatment Plant

WAC	Waste Assimilative Capacity
WWD	Waste Water Directive
WWDA	Waste Water Discharge Authorisation
WWDL	Waste Water Discharge Licence
WaPUG	Waste Water Planning Users Group
WwTP	Waste Water Treatment Plant
WwTW	Waste Water Treatment Works
WFD	Water Framework Directive
WSSP	Water Services Strategic Plan
WHO	World Health Organisation
ZoI	Zone of Influence

APPENDIX 1

CRITERIA FOR RATING SITE ATTRIBUTES – ESTIMATION OF IMPORTANCE OF HYDROLOGY ATTRIBUTES

TRANSPORT INFRASTRUCTURE IRELAND (TII, 2009)

EiAR Guideline tables for Hydrology**Table 1: Criteria for rating impact magnitude at EIS stage – Estimation of magnitude of impact on hydrology attributes (NRA, 2009)**

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute and/ or quality and integrity of attribute	Loss or extensive change to a water body or water dependent habitat
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Calculated risk of serious pollution incident >1% annually ²
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Increase in predicted peak flood level >10mm ¹
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Negligible change in predicted peak flood level ¹
Minor Beneficial	Results in minor improvement of attribute quality	Calculated reduction in pollution risk of 50% or more where existing risk is <1% annually ²
Moderate Beneficial	Results in moderate improvement of attribute quality	Calculated reduction in pollution risk of 50% or more where existing risk is >1% annually ²
Major Beneficial	Results in major improvement of attribute quality	Reduction in predicted peak flood level >100mm ¹

Additional examples are provided in the NRA Guidance Document

¹ Refer to Annex 1, Methods E and F, Annex 1 of HA216/06

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

Source: ‘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 Site Attributes - Estimation of Importance of Hydrology Attributes (NRA)

Importance	Criteria	Typical Examples
Extremely High	Attribute has a high quality or value on an international scale	River, wetland or surface water body ecosystem protected by EU legislation <i>e.g.</i> 'European sites' designated under the Habitats Regulations or 'Salmonid waters' designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988.
Very High	Attribute has a high quality or value on a regional or national scale	River, wetland or surface water body ecosystem protected by national legislation – NHA status Regionally important potable water source supplying >2500 homes Quality Class A (Biotic Index Q4, Q5) Flood plain protecting more than 50 residential or commercial properties from flooding Nationally important amenity site for wide range of leisure activities
High	Attribute has a high quality or value on a local scale	Salmon fishery Locally important potable water source supplying >1000 homes Quality Class B (Biotic Index Q3-4) Flood plain protecting between 5 and 50 residential or commercial properties from flooding Locally important amenity site for wide range of leisure activities
Medium	Attribute has a medium quality or value on a local scale	Coarse fishery Local potable water source supplying >50 homes Quality Class C (Biotic Index Q3, Q2- 3) Flood plain protecting between 1 and 5 residential or commercial properties from flooding
Low	Attribute has a low quality or value on a local scale	Locally important amenity site for small range of leisure activities Local potable water source supplying <50 homes Quality Class D (Biotic Index Q2, Q1) Flood plain protecting 1 residential or commercial property from flooding Amenity site used by small numbers of local people

APPENDIX 2

WASTE ASSIMILATIVE CAPACITY CALCULATIONS

NICHOLAS O'DWYER		Calculation Sheet			
Project Number: 20893		Rev	Date	By	
Project Name: Bandon		1.0	07-Aug-22	CAS	
Sheet: 1 of 1		2.0	19-Oct-22	CAS	
Waste Assimilative Capacity (WAC) Calculation					
Name of River	Bandon_090		WFD 2016 -2021 Status	Good	
River Flow	m ³ /s	Data Source	m ³ /d	PE	
95%ile Flow	1.570	Flow Data confirmed by the EPA Hydrometrics & Groundwater Section	135,648	10 year design	14,456
Background Concentration		Proposed ELVs		Max Allowable D/S	Legislation
	mg/l	Data Source	(mg/l)	95%ile mg/l ^{Note 1}	Data Ref
Carbonaceous BOD	1.304	Data Source: Catchments.ie Mean background concentration - Jan 2020 - May 2022 (Station: RS20B020800)	25.00	2.60	SW Regulations - Good Status EQS
Total Ammonia (NH ₃)	0.033		3.00	0.14	SW Regulations - Good Status EQS
Ortho-Phosphate (OP)	0.033		1.60	0.075	SW Regulations - Good Status EQS
Dry Weather Flow ^{Note 2}	Flow in River	Allowable Effluent Concentration	WAC	Predicted Downstream Concentration	Comments
	95%ile	BOD	BOD	BOD	Treatment Plant Capacity
m ³ /d	m ³ /d	mg/l	kg/d	mg/l	Comply with SW Regulations
2602	135,648	70.15	182.54	1.750	10 year design
	95%ile	NH ₃	NH ₃	NH ₃	
m ³ /d	m ³ /d	mg/l	kg/d	mg/l	
2602	135,648	5.73	14.91	0.089	10 year design
	95%ile	OP	OP	OP	
m ³ /d	m ³ /d	mg/l	kg/d	mg/l	
2602	135,648	2.25	5.86	0.063	10 year design

Note 1: S.I. No. 77/2019 - European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019

Note 2: using 180 lpd

NICHOLAS O'DWYER		Calculation Sheet				
Project Number: 20893		Rev	Date	By		
Project Name: Bandon		1.0	07-Aug-22	CAS		
Sheet: 1 of 1		2.0	19-Oct-22	CAS		
Waste Assimilative Capacity (WAC) Calculation						
Name of River	Bandon_090		WFD 2016 -2021 Status	Good		
River Flow	m ³ /s	Data Source	m ³ /d	PE		
95%ile Flow	1.570	Flow Data confirmed by the EPA Hydrometrics & Groundwater Section	135,648	10 year design	14,456	
Background Concentration		Proposed ELVs	Max Allowable D/S	Legislation	Status	
	mg/l	Data Source	(mg/l)	Data Ref		
Carbonaceous BOD	0.260	Background Concentration mg/l (Notionally Clean)	25.00	SW Regulations - Good Status EQS	Good	
Total Ammonia (NH ₃)	0.008		3.00	SW Regulations - Good Status EQS	Good	
Ortho-Phosphate (OP)	0.005		1.60	SW Regulations - Good Status EQS	Good	
Dry Weather Flow ^{Note 2}	Flow in River	Allowable Effluent Concentration	WAC	Predicted Downstream Concentration	Comments	Legislation
m ³ /d	95%ile m ³ /d	BOD mg/l	BOD kg/d	BOD mg/l	Treatment Plant Capacity	Comply with SW Regulations
2602	135,648	124.59	324.18	0.726	10 year design	Yes
m ³ /d	95%ile m ³ /d	NH ₃ mg/l	NH ₃ kg/d	NH ₃ mg/l		
2602	135,648	7.02	18.27	0.064	10 year design	Yes
m ³ /d	95%ile m ³ /d	OP mg/l	OP kg/d	OP mg/l		
2602	135,648	3.72	9.69	0.035	10 year design	Yes

Note 1: S.I. No. 77/2019 - European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019

Note 2: using 180 lpd

APPENDIX 3

WATER FRAMEWORK DIRECTIVE ASSESSMENT

**WATER FRAMEWORK
DIRECTIVE (WFD)
ASSESSMENT REPORT**

**FOR BANDON
AGGLOMERATION
OPERATIONAL
DISCHARGES**

**AT
BANDON, CO. CORK**

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CD/227501.0530WR01

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Appendix A Water Framework Directive Matrix

1.0 INTRODUCTION

AWN Consulting Limited (AWN) were retained by Nicholas O'Dwyer Ltd., on behalf of Irish Water (IW), to prepare this Water Framework Directive (WFD) Screening Assessment as part of the Environmental Impact Assessment Report (EIAR) for the operational discharges associated with the Bandon Waste Water Discharge Licence Review Application. A detailed description of the operational discharges (SW001, SW002, SW004, SW008, SW014 and SW016 – SW020) is provided in **Chapter 3** of the EIAR.

This WFD Screening Assessment has been prepared in response to the requirements of the WFD. This WFD Screening Assessment is contained as an Appendix to the EIAR and specifically to supplement the Land, Soils, Geology & Hydrogeology Chapter and Water Chapter of the EIAR and should, therefore, be read together with these chapters.

This report was prepared by Colm Driver (BSc MSc PGeo EurGeol), and Teri Hayes (BSc MSc PGeo EurGeol). Colm is a Senior Hydrogeologist with over 5 years of experience in environmental consultancy and water resources studies. Colm is a professional member of the Institute of Geologists Ireland and European Federation of Geologists). He is also an active member of the Irish Group of the Association of Hydrogeologists (IAH).

Teri is a hydrogeologist with over 25 years of experience in water resource management and impact assessment. She has a Masters in Hydrogeology and is a former President of the Irish Group of the Association of Hydrogeologists (IAH) and has provided advisory services on water related environmental and planning issues to both public and private sector bodies. She is a professional member of the Institute of Geologists Ireland and European Federation of Geologists and has qualified as a competent person as recognised by the EPA in relation to contaminated land assessment (IGI Register of competent persons www.igi.ie). Her specialist area of expertise is water resource management eco-hydrogeology, hydrological assessment, and environmental impact assessment.

1.1 Background

Bandon is a town in County Cork, approximately 25km south west of Cork City. The River Bandon runs through the town.

The Bandon agglomeration (D0136-01) is served by a sewerage system that comprises gravity sewers, Pumping Stations, rising mains and the aforementioned WwTP.

The Bandon WwTP, located at NGR 150425E, 055700N, was constructed in the early 1960s and was significantly upgraded and extended in 1993. More recently, further upgrade works were completed in Q2 2021. Following upgrade works, the plant now has a current design 14,456, and therefore has adequate capacity to treat the current load of 9,744 p.e. (AER, 2021).

Improvement works within the Bandon agglomeration have taken place over recent years and involved several elements:

- Bandon Waste Water Treatment Plant WwTP and Glasslinn Road Pumping Station Upgrade (Bandon Sewerage Scheme) – These works were completed in Q2 2021;

- Bandon IDA Laragh WwTP Upgrade - this upgrade project was completed in Q3 2018. As part of this WWDL Review Application, the Bandon IDA Laragh Agglomeration (A0362-01) is to be amalgamated into the current Bandon agglomeration; and
- Bandon Watermain & Sewer Network Project including the removal of 10 no. Storm Water Overflows (SWOs) – these works are underway and are due to be completed by the end of Q1 2023.

Refer to **Chapter 1, Section 1.2** of the main EIAR document for more details on the above projects.

Planning Permission for the Bandon Sewerage Scheme (Cork County Council planning Ref: 174106) was obtained on the basis of the upgraded WwTP meeting the ELVs as per Schedule A.1 of the WWDL D0136-01 (Tech Amendment A): BOD 25mg/l, COD 125mg/l, SS 35mg/l, pH 6-9 pH units, Orthophosphate as P 3mg/l and Ammonia 3mg/l.

Since planning was obtained, a Waste Assimilative Capacity calculation was completed in 2022 to inform this WWDA review application in order to ensure that the above ELVs were fit for purpose based on the latest data available (see **Appendix B** of EIAR). It was concluded that a more onerous Ortho-phosphate ELV of 1.6 mg/l was required in order to meet the Good-status 95%ile EQS downstream of the primary discharge.

A Total Phosphorus (TP) ELV of 2mg/l is being proposed as part of the WWDL Review due to the Upper Bandon Estuary nutrient sensitive estuary (P limited) being located ca. 5km downstream of the primary discharge point, and the fact that the p.e. of the agglomeration will be greater than 10,000.

The most significant drainage system in the vicinity is the Bandon River and its tributaries (refer to **Figure 1.1** below), which is located along the northern boundary of the Bandon WwTP.

The operational discharges subject to the licence review are located within the former South Western River Basin District (SWRBD) (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). It is situated in Hydrometric Area No. 20 (Bandon-Ilen) of the Irish River Network. It is located within the Bandon-Ilen WFD Catchment and Bandon Sub-Catchments (Bandon_SC_050, 20_5 & Bandon_SC_040, 20_2).

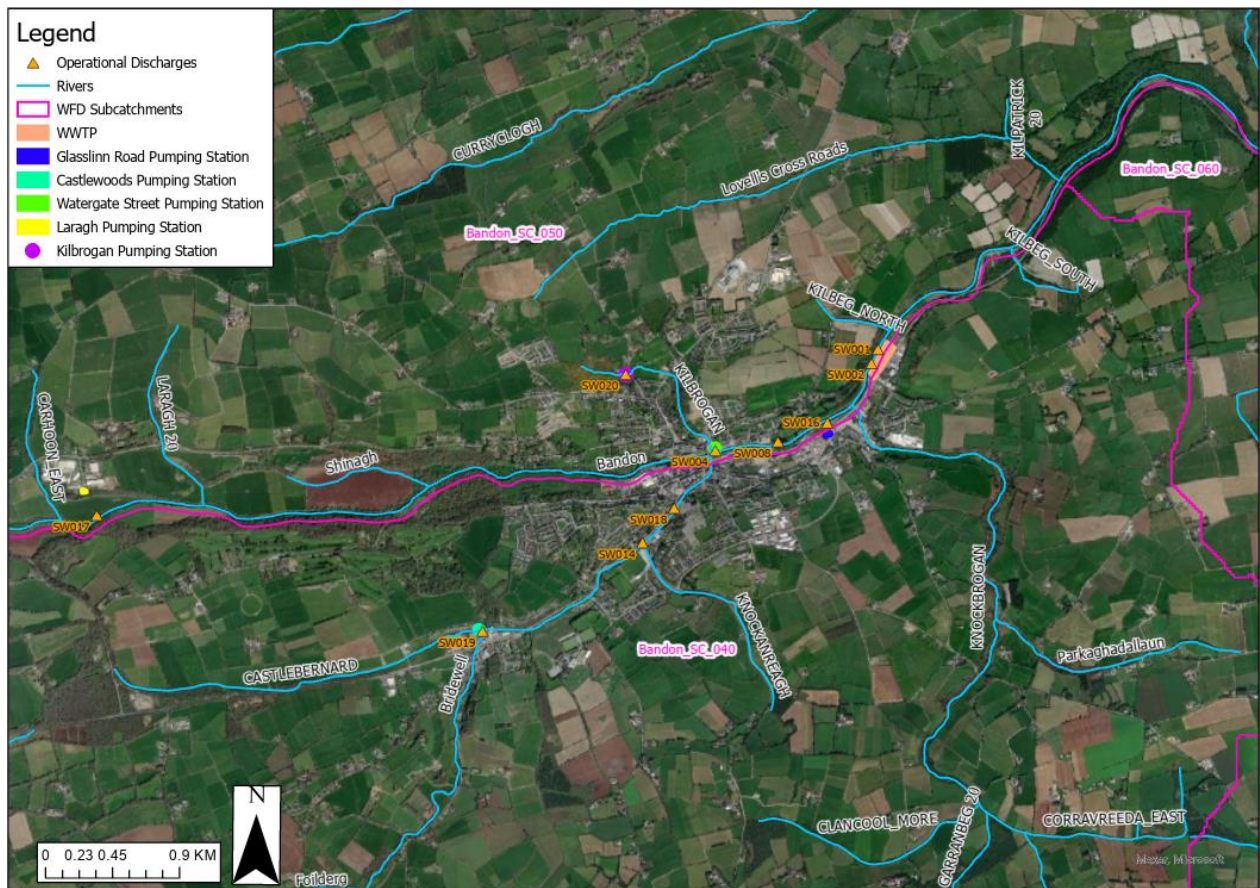


Figure 1.1 Site Location Map with Hydrological Environment

1.2 Legislative Context

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. It takes a holistic approach to the sustainable management of water by considering the interactions between surface (including transitional and coastal waters, rivers, streams, and lakes), groundwater and water dependent ecosystems.

Under the WFD, ‘*water bodies*’ are the basic management units and are defined as all or part of a river system or aquifer. These water bodies form part of a larger river basin district (RBD), for which ‘*River Basin Management Plans*’ (RBMP) are developed by EU member states and environmental objectives are set. RBMPs are produced every six (6) years, in accordance with the river basin management planning cycle.

The WFD requires all EU member states to classify the current condition or ‘*status or potential*’ of surface and groundwater bodies and to set a series of objectives for maintaining or improving conditions so that water bodies maintain or reach ‘good status or potential’ during the next river basin management planning cycle. The EPA and other stakeholders such as local authorities are the competent authority for implementing the WFD in Ireland. Article 4(1) of the WFD states “to *ensure non-deterioration and the achievement of good surface water status*”:

- Surface waters: Good chemical and Good Ecological status/potentials
- Groundwater: Good Chemical and Good Quantitative status.

As part of its role, these authorities must consider whether proposals for new developments (other than where exemptions apply Article 4.4 -4.7) 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.

The requirement to demonstrate compliance with the Article 4(1) test for “no deterioration” by a development was upheld by the High Court in the *Sweetman v An Bord Pleanála (2021 IEHC 16) “Bradán Beo case”*. The court relied on the *Weser judgement in terms of interpretation of Article 4*. In that case, the CJEU concluded that:

Article 4 required that Member states were required to refuse authorisation for a project (other than where exemptions apply) where it may cause deterioration of the status of a body of water or where it jeopardises the attainment of good water status.

- “deterioration of the status” of the relevant water body includes a fall by one class of any element of the “quality elements” even if the fall does not result in the a fall of the classification of the water body as a whole;
- ‘Any deterioration’ in quality elements in the lowest class constitutes deterioration; and
- Certainty regarding a project’s compliance with the Directive is required at the planning consent stage; hence, where deterioration ‘may’ be caused, derogations under Article 4.7 of the WFD are required at this stage.

While deterioration within a status class does not contravene the requirements of the WFD, (except for Drinking Water Directive parameters in drinking water protected areas), the WFD requires that action should be taken to limit within-class deterioration as far as practicable. For groundwater quality, measures must also be taken to reverse any environmentally significant deteriorating trend, whether or not it affects status or potential.

The *no deterioration* requirements are applied independently to each of the elements that come together to form the water body classification as required by Annex V of the Water Framework Directive and Article 4 of the Groundwater Daughter Directive.

The WFD requires ‘Good Water Status’ for all European waters to be achieved through a system of river basin management planning and extensive monitoring by 2015 or, at the least, by 2027. In 2009 the SWRBD River Management Plan (RMP) 2009-2015 was published. In the SWRBD RMP, the impacts of a range of pressures were assessed including diffuse and point pollution, water abstraction and morphological pressures (e.g., water regulation structures). The purpose of this exercise was to identify water bodies at risk of failing to meet the objectives of the WFD by 2015 and include a programme of measures to address and alleviate these pressures by 2015. This was the first River Basin Management planning cycle (2010-2015). The second cycle river basin management plan for Ireland is currently in place and will run between 2018-2022 with the previous management districts now merged into one Ireland River Basin District (Ireland RBD).

The primary aim of the plan is that Water bodies identified as being ‘At Risk’ of not achieving their environmental objectives need to have targeted measures implemented to achieve objectives under this Plan. 190 Areas for Action were identified across the 5 Local Authority regions. Within these 190 areas, a total of 726 water bodies were selected for initial actions during this RBMP cycle. There are 832 water

bodies identified as being 'At Risk' of not achieving their environmental objectives under this Plan that have not been included in the Areas for Action. For most of these water bodies, targeted actions will be undertaken in the third cycle RBMP from 2022-2027. The draft 3rd cycle RBMP has been reviewed in the context of ensuring mitigation measures comply with current and expected future measures required to be implemented for protection of water body status within the context of the operational discharges.

1.3 Sources of Information

The following sources of information were used:

- Geological Survey of Ireland- online mapping (GSI, 2022),
- GSI - Geological Heritage Sites & Sites of Special Scientific Interest
- Ordnance Survey of Ireland (OSI),
- Teagasc subsoil database,
- National Parks and Wildlife services (NPWS, 2022) and,
- Environmental Protection Agency (EPA) – website mapping and database information. Envision water quality monitoring data for watercourses in the area;
- River Basin Management Plan for Ireland 2018-2021.
- *Draft* River Basin Management Plan for Ireland 2022-2027.
- Cork 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)
- South Dublin City Council (2005), Greater Dublin Strategic Drainage Study: Technical Documents of Regional Drainage Policies. Dublin: Dublin City Council; and
- 'Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors' (CIRIA 532, 2001);
- National Parks and Wildlife Services (NPWS) – Protected Site Register.

2.0 WATER FRAMEWORK DIRECTIVE (WFD) SCREENING

According to the EPA maps, the Bandon operational discharges are located within the former SWRBD (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). It is situated within Hydrometric Area No. 20 (Bandon-Ilen) of the Irish River Network. It is located within the Bandon-Ilen WFD Catchment and Bandon Sub-Catchments (Bandon_SC_050, 20_5 & Bandon_SC_040, 20_2).

The Groundwater Body (GWB) underlying the site is the Bandon GWB (EU Groundwater Body Code: IE_SW_G_086). Refer to **Section 3.6** below for further information.

This WFD Screening has identified three (3) no. WFD surface water bodies and one (1) no. WFD groundwater bodies of relevance due to the close proximity and connection of these waterbodies associated with the operational discharges. To note there is a direct connection to the River Bandon during the operation as the primary discharge (SW001) discharges to this waterbody.

The water bodies are listed in **Table 2-1** and the locations are presented in **Figure 2.1** above. For each the WFD status and risk score is provided (Source EPA website - EPA Maps (Note: EPA Maps has not been updated to reflect the recently published 2016-2021 assessment period))

Table 2-1 WFD water bodies located within the study area

Type	WFD Classification	WFD Status (2013-2018)	WFD Risk (2013-2018)	Waterbody Name / ID	Location
Surface Water	River	Moderate*	Under Review	Bandon River (IE_SW_20B020800, 20_654)	Located along the northern boundary of the Bandon WwTP.
	River	Moderate*	Under Review	Bandon River (IE_SW_20B020800, 20_649, 20_651)	Located approx. 300 metres to the south-west of the Bandon WwTP.
	Transitional River	Poor**	At Risk of Not Achieving Good Status	Upper Bandon Estuary (IE_SW_080_0300)	Located 4.05 km to the north-east of the Bandon WwTP.
	Transitional River	Moderate**	At Risk of Not Achieving Good Status	Lower Bandon Estuary (IE_SW_080_0100)	Located 10.59 km to the north-east of the Bandon WwTP.
Groundwater	Groundwater	Good*	Under Review	Bandon Groundwater Body (GWB) (IE_SW_G_086)	Groundwater body immediately underlying the site.

*Good Status for recently published 2016-2021 monitoring period

**Poor Status for recently published 2016-2021 monitoring period

Operational discharge will discharge to the Bandon River (Bandon_080 and Bandon_090), refer to **Section 3.4** below. To note there are no discharges to ground or abstractions associated with the Bandon agglomeration.

With consideration of the operational discharges and taking into account the techniques embedded within the design of the Bandon Sewerage Scheme, Bandon IDA Laragh WwTP Upgrade and the Bandon Watermain & Sewer Network Project (as

detailed in **Chapter 6: Water of the EIAR**) it is considered that all WFD water bodies identified in **Table 2-1** should be carried through into the WFD Assessment.

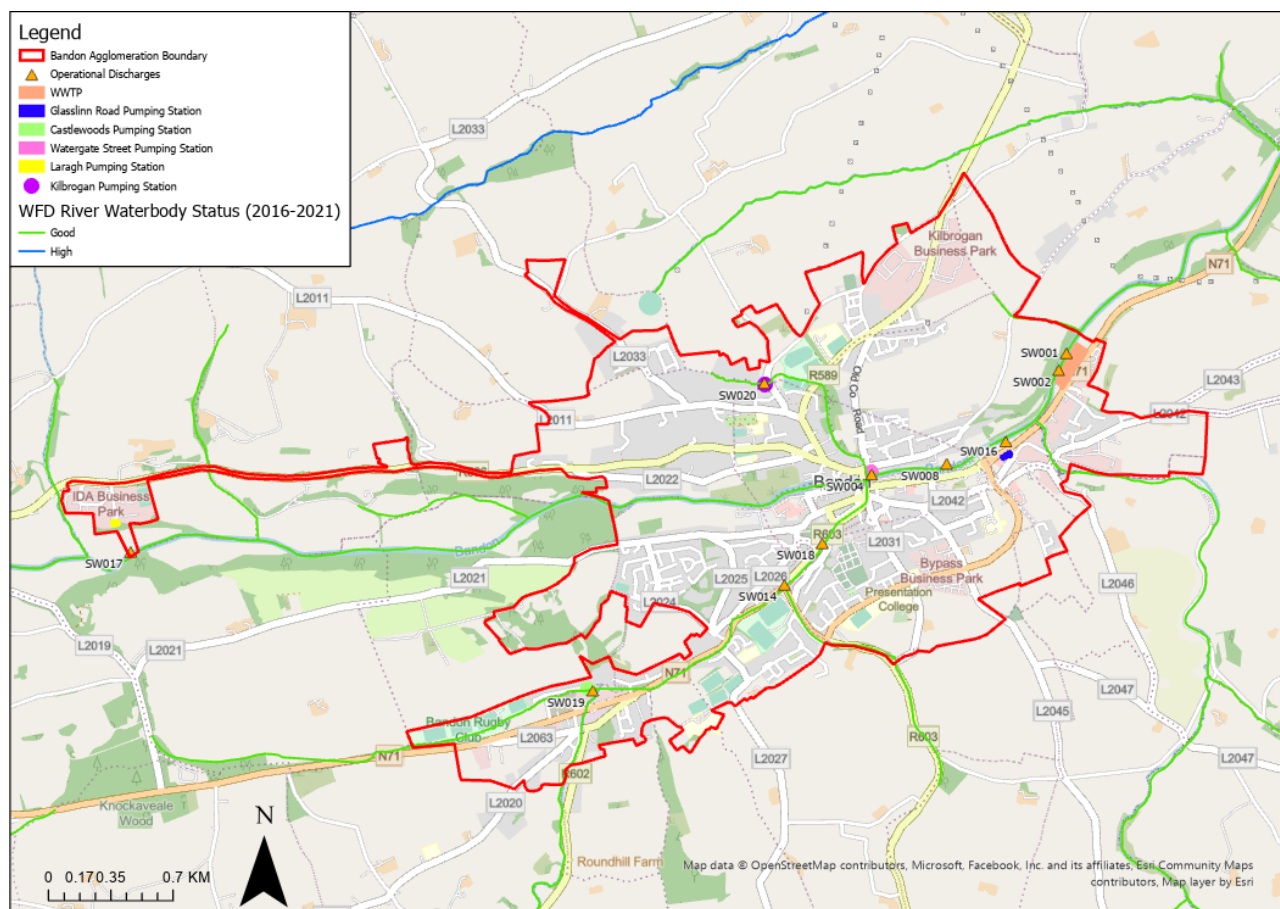


Figure 2.1 WFD status for the Local Hydrological Environment

3.0 EXISTING ENVIRONMENT – WATER BODY STATUS

3.1 Topography

The topography is generally consistent and flat across the Bandon Wastewater Treatment Plant site (approximately +15 mAOD). The most significant drainage system in the vicinity is the Bandon River and its tributaries, which are located directly north of the WwTP (refer to **Figure 1.1**). Furthermore, regional topography across entire Bandon agglomeration e.g., ranges from ca. 10mAOD to ca. 40mAOD at the Laragh PS site and generally slopes downwards toward Bandon River.

3.2 Land Use

The Bandon agglomeration (D0136-01) is served by a sewerage system that comprises gravity sewers, Pumping Stations, rising mains and the aforementioned WwTP.

3.3 Water Body Status

3.3.1 Background to Surface Water 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. This system is summarised below in **Figure 3-1**.

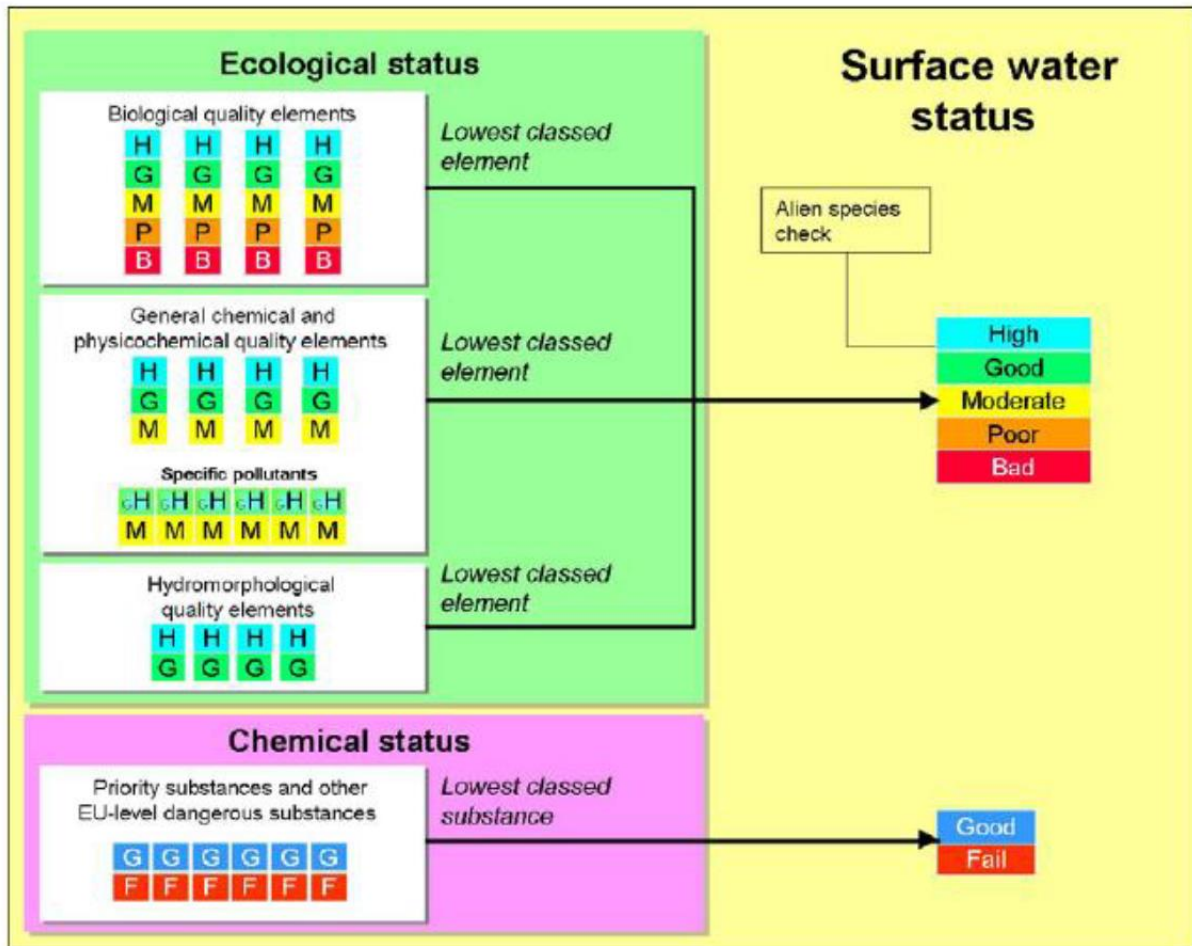


Figure 3.1 WFD classification elements for surface water body status (Environmental Agency, 2015)

3.3.2 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.

3.3.3 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, 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.

3.4 Surface Water Quality

Hydrological Environment

The upgraded Bandon WwTP Primary Discharge (SW001) and the Dual Function Overflow at the WwTP (SW002) discharge to the Bandon_090. Dual Function Overflows SW004, SW016 and SW020 also discharge to the Bandon_090 as well as SWOs, SW008, SW014 and SW018, and EO SW019. SWO SW017 discharges to the Bandon_080.

As mentioned above the operational discharges are located within the former SWRBD (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). It is situated in Hydrometric Area No. 20 (Bandon-Ilen) of the Irish River Network. It is located within the Bandon-Ilen WFD Catchment and Bandon Sub-Catchments (Bandon_SC_050, 20_5 & Bandon_SC_040, 20_2).

Surface Water Quality

Figure 3.2 below presents the EPA quality monitoring points in the context of the operational discharges and other regional drainage settings.

Surface water quality is monitored periodically by the EPA at various regional locations along principal and other smaller watercourses. With reference to the operational discharges setting, the nearest EPA monitoring station is situated along the River Bandon. The EPA assesses 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 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.

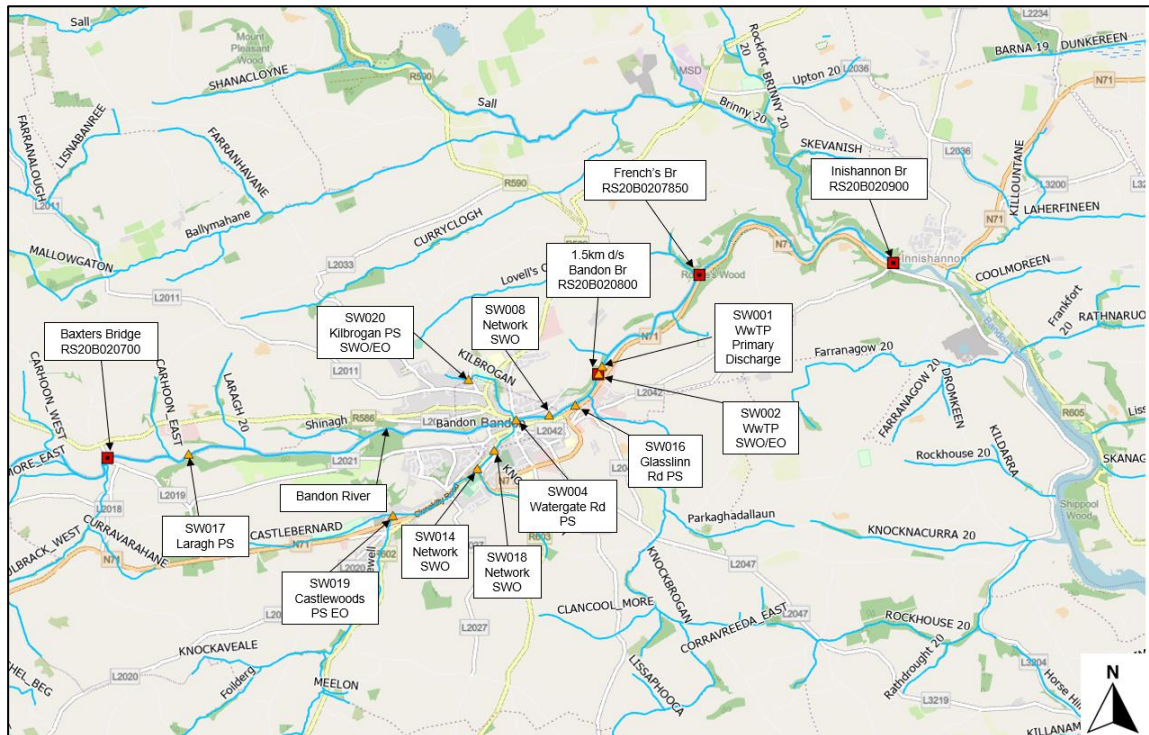


Figure 3.2 Surface Water Quality Monitoring Point (EPA,2022)

There are three (3) no. water quality monitoring stations located on the River Bandon upstream and downstream of the Bandon WwTP which have quality ratings available within the last ten years. The EPA monitor biological water quality at Station RS20B020800 (1.5km d/s Bandon Br) which is adjacent to Bandon WwTP and ca. 20m upstream of SW002. The next Q value monitoring point downstream is RS20B020900 (Inishannon Br) ca. 5km downstream of Bandon WwTP. Approximately 5km upstream of Bandon and 1km upstream of SW017 RS20B020700 (Baxter's Br Bandon_070) is also monitored. All stations were assigned Q4 values in 2020 indicating Good water quality conditions. The Q value at station RS20B020800 adjacent to Bandon WwTP has improved relative to the Q3-4 achieved in 2018, indicating Moderate water quality conditions have improved to Good, and consequently reflected in the recent status update.

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. Currently, the EPA classifies the WFD Ecological Status for the Bandon waterbody (IE_SW_20B020780, Bandon_080 & IE_SW_20B020800, Bandon_090) as having 'Good Status' (2016-2021). This is an improvement from the Moderate status for the 2013-2018 assessment period.

Figure 3.2 above presents the operational discharge points as they relate to the WWDL review.

The main pressure associated with the Bandon-Ilen Catchment is excess nutrients impacting 22 waterbodies in Cycle 3. Organic pollution and sediment issues are each impacting 10 waterbodies, morphological and hydrological impacts are affecting six and two waterbodies, respectively. For rivers, the main significant issues are nutrient pollution (10), sediment (9), morphological impacts (6), organic pollution (4) and hydrological impacts (1) ([Bandon Ilen \(catchments.ie\)](http://BandonIlen.catchments.ie)).

Where waterbodies have been classed as At Risk, significant pressures have been identified. The significant pressure affecting the greatest number of waterbodies is agriculture, followed by other, urban waste water, forestry, hydromorphology, urban run-off, domestic waste water and mines & quarries.

When comparing Cycle 2 and Cycle 3 the biggest change is an increase of four waterbodies where agriculture is a significant pressure, from 16 waterbodies in Cycle 2 to 20 waterbodies in Cycle 3. This suggests that agricultural pressures are the main reason for the overall decline in status of waterbodies since Cycle 2. However, all other significant pressure categories have experienced an increase with the exception of mines & quarries which remained at one.

Agriculture is a significant pressure in nine river waterbodies, one lake waterbody (Abisdealy), seven transitional waterbodies, two coastal waterbodies (Clonakilty Bay & Rosscarberry Bay) and Ballinhassig East groundwater body in Cycle 3. The issues related to farming in this catchment are generally related to loss of phosphorus and ammonia loss to surface waters from, for example, direct discharges; or runoff from yards, roadways or other compacted surfaces, or runoff from poorly draining soils on pastoral lands. Sediment can also be a problem from land drainage works, bank erosion from animal access or stream crossings

Invasive species

Invasive non-native (montbretia and non-native pine) plant species were identified during the 2018 as one of the significant pressures along the banks of the Leamawaddra_010 river waterbody. These invasive species are altering habitats and contributing to the less than High hydromorphological conditions and preventing the waterbody from achieving its High Status Objective.

Other Anthropogenic Pressure – Windfarms

Siltation from construction activities associated with a windfarm was identified as the pressure leading to sediment issues in Caha_020.

Unknown anthropogenic

The significant pressures impacting five river waterbodies (Bandon_060, Bandon_090, Bandon_100, Ballinspittle_010 & Clonakilty Stream_010), one lake waterbody (Curraghalicky) and one groundwater body (Ballinhassig East) are unknown.

Urban waste water agglomerations have been identified as a significant pressure in five At Risk river waterbodies

Two out of the five agglomeration (Courtmacsherry and Timoleague and Bandon) identified as significant pressures, are scheduled to be upgraded in 2021.

Table 3.1: Waste Water Treatment Agglomerations identified as significant pressures in At Risk waterbodies in Cycle 3.

Facility name	Facility Type	Waterbody	2013-18 Ecological Status	Irish Water's Expected CIP Completion Date ⁷
Courtmacsherry and Timoleague D0294	Agglomeration PE > 10,000	Argideen Estuary	Poor	2021
Skibbereen D0166	Combined Sewer Overflows	Ilen Estuary	Moderate	N/A
Dunmanway D0160	Combined Sewer Overflows	BANDON_030	Moderate	N/A
Bandon D0136	Combined Sewer Overflows	BANDON_090	Moderate	2021
Bandon D0136	Combined Sewer Overflows	BANDON_100	Moderate	2021

Urban waste water significant pressures impacted three more waterbodies than in Cycle 2 (an increase from two to five waterbodies impacted). The following Agglomerations are pressures in Cycle 3 but were not significant pressures in Cycle 2.

- Dunmanway (D0160)
- Bandon (D0136)

Other notable pressures within the catchment include:

- Forestry
- Hydromorphology
- Urban Run-off
- Domestic waste water
- Mines & quarries

3.4.1 Bandon Agglomeration Operational Discharges

A summary of the Bandon agglomeration operational discharges is provided below. Full details are provided in **Chapter 3** of the main EIAR document.

Primary Discharge - SW001

The primary discharge from the Bandon WwTP discharges to the River Bandon at NGR 150411E, 055785N *via* 3 no. diffusers.

As mentioned above, planning was obtained on the basis of WwTP meeting the ELV's as per Schedule A.1. of the WWDL D0136-01 (Tech Amendment A): BOD 25mg/l, COD 125mg/l, SS 35mg/l, pH 6-9 pH units, Ortho-phosphate as P 3mg/l and Ammonia 3mg/l. Since planning was obtained, a Waste Assimilative Capacity calculation was completed in 2022 to inform this WWDA review application in order to ensure that the above ELVs were fit for purpose based on the latest data available (see **Appendix 2** of the EIAR). It was concluded that a more onerous Ortho-phosphate ELV of 1.6mg/l was required in order to meet the Good-status 95%ile EQS downstream of the primary discharge.

A Total Phosphorus (TP) ELV of 2mg/l is being proposed as part of this Review due to the Upper Bandon Estuary nutrient sensitive estuary (P limited) being located ca. 5km downstream of the primary discharge point, and the fact that the p.e. of the agglomeration will be greater than 10,000.

The primary discharge will comply with the proposed ELVs/standards as set out in **Table 3.2** below.

The WAC calculation based on the proposed ELVs at 14,456 p.e and DWF of the WwTP shows that the receiving waterbody, based on the most recent available upstream background data, has the capacity to accommodate the discharge from the upgraded WwTP without causing a breach in the relevant standards as outlined in National and European legislation. This includes ensuring compliance with the *Good* (95%ile EQSs) standards set in European Communities Environmental Objectives (Surface Water) Regulations, 2009, as amended.

All flows arriving at the upgraded WwTP receive secondary treatment and will have Phosphorus levels reduced to comply the limits tabled below.

Table 3.2 Proposed Emission Limit Value (ELVs) for Upgraded Bandon WwTP

Parameter	Proposed Emission Limit Value
Biological Oxygen Demand	25 mg/l
Chemical Oxygen Demand	125 mg/l
Suspended Solids	35 mg/l
Ortho-P (as P)	1.6 mg/l
Ammonia (as N)	3 mg/l
Total Phosphorus	2 mg/l
pH	6 - 9

These standards give effect to the principle of the Combined Approach as defined in Waste Water Discharge (Authorisation) Regulations, 2007 to 2020 in that they accommodate the Urban Waste Water Regulations, and the status of the receiving waterbody, the River Bandon.

The Bandon WwTW has been designed to ensure that emissions from the works will not result in the contravention of any relevant EU Directives and National Regulations.

SW002 – Dual Function Overflow from WwTP

There is one Dual Function Overflow (SW002) at the WwTP *i.e.*, overflow which can act as a SWO or as an Emergency Overflow (EO) depending on the event.

SWO

Should the capacity of the stormwater storage tank at the WwTP be exceeded, the excess water will be discharged to the River Bandon *via* overflow SW002 (NGR 150368E, 055690N). Overflows from the Storm Water Holding Tank are screened before entering the River Bandon. This will provide primary treatment in the event that effluent spills to the outfall.

SW002 has been designed to meet the definition of '*Storm Water Overflow*' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG '*Procedures and Criteria in Relation to Storm Water Overflows*', 1995.

EO

A new back-up generator is present at the WwTP to provide for continued operation of the WwTP in the event of an interruption in the power supply. If there was a "*catastrophic failure*" whereby there was a power failure, and the backup generator was to fail then flows would enter the stormwater storage tank. Water will fill the tank to the point of the overflow and water will discharge *via* overflow SW002 to the River Bandon. All appropriate design measures and mitigation to prevent Emergency Overflow that can be applied has been incorporated in the design and operation of the discharges.

SW004 – Dual Function Overflow from Watergate Street Pumping Station

There is one Dual Function Overflow (SW004) at the Watergate Street Pumping Station which when activated discharges to the River Bandon at SW004 (NGR 149316E, 055104N).

SWO

SW004 has been designed to meet the definition of '*Storm Water Overflow*' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG '*Procedures and Criteria in Relation to Storm Water Overflows*', 1995.

EO

In the event of a power failure or pump failure at the Watergate Street Pumping Station, flows will discharge through 2 no. screened overflows to the adjacent storm sump and then discharge to the Bandon River *via* the overflow SW004. All appropriate design measures and mitigation to prevent Emergency Overflow that can be applied has been incorporated in the design and operation of the discharges.

SW008 - SWO at Glasslinn Road

There is a single SWO (SW008) along the Glasslinn Road. This SWO has been designed to meet the definition of '*Storm Water Overflow*' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG '*Procedures and Criteria in Relation to Storm Water Overflows*', 1995.

SW014 - SWO at Glasslinn Road

There is a single SWO (SW014) along the N71 Road. This SWO has been designed to meet the definition of '*Storm Water Overflow*' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG '*Procedures and Criteria in Relation to Storm Water Overflows*', 1995.

SW016 – Dual Function Overflow from Glasslinn Road Pumping Station

There is one Dual Function Overflow (SW016) at the Glasslinn Road Pumping Station which when activated discharges to the River Bandon at SW016 (NGR 150070E, 055290N).

SWO

SW016 has been designed to operate to meet the definition of 'Storm Water Overflow' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995.

EO

A new back-up generator and bunded fuel tanks are present at Glasslinn Pumping Station to provide for continued operation of the Pumping Station in the event of an interruption in the power supply. If there was a "catastrophic failure" whereby there was a power failure, and the backup generator was to fail then flows would enter the stormwater storage tank. In the event that the capacity of the wet well is exceeded then excess flows will be discharged to the River Bandon via SW016. All appropriate design measures and mitigation to prevent Emergency Overflow that can be applied has been incorporated in the design and operation of the discharges.

SW017 - Dual Function Overflow from Laragh Pumping Station

There is one Dual Function Overflow (SW017) at the Laragh Pumping Station which when activated discharges to the River Bandon at SW017 (NGR 145152E, 054669N).

SWO

SW017 has been designed to meet the definition of 'Storm Water Overflow' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995.

EO

This EO is only used in the case of a "catastrophic breakdown" of the Pumping Station. This overflow will control spills from the sump and will avoid flooding of the site and neighbouring land. Although these spills would be extremely rare, measures are included in the design in order to avoid such spills during emergency breakdown events. The storage capacity of the on-site storage tank is 80m³. A 6mm solids separation screen with a minimum solid capture rate of 80% (based on "Formula A" flow) has been installed at the overflow point. Like during a storm event this will provide primary treatment in the event that effluent spills to the overflow outfall (SW017) during a power/pump failure.

SW018 - SWO at New Road

There is a single SWO (SW018) along the New Road. This SWO has been designed to meet the definition of 'Storm Water Overflow' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995.

SW019 - EO from Castlewoods Pumping Station

There is one EO (SW019) at the Castlewoods Pumping Station which when activated discharges to the River Bandon at SW019 (NGR 147749E, 053889N).

This EO is only used in the case of a "catastrophic breakdown" of the Pumping Station. This overflow will control spills from the sump and will avoid flooding of the site and neighbouring land. Although these spills would be extremely rare, measures are included in the design in order to avoid such spills during emergency breakdown

events. Connection for a generator is available at the Castlewoods Pumping Station to provide for continued operation of the pumping equipment in the event of an interruption in the power supply.

SW020 - Dual Function Overflow from Kilbrogan Pumping Station

There is one Dual Function Overflow (SW020) at the Kilbrogan Pumping Station which when activated discharges to the River Bandon at SW020 (NGR 148713E, 055617N).

SWO

SW020 has been designed to meet the definition of 'Storm Water Overflow' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995.

EO

This EO is only used in the case of a "catastrophic breakdown" of the Pumping Station. This overflow will control spills from the sump and will avoid flooding of the site and neighbouring land. Although these spills would be extremely rare, measures are included in the design in order to avoid such spills during emergency breakdown events. Connection for a generator is available at the Kilbrogan Pumping Station to provide for continued operation of the pumping equipment in the event of an interruption in the power supply.

3.5 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 3.3** below.

3.5.1 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.
- **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.

3.5.2 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.
- **Groundwater Dependent Terrestrial Ecosystems (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.

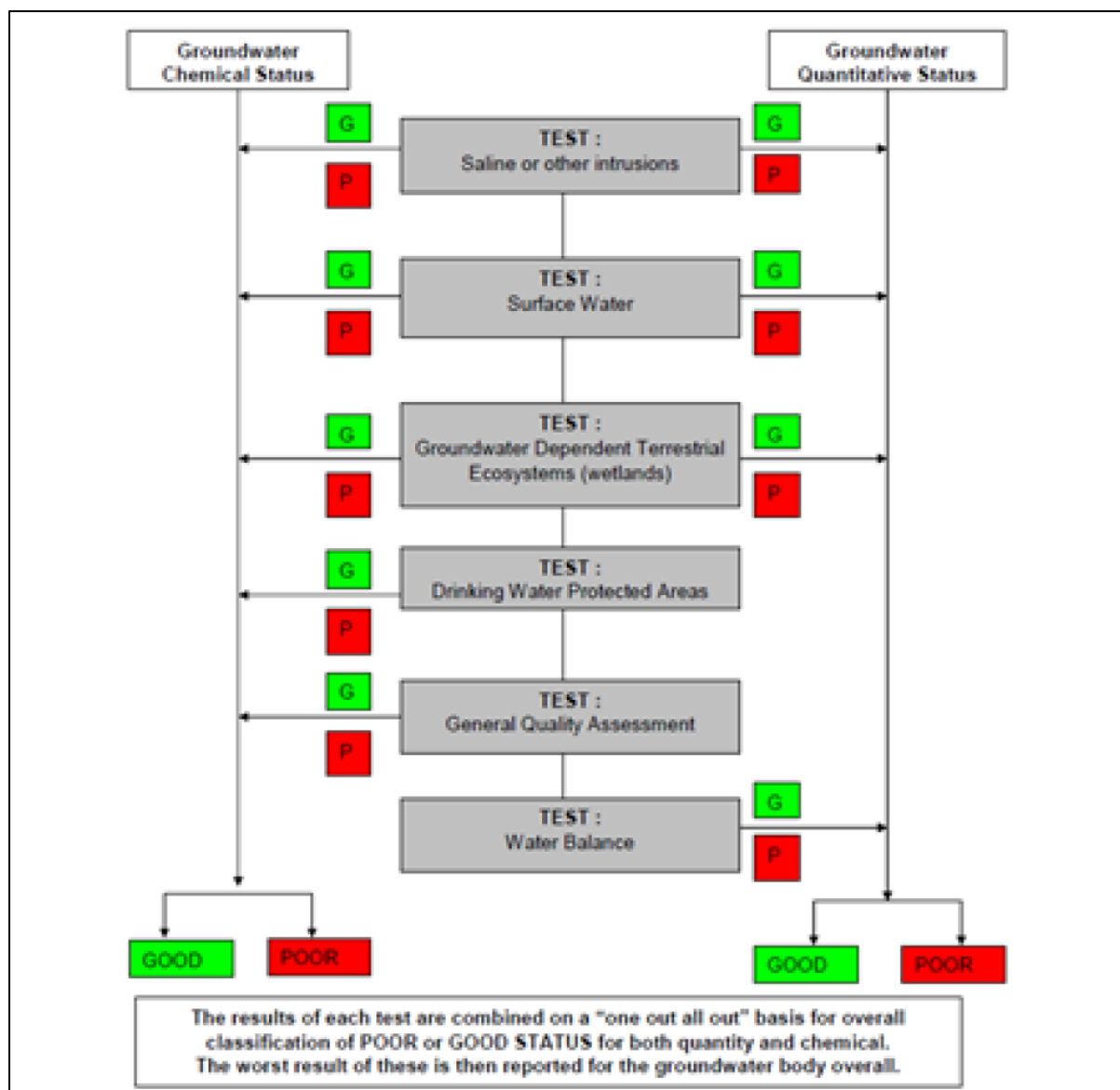


Figure 3.3 WFD classification elements for groundwater body status (Environmental Agency, 2015)

3.6 Groundwater Water Status

Aquifer Classification

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 (km²), well yield (m³/d), specific capacity (m³/d/m) and groundwater throughput (mm³/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 subdivided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (Ll). Similarly, poor aquifers are classed as either generally unproductive except for local zones (Pl) or generally unproductive (Pu).

The bedrock aquifer underlying the site according to the GSI (www.gsi.ie/mapping) National Draft Bedrock Aquifer Map is classified as a (Ll) *Locally Important Aquifer*, i.e. *bedrock aquifer which is moderately productive only in local zones*.

Aquifer vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. Due to the nature of the flow of groundwater through bedrock in Ireland, which is almost completely through fissures/fractures, the main feature that protects groundwater from contamination, and therefore the most important feature in the protection of groundwater, is the subsoil (which can consist solely of/ or of mixtures of peat, sand, gravel, glacial till, clays or silts).

Groundwater Vulnerability is a term used to represent the natural ground characteristics that determine the ease with which groundwater may be contaminated by human activities. The GSI currently classifies the aquifer vulnerability in the region of the agglomeration as *Extreme (E)* to *High (H)* which indicates an overburden depth of less than 5 metres of low permeability soil present, with a moderate vulnerability noted at along the Bandon waterbody at discharge point SW017.

Groundwater Quality

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, 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.

The Groundwater Body (GWB) underlying the agglomeration is the Bandon GWB (EU Groundwater Body Code: IE_SW_G_086). Currently, the EPA (2022) classifies the Bandon GWB as having '*Good Status*', with a Ground Waterbody Risk score of '*under review*'. The Bandon GWB has a *Good Status* for chemical and quantitative categories. Therefore, the overall status is considered *Good*. This is consistent with the *Good* status for the 2013-2018 assessment period.

4.0 ASSESSMENT METHODOLOGY

4.1 Introduction

As stated above (**Section 1.2**) projects that have the potential to impact on current or predicted WFD status are required to assess their compliance against the objectives defined for potentially affected water bodies.

4.2 No Deterioration Assessment

The no deterioration baseline for each water body is the status that is reported in **Section 3.4** Surface Water Quality and **Section 3.6** Groundwater Quality. There are no 'high status' waterbodies within the study area, while the underlying bedrock aquifer (groundwater body) is considered 'Good status'.

4.2.1 Surface Water No Deterioration Assessment

Table 4.1 below presents the matrix used to assess the effect of the operational discharges 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 4.1** is applied to the spreadsheet assessment in **Appendix A** of this report.

Table 4-1 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.
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4.2.2 Groundwater No Deterioration Assessment

Table 4.2 below presents the matrix used to assess the effect of the operational discharges 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 4.2** is applied to the spreadsheet assessment in **Appendix A**.

Table 4-2 Groundwater Assessment Matrix

Magnitude of Impact of the operational discharges 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

4.3 Future Status Objectives

RBMPs are used to outline water body pressures and the actions that are required to address them. The future status objective assessment considers the ecological potential of a surface water body and the mitigation measures that defined the ecological potential. Assessments in this Project are based on mitigation measures defined in the EIAR which will not impact on the WFD status and risk as well as the objectives set out in the 2nd Cycle RBMP 2018-2021 and *draft* 3rd Cycle RBMP 2022-2027. The assessment considers whether the operational discharges have the potential to prevent the implementation or impact the effectiveness of the defined measures.

5.0 WATER FRAMEWORK DIRECTIVE ASSESSMENT

5.1 General Approach and Project Details

The WFD Assessment uses a spreadsheet tool to assess the effects of the operational discharges on each of the WFD elements (biological, physico-chemical and hydromorphological surface water elements, and quantitative and chemical groundwater elements).

Both the surface water assessment and the groundwater assessment examine the potential effects of the operational discharges of the Bandon agglomeration. A full description of the proposed development is detailed in **Chapter 3** of the EIAR.

- **Primary Discharge:** The primary discharge discharges into the River Bandon (Bandon_090).
- **Overflow:** There are 5 no. Dual Function Overflows (SW002, SW004, SW016, SW017 and SW020) which will operate as an SWO or EO *i.e.*, an overflow which can act as a SWO or as an EO depending on the event. There are 3 no. SWOs in the agglomeration (SW008, SW014 and SW018) and 1 no. EO (SW019).

For surface water & groundwater, the potential effects identified are as a result of:

- Operational discharges; and
- Accidental [unintended] discharges and spills

Appendix A contains the surface water and groundwater assessments where the above potential effects are considered. The colour coded system referred to in **Table 4-1** and **Table 4-2** above is used to give a visual impression of the assessment

5.1.1 Summary of Source-Pathway-Receptor (S-P-R) Model

The table below (**Table 5.1**) describes the S-P-R model for operational discharges.

Table 5.1 Source-Pathway-Receptor (S-P-R) Model (Pollutant Linkage Assessment) (with mitigation)

Source	Pathways	Receptors considered	Risk of Impact	Mitigation Measures
Primary Discharge to the Bandon River (IE_SW_20B020800).	Direct pathway to hydrological environment via SW001	Hydrological environment (Bandon River)	No perceptible risk as an assimilative capacity assessment for a conservative scenario based on the proposed ELVS demonstrates that there is adequate assimilative capacity in the Bandon River to ensure compliance with the Good status standards set in European Communities Environmental Objectives (Surface Water) Regulations, 2009, as amended. The proposed ELVs take account of the sensitivity of the receiving River Bandon.	There will be no deterioration of the water quality status of the waterbody. Mitigation measures to avoid or reduce the potential impacts of SW001 and other operational discharges on the WFD status are therefore not required.
Overflows the Bandon River (IE_SW_20B020800).	Direct pathway to hydrological environment via SW002, SW008, SW014 and SW016 – SW020)	Hydrological environment (Bandon River)	No perceptible risk due to the implementation of the design measures which includes improved attenuation of stormflow and improved treatment processes prior to discharge to the hydrological environment.	There will be no deterioration of the water quality status of the waterbody. Mitigation measures to avoid or reduce the potential impacts of SW002, SW008, SW014 and SW016 to SW020 on the WFD status are therefore not required.
Overflows to the Bandon River (IE_SW_20B020780).	Direct pathway to hydrological environment via SW017	Hydrological environment (Bandon River)	No perceptible risk due to the implementation of the design measures which includes improved attenuation of stormflow and improved treatment processes prior to discharge to the hydrological environment.	There will be no deterioration of the water quality status of the waterbody. Mitigation measures to avoid or reduce the potential impacts of SW017 on the WFD status are therefore not required.

5.2 No Deterioration Assessment

5.2.1 Hydrological Environment

The WwTP upgrade has been designed to meet the current D0136-01 ELVs along with a more onerous Ortho-phosphate ELV. The assimilative capacity calculations (**Appendix 2** of the EIAR) demonstrate that based on background water quality, future loads and 95%ile flows that the ELV's are sufficient to ensure the WFD waterbody objective of maintaining Good status can be met. Calculations show that the Assimilative Capacity would not exceed the established threshold values for Biological Oxygen Demand (BOD), Total Ammonia and Ortho-phosphate in the receiving River Bandon waterbody in order to maintain 'Good' status. Therefore, there will be no deterioration of the water quality status of the waterbody.

In terms of the SWOs, there is the potential for overflows during a storm event. However it is important to reiterate that, all SWOs have been designed to meet the definition of 'Storm Water Overflow' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995 and a number of measures have been incorporated into the design to prevent unintended discharges (Refer to **Attachment C.2** of WWDL Application Review Documentation).

A number of measures have been incorporated into the design to prevent unintended discharges (Refer to **Attachment C.2** of WWDL Application Review Documentation). In this context, Emergency discharges will be highly unlikely as all appropriate design measures and mitigation to prevent Emergency Overflows that can be applied have been incorporated in the Pumping Station design, however, should one occur, it will be temporary (short-lived) and have no long-term negative impact on the waterbody quality.

There is no dewatering associated with this Project, hence there is no impact on the hydrological environment in terms of baseflow.

Based on the above, overall, the potential effects on the WFD status to the waterbodies are considered "*No Impact*" i.e., no change to the WFD status or elements in terms of the hydrological environment.

5.2.2 Bandon Groundwater Body (GWB)

There are no potential impacts to the hydrogeological environment as there is no discharge to ground or active dewatering associated with the operational discharges.

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

5.3 Future Good Status

Currently, based on the recently published 2016-2021 WFD assessment period, the EPA classifies the WFD Ecological Status for the Bandon_090 and Bandon_080 waterbodies as having 'Good Status'.

Therefore, the objectives for both sections of the Banon waterbody are currently being achieved. The main pressure associated with the Bandon-Ilen Catchment is excess nutrients impacting 22 waterbodies in Cycle 3. Organic pollution and sediment issues are each impacting 10 waterbodies, morphological and hydrological impacts are affecting six and two waterbodies, respectively. For rivers, the main significant issues

are nutrient pollution (10), sediment (9), morphological impacts (6), organic pollution (4) and hydrological impacts (1) ([Bandon Ilen \(catchments.ie\)](#)).

As mentioned above, the main pressure is agricultural. Therefore, the main potential contaminants are phosphate and nitrates which are mainly associated with agricultural activities and wastewater. The Bandon agglomeration is listed as a pressure on its receiving waterbody. The removal of 10 no. SWOs and the proposed more onerous ELV for Ortho-phosphate, and the proposed design and operation of the overflows, will result in a reduction in overall nutrient input into the river system. Therefore, the operational discharges will not have any discharges which will hinder catchment improvement measures.

The 2nd cycle of the RBMP 2018-2021 highlighted that the Bandon Estuary (slightly downgradient from the WWTP site) was an Area for Action, while the *draft* 3rd cycle of the RBMP 2022-2027 highlighted the Lower Bandon and Bandon Estuary for restoration. This indicates that the overall waterbody is *below Good Status*, and the key objective is to restore this waterbody to *Good* status by 2027.

The objective of the Bandon GWB is Good for 2018. Therefore, the objective is currently being met.

At present there are no local targeted measures within the catchments 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.

Based on the above information it is considered that any of the aspects of the operational discharges will not prevent the WFD objectives from being achieved or to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

6.0 CONCLUSIONS

This WFD Screening Assessment indicates that, based on the nature of the operational discharges, there is no potential for adverse or long-term effects on the River Bandon surface water body. It has been assessed that the operational discharges will not cause any significant deterioration or change in the current water body Good status or to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027

The WFD assessment indicates that there is no potential for adverse or minor temporary or localised effects on the Bandon groundwater body. Therefore, it has been assessed that the operational discharges will cause any significant deterioration or change in water body status or prevent attainment, or potential to achieve the WFD objectives or to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

No further assessment of WFD is recommended given that no significant deterioration or change in water body status is expected based on the nature of the Bandon agglomeration operational discharges.

7.0 STUDY LIMITATIONS

The conclusions and recommendations listed above are based on our current understanding of the operational discharges. This has been formed from review of historical maps, review of current and previous environmental and engineering reports for the project. This information is taken as being accurate and true.

Public databases held by the EPA, GSI, OPW, NPWS and OSI have been consulted and the most recent available data has been referenced.

No subsurface or destructive testing was carried out as part of this assessment.

8.0 REFERENCES

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- Ordnance Survey of Ireland (OSI)
- Teagasc subsoil database
- River Basin Management Plan for Ireland 2018-2021.
- *Draft* River Basin Management Plan for Ireland 2022-2027.
- Cork County Development Plan 2022-2028.

APPENDIX A
WATER FRAMEWORK DIRECTIVE ASSESSMENT MATRIX

Risk screening of potential to cause deterioration of current WFD status						
	SURFACE WATER	Scheme Elements	Bandon WWDL (D0136-01) Review Application		Mitigation Measures	Overall Impact with mitigation measures
	IE_SW_20B020800	Phase (Operation)	Operational Discharges			
	Bandon Catchment and associated streams	Identified Quantitative Impacts	SW001	Overflows (SWOs & EOs)		
WFD Status	Macrophytes and phytobenthos - combined	Predicted change to status elements (green = none, amber = possibly, red = likely)	No measurable change anticipated.	No measurable change anticipated.	<p>There will be no deterioration of the water quality status of the Bandon River (IE_SW_20B020800).</p> <p>Mitigation measures to avoid or reduce the potential impacts of the operational discharges on the WFD status are therefore not required.</p> <p>Details of Design Measures:</p> <p>The Bandon WwTP has been designed to IW design standards to ensure that the effluent discharge parameters are compliant with proposed ELVs. As described in Chapter 3 of the EIAR, a WAC was carried out to verify that the proposed ELVs are fit for purpose and have been appropriately assigned to ensure that the receiving waterbody has the capacity to accommodate the proposed discharge from the upgraded WwTP without causing a breach in the relevant standards as outlined in National and European legislation.</p> <p>All SWOs have been designed to meet the definition of 'Storm Water Overflow' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995.</p> <p>Provision for a standby power supply will be made at the WwTP and Glasslinn Pumping Station to provide for continued operation of the pumping equipment in the event of an interruption in the power supply. A connection for a generator is available at the Castlewoods Pumping Station and Kilbrogan Pumping Station to provide for continued operation of the pumping equipment in the event of an interruption in the power supply.</p>	No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Macroinvertebrates		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 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.	<p>In the unlikely event where the backup generator fails and where there is a prolonged power failure, the wastewater will begin to fill the stormwater tank until it reaches its capacity and will then be discharged to the Bandon River via the Emergency Overflow. In this context, Emergency discharges will be highly unlikely as all appropriate design measures and mitigation to prevent Emergency Overflows that can be applied have been incorporated in the design of these overflows</p> <p>Alarms for WwTP fed to SCADA with alarms sent to operators.</p> <p>High level/pump failure/power outage alarms at network Pumping Stations with alerts sent to operator.</p> <p>An Emergency Response Plan and Procedures, Operation and Maintenance Procedures for all equipment is in place and will be implemented by the appointed plant operator, as required.</p> <p>Refer to Attachment C.2 of WWDA Review Application Documentation for further details on Measures to Prevent Unintended Discharges to the Bandon River.</p>	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 anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Ortho-Phosphate		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.	<p>Alarms for WwTP fed to SCADA with alarms sent to operators.</p> <p>High level/pump failure/power outage alarms at network Pumping Stations with alerts sent to operator.</p> <p>An Emergency Response Plan and Procedures, Operation and Maintenance Procedures for all equipment is in place and will be implemented by the appointed plant operator, as required.</p> <p>Refer to Attachment C.2 of WWDA Review Application Documentation for further details on Measures to Prevent Unintended Discharges to the Bandon River.</p>	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 anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	River continuity		Not Applicable.	Not Applicable.		Not Applicable.
	River depth and width variation bed		No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Structure and substrate of river bed		No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status
	Structure of riparian zone		No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrological environment with no deterioration to the WFD Status

Risk screening of potential to cause deterioration of current WFD status						
	GROUNDWATER	Scheme Elements	Bandon WWDL (D0136-01) Review Application		Mitigation Measures	Overall Impact
	IE_SW_G_086	Phase (Operation)	Operational Discharges			
	Bandon GWB	Identified Quantitative Impacts	SW001	Overflows (SWOs & EOs)		
Quantitative Elements	<p>Saline or other intrusions. 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.</p>	Predicted change to status elements (green = none, amber = possibly, red = likely)	No measurable change anticipated.	No measurable change anticipated.	<p>There will be no deterioration of the water quality status of the Bandon Groundwater Body.</p> <p>Mitigation measures to avoid or reduce the potential impacts of the operational discharges on the WFD status of the Bandon Groundwater Body are therefore not required.</p> <p>Details of Design Measures:</p> <p>The Bandon WwTP has been designed to IW design standards to ensure that the effluent discharge parameters are compliant with proposed ELVs. As described in Chapter 3 of the EIAR, a WAC was carried out to verify that the proposed ELVs are fit for purpose and have been appropriately assigned to ensure that the receiving waterbody has the capacity to accommodate the proposed discharge from the upgraded WwTP without causing a breach in the relevant standards as outlined in National and European legislation.</p> <p>All SWOs have been designed to meet the definition of 'Storm Water Overflow' as per Regulation 3 of the Waste Water Discharge (Authorisation) Regulations, 2007, as amended and the criteria as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995.</p> <p>Provision for a standby power supply will be made at the WwTP and Glasslinn Pumping Station to provide for continued operation of the pumping equipment in the event of an interruption in the power supply. A connection for a generator is available at the Castlewoods Pumping Station and Kilbrogan Pumping Station to provide for continued operation of the pumping equipment in the event of an interruption in the power supply.</p> <p>In the unlikely event where the backup generator fails and where there is a prolonged power failure, the wastewater will begin to fill the stormwater tank until it reaches its capacity and will then be discharged to the Bandon River via the Emergency Overflow. In this context, Emergency discharges will be highly unlikely as all appropriate design measures and mitigation to prevent Emergency Overflows that can be applied have been incorporated in the design of these overflows</p> <p>Alarms for WwTP fed to SCADA with alarms sent to operators.</p> <p>High level/pump failure/power outage alarms at network Pumping Stations with alerts sent to operator.</p>	No anticipated impacts to the hydrogeological environment with no deterioration to the WFD Status
	<p>Surface water To assess the impact of groundwater abstractions on the ecological status of surface water bodies.</p>		No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrogeological environment with no deterioration to the WFD Status
	<p>Groundwater Dependent Terrestrial Ecosystems (GWDTE's) To assess the impact of groundwater abstractions on the condition of GWDTE'S.</p>		No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrogeological environment with no deterioration to the WFD Status
	<p>Water balance To identify groundwater bodies where abstractions exceed the available resource.</p>		Not Applicable (no water supply from borehole anticipated)	Not Applicable (no water supply from borehole anticipated)		Not Applicable
Chemical Elements	<p>Saline or other intrusions 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.</p>	Predicted change to status elements (green = none, amber = possibly, red = likely)	No measurable change anticipated.	No measurable change anticipated.	<p>An Emergency Response Plan and Procedures, Operation and Maintenance Procedures for all equipment is in place and will be implemented by the appointed plant operator, as required.</p> <p>Refer to Attachment C.2 of WWDA Review Application Documentation for further details on Measures to Prevent Unintended Discharges to the Bandon Groundwater Body.</p>	No anticipated impacts to the hydrogeological environment with no deterioration to the WFD Status
	<p>Surface water To assess the impact of groundwater abstractions on the ecological status of surface water bodies.</p>		No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrogeological environment with no deterioration to the WFD Status
	<p>Groundwater Dependent Terrestrial Ecosystems (GWDTE's) To assess the impact of nutrient concentrations in groundwater (primarily phosphates) on GWDTE'S.</p>		No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrogeological environment with no deterioration to the WFD Status
	<p>Drinking Water Protected Areas (DrWPAs) 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.</p>		No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrogeological environment with no deterioration to the WFD Status
	<p>General quality assessment To identify groundwater bodies where widespread deterioration in quality has or will compromise the strategic use of groundwater.</p>		No measurable change anticipated.	No measurable change anticipated.		No anticipated impacts to the hydrogeological environment with no deterioration to the WFD Status