



ATTACHMENT D.2.2:

AA SCREENING & NATURA IMPACT STATEMENT REPORT, DECEMBER 2022

Irish Water Report

Appropriate Assessment Screening & Natura Impact Statement
Report as part of the Bandon Waste Water Discharge Licence
(D0136-01) Review
December 2022



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Introduction

This report provides information to enable the EPA as Competent Authority to conduct an Appropriate Assessment (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. It considers whether the operational discharges from the Bandon agglomeration, alone or in combination with other plans and projects, could adversely affect the integrity of European Site(s) in view of best scientific knowledge and the conservation objectives of the site(s). European Sites are those identified as sites of European Community importance designated as Special Areas of Conservation (SACs) under Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the "Habitats Directive") or as Special Protection Areas (SPAs) under the Conservation of Wild Birds Directive (79/409/ECC) as codified by Directive 2009/147/EC (the "Birds Directive").

This report takes account of the guidance for AA published by the Environmental Protection Agency's (EPA) '*Note on Appropriate Assessments for the purposes of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007)*' (EPA, 2009), the OPR guidance on Appropriate Assessment Screening for Development Management, OPR Practice Note PN01 (OPR, 2021) and the Department of the Environment, Heritage and Local Government's guidelines '*Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities*' (DoEHLG, 2009), together with subsequent case law.

This assessment 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, Natura Impact Statements (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 Irish Water 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.

Legislative Context

The Habitats Directive provides legal protection for habitats and species of European importance. Articles 3 to 9 provide the legislative means to protect habitats and species of Community interest through the establishment and conservation of an EU-wide network of sites known as Natura 2000. These are SACs designated under the Habitats Directive and SPAs designated under the Birds Directive.

Articles 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to affect European sites (Annex 1.1). Article 6(3) establishes the requirement for Appropriate Assessment (AA):

Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.

Article 6(4) states:

If, in spite of a negative assessment of the implications for the [Natura 2000] site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, Member States shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.

Article 7 of the Habitats Directive provides that the provisions of Article 6(3) and 6(4) (among other provisions) are to apply to SPAs designated under the Birds Directive.

Article 6(3) provides for a two-stage process. The first stage involves a screening for AA and the second stage arises where, having screened the application for the development, the competent authority determines that AA is required, in which case it must then carry out that AA. A competent authority does not have jurisdiction to grant development consent unless the AA provisions are correctly applied.

The Habitats and Birds Directives are transposed in Ireland under the European Communities (Birds and Natural Habitats) Regulations 2011, as amended (2011 Regulations). In relation to the assessments to be carried out under the Habitats Directive, the provisions of Regulation 42 of the 2011 Regulations require “a screening for AA of a... project for which an application for consent is received”. Following that screening, if the relevant public authority determines that an AA is required, then a Natura Impact Statement [NIS] must be submitted and “a public authority shall give consent for a... project, only after having determined that the... project shall not adversely affect the integrity of a European site”.

Methodology

Guidance Followed

Both EU and national guidance exists in relation to Member States fulfilling their requirements under the EU Habitats Directive, with particular reference to Article 6(3) and 6(4) of that Directive. The methodology followed in relation to this NIS has had regard to the following guidance:

- Office of the Planning Regulator (OPR). Appropriate Assessment Screening for Development Management. OPR Practice Note PN01. (OPR, 2021)
- Note on Appropriate Assessments for the purposes of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007). Environmental Protection Agency, (EPA, 2009).
- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. Department of Environment, Heritage and Local Government, (DoEHLG, 2010).
- Circular L8/08 – Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments. Department of Environment, Heritage and Local Government, (DoEHLG, 2008).
- Communication from the Commission on the Precautionary Principle. Office for Official Publications of the European Communities, Luxembourg, (EC, 2000).
- Managing Natura 2000 Sites: the provisions of Article 6 of the ‘Habitats’ Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg, (EC, 2018).
- Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Articles 6(3) and (4) of the Habitats Directive 92/43/EEC. Office for Official Publications of the European Communities, Brussels (EC, 2001).
- Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC. European Commission, Brussels (EC, 2021).
- Guidance document on Article 6(4) of the ‘Habitats Directive’ 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the Commission. Office for Official Publications of the European Communities, Luxembourg, (EC, 2007).
- Nature and biodiversity cases: Ruling of the European Court of Justice. Office for Official Publications of the European Communities, Luxembourg (EC, 2006).

- Interpretation Manual of European Union Habitats. Version EUR 28. European Commission (EC, 2013).
- Marine Natura Impact Statements in Irish Special Areas of Conservation: A working document, National Parks and Wildlife Service, Dublin (NPWS, 2012).
- EPA Guidance for Irish Water on Requests for Alterations to a Wastewater Discharge Licence or Certificate of Authorisation” (Revised March 2019).

Stages Involved in the Appropriate Assessment Process

Stage 1: Screening / Test of Significance

This process identifies whether the agglomeration operational discharges are directly connected to or necessary for the management of a European Site(s); and identifies whether the Bandon operational discharges are likely to have significant impacts upon a European Site(s) either alone or in combination with other projects or plans.

In essence, upon conducting a Stage 1 Screening, the competent authority is required to determine whether or not it can be excluded, on the basis of objective scientific information, that the project, individually or in combination with other plans or projects, will have a significant effect on a European site.

The output from this stage is a determination for each European Site(s) of not significant, significant, potentially significant, or uncertain effects. The latter three determinations will cause that site to be brought forward to Stage 2.

Stage 2: Appropriate Assessment

This stage considers the impact of the operational discharges on the integrity of a European Site(s), either alone or in combination with other projects or plans, with respect to (1) the site's conservation objectives; and (2) the site's structure and function and its overall integrity. The potential impacts from the Bandon operational discharges are examined with respect to the attributes and targets which define the favourable conservation condition of each qualifying interest in the European sites, and the extent, if any, to which meeting those targets could be affected. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts may be carried out at Stage 2.

To assist the competent authority to carry out the Stage 2 AA, the developer must prepare a Natura Impact Statement (NIS). This document must include sufficient information for the EPA to carry out the AA. If the assessment is negative, *i.e.*, adverse effects on the integrity of a European site cannot be excluded, then the process must consider alternatives (Stage 3) or proceed to Stage 4.

Stage 3: Assessment of Alternatives

This process examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the European Site. This assessment may be carried out concurrently with Stage 2 in order to find the most appropriate solution. If no alternatives exist or

all alternatives would result in negative impacts to the integrity of the European sites, then the process either moves to Stage 4 or the project is abandoned.

Stage 4: Assessment Where Adverse Impacts Remain

An assessment of compensatory measures where, in the light of an assessment of Imperative Reasons of Overriding Public Interest (IROPI), it is deemed that the project or plan should proceed.

Consultation

Irish Water 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 Waste Water Discharge Licence (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 AA.

“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 status. Also, the Waste Assimilative Capacity (WAC) calculations (**Appendix 1**) used to inform the Bandon WWDL review application and supporting documents, including this AA Screening & NIS 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).

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 Environmental Protection Agency 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 operational discharge locations were visited with the aim of identifying the aquatic habitats in the receiving waters, and determining what qualifying interests 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)¹ and the Annex I interpretation manual². Searches for protected species followed NRA (2009)³ guidance. Salmonid habitat was assessed for adult, juvenile and nursery habitat potential following DANI guidelines⁴, while lamprey habitat potential was assessed following Harvey & Cowx (2003)⁵.

¹ <https://www.npws.ie/sites/default/files/publications/pdf/A%20Guide%20to%20Habitats%20in%20Ireland%20-%20Fossitt.pdf>

² Interpretation Manual of European Union Habitats – EUR28

https://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/Int_Manual_EU28.pdf

³ 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>

⁴ <https://www.daera-ni.gov.uk/sites/default/files/publications/dcal/provision-of-salmon-and-trout-habitat-leaflet.pdf>

⁵ 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

Description of the Project

Bandon town lies within an agricultural landscape on the N71 ca. 25km southwest of Cork City. The Waste Water Treatment Plant (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 1**).

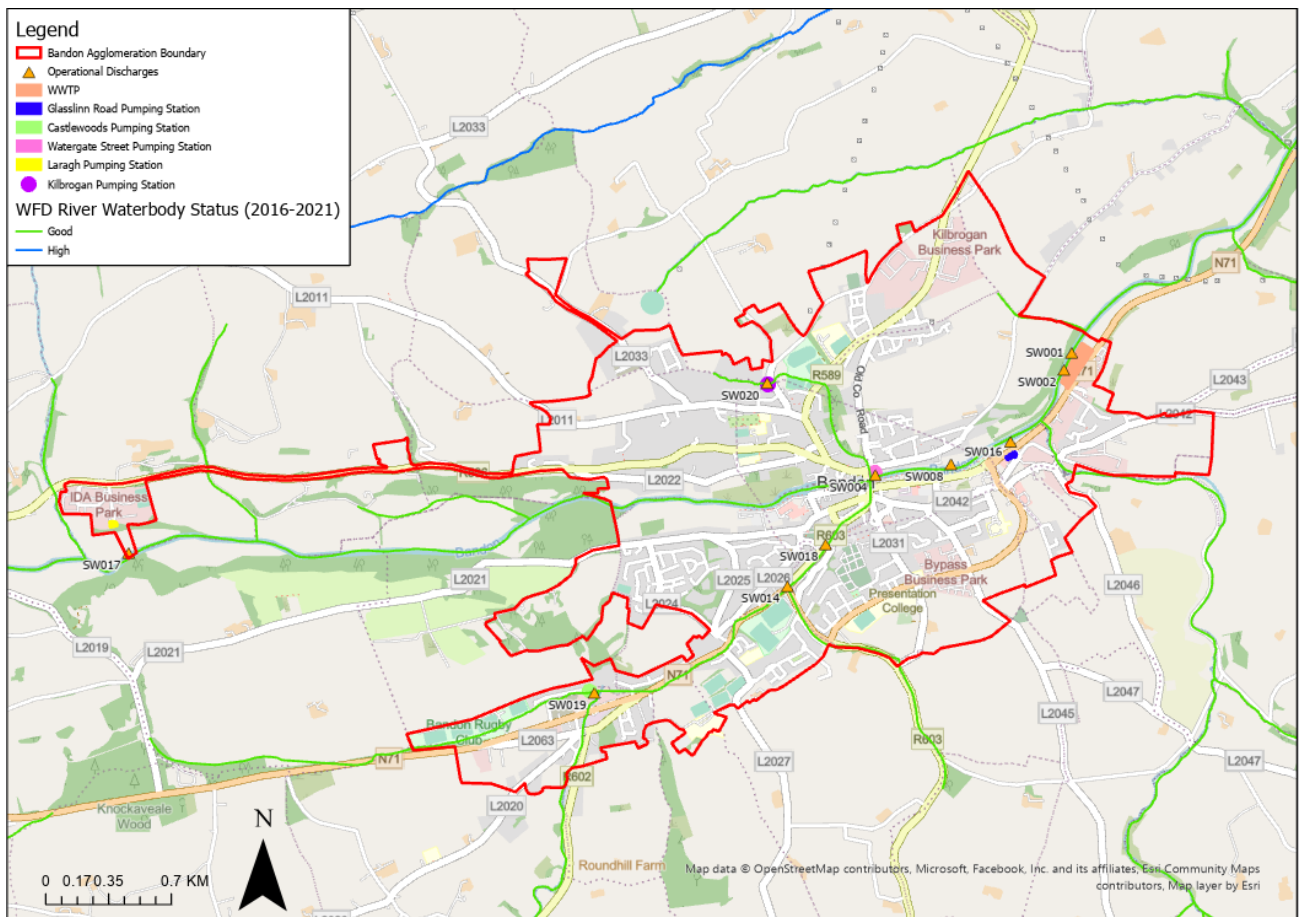


Figure 1: Operational Discharges relating to D0136-01 WWDL Review

The Bandon agglomeration has been upgraded through a number of completed and ongoing projects involving the provision of additional treatment processes at the WwTP, the upgrade of Glasslinn Road Pumping Station (completed in 2021), the connection of the Bandon IDA network to Bandon WwTP (completed in 2018), the provision of new sewers, and the removal of 10 no. storm-water overflows (due to be completed in by the end of Q1 2023)

The upgrade of the WwTP involved the following key infrastructure elements:

- 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* the 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 existing surface aeration system in the Aeration Ditch with a more efficient system.
- Upgrade of the 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 existing sludge dewatering building to house the 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 bunded 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 is to provide additional resilience for the WwTP and reduces the risks of flooding in the Bandon Sewer Network in the event of a mains power failure.
- Hydraulic upgrade of interconnecting pipelines.
- New chemical storage tank (Plan area circa 5m²), emergency shower and eyewash, chemical dosing pumps and delivery.

The upgraded Bandon WwTP has been designed to meet the Emission Limit Values (ELVs) as per Schedule A.1. of the WWDL D0136-01: BOD 25mg/l, COD 125mg/l, SS 35mg/l, pH 6-9 pH units, Ammonia 3mg/l and Orthophosphate 3mg/l. With regard to Ortho-phosphate, the licence specifies a limit of 3mg/l. However, considering future loadings, a more stringent ELV of 1.6mg/l will be required to ensure adequate assimilative capacity for Ortho-phosphate remains downstream in the river. The upgraded WwTP can achieve this ELV. A Total Phosphorus (TP) ELV of 2mg/l is also 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.

Any necessary changes to ensure compliance with a new licence will be implemented following confirmation from the EPA of the new licence ELVs.

Considering relevant flow data, upstream water quality and treatment capabilities, the above ELV have been selected to ensure Good status water chemistry requirements under the WFD are met by the primary discharge (SW001).

On completion of the network upgrade works (end of Q1 2023) there will be 5 no. Dual Function Overflows remaining in the agglomeration, one is associated with the WwTP, while the other four are associated with Pumping Stations (*i.e.*, Watergate Street Pumping Station, Glasslinn Road

Pumping Station, Laragh Pumping Station and Kilbrogan Pumping Station), 3 no. SWOs on the network and 1 no. EO associated with Castlewoods Pumping Station.

The SWO's 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. The following measures are also in place:

- Provision of 900m³ of storm storage provided at the WwTP, 250m³ at Glasslinn Road Pumping Station and 80m³ at Bandon Laragh Pumping Station .
- Provision of backup generators and banded 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 Dual Function Overflow at the WwTP and 4 no. at Pumping Stations (*i.e.*, Watergate Street Pumping Station, Glasslinn Pumping Station, Laragh Pumping Station and Kilbrogan Pumping Station) have been designed primarily as a SWO, as per Irish Water's Standard IW-TEC-800-03 and the 1995 DoEHLG criteria, but will function as an EO should a catastrophic and highly unlikely event occur where there is a double failure mode at the WwTP or Pumping Stations *e.g.*, duty and stand-by pump fails and/or power outage and back-up generator fails or other double failure scenarios.

All overflows when activated discharge to the Bandon_090 river waterbody, apart from SW017, which discharges to the Bandon_080.

Effluent data from 2021-2022 is presented in **Table 1.0** together with the current licensed ELVs. The 2021 AER was also reviewed, which states that the discharge is compliant with its current ELV's.

Table 1.0: Effluent Monitoring Data at Primary Discharge 2021-2022

Date	BOD mg/l	COD mg/l	SS mg/l	Ammonia mg/l	Ortho-phosphate mg/l	Total Phosphorus
Current ELVs as per Current Licence	25	125	35	3	3	-
21/01/2021	4	24	7	0.4	0.96	1.16
03/02/2021	3.8	<21	6	0.9	0.48	0.64
10/03/2021	7.1	59	8	1.6	0.82	1.1
14/04/2021	2.9	<21	6	0.6	2.52	2.68
19/05/2021	2.2	<21	5	0.8	1.79	1.73
23/06/2021	3.9	38	12	0.1	3.17	2.87
21/07/2021	1.7	<21	3	0.2	2.49	2.85
11/08/2021	1.6	30	4	<0.100	1.78	2.05
01/09/2021	2	26	4	0.5	2.82	2.86
13/10/2021	1.1	<21	4	1.2	1.27	1.38
03/11/2021	2	29	5	2.1	0.39	0.48
01/12/2021	4.4	23	5	2.1	2.86	3.35
26/01/2022	1.1	26	<2.5	0.2	1.61	1.74
02/02/2022	2	24	<2.5	<0.100	2.24	2.16
02/03/2022	1.7	27	<2.5	<0.100	1.41	1.37
21/04/2022	3.4	38	6	0.6	2.11	2.45
25/05/2022	2.2	<21	4	12.7	1.69	1.97
15/06/2022	2.8	<21	4	0.2	0.81	1.05
27/07/2022	18	42	16	0.2	2.32	2.45
10/08/2022	1.9	<21	3	0.1	2.39	2.48
21/09/2022	1.6	<21	4	<0.100	1.14	1.31
27/10/2022	1.3	<21	<2.5	0.043	0.44	0.51

Description of the Receiving Environment and Monitoring Results

Water Quality

The agglomeration discharges to the River Bandon are presented below (**Table 2.0**). These include the primary discharge from the WwTP (SW001) and 5 no. Dual Function Overflows which can function as Storm Water Overflows (SWO) or Emergency Overflows (EO), 1 no. EO, and 3 no. network SWOs. 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. However, the 3rd cycle catchment assessment report highlights combined sewer overflows from the Bandon agglomeration as a significant pressure for the Bandon_090 and Bandon_100 waterbodies⁶.

Table 2.0: Bandon Agglomeration Discharges

Discharge Name	Type	Asset	Discharge Location (NGR)	Receiving Waterbody
SW001	Primary Discharge	WwTP	150411E, 055785N	BANDON_090
SW002	Dual Function Overflow (SWO & EO)	WwTP	150368E, 055690N	BANDON_090
SW004	Dual Function Overflow (SWO & EO)	Watergate Street PS	149316E, 055104N	BANDON_090
SW008	SWO	Network	149738E, 055164N	BANDON_090
SW014	SWO	Network	148826E, 054484N	BANDON_090
SW016	Dual Function Overflow (SWO & EO)	Glasslinn Road PS	150070E, 055290N	BANDON_090
SW017	Dual Function Overflow (SWO & EO)	Laragh PS	145152E 054669N	BANDON_080
SW018	SWO	Network	149039E, 054717N	BANDON_090
SW019	EO from PS	Castlewoods PS	147749E, 053889N	BANDON_090
SW020	Dual Function Overflow (SWO & EO)	Kilbrogan PS	148713E, 055617N	BANDON_090

⁶ <https://catchments.ie/wp-content/files/catchmentassessments/20%20Bandon-Ilen%20Catchment%20Summary%20WFD%20Cycle%203.pdf>

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. 5.3km 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. This was consequently reflected in the recent WFD 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 3.0**. Monitoring locations are shown on **Figure 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 discharge with occasional exceedances. The current WFD target objective for the waterbody is to maintain Good status. 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 3.0: 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: ≤0.14 (good) ≤0.090 (high) Mean: ≤0.065 (good) ≤0.040 (high)	95%ile: ≤2.6 (good) (good) ≤2.2 (high)	95%ile: 80-120%	95%ile: ≤0.075 (good) ≤0.045 (high) Mean: ≤0.035 (good) ≤0.025 (high)	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	-

Sample Date	Ammonia mg/l	BOD mg/l	DO % Sat	Ortho-P mg/l	pH	SS mg/l
	95%ile: ≤0.14 (good) ≤0.090 (high) Mean: ≤0.065 (good) ≤0.040 (high)	95%ile: ≤2.6 (good) ≤2.2 (high)	95%ile: 80-120%	95%ile: ≤0.075 (good) ≤0.045 (high) Mean: ≤0.035 (good) ≤0.025 (high)	4.5< pH < 9.0	≤25 (Salmonid River Regulations (S.I. 293 of 1988))
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	-
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

Sample Date	Ammonia mg/l	BOD mg/l	DO % Sat	Ortho-P mg/l	pH	SS mg/l
	95%ile: ≤0.14 (good) ≤0.090 (high) Mean: ≤0.065 (good) ≤0.040 (high)	95%ile: ≤2.6 (good) ≤2.2 (high)	95%ile: 80-120%	95%ile: ≤0.075 (good) ≤0.045 (high) Mean: ≤0.035 (good) ≤0.025 (high)	4.5< pH < 9.0	≤25 (Salmonid River Regulations (S.I. 293 of 1988))
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

Waste Assimilative Calculations

A Waste Assimilative Capacity (WAC) analysis has been carried out on the receiving waterbody, the Bandon_090 on the basis of the current ELVs, with a proposed Ortho-phosphate ELV of 1.6mg/l, and a design PE of 14,456. The calculations were based on the EPA adopted approach utilising dry weather flows from the treatment plant mass-balanced against 95%ile flows in the river. The calculations were performed using January 2020 to May 2022 mean background river water quality data from Station RS20B020800. The calculations were also performed using the “*notionally clean river*”⁷ concentrations for comparison purposes only. The long-term 95-%ile flow for the relevant reach of the River Bandon as obtained from the EPA Hydrometrics and Groundwater Section is 1.570m³/sec.

Based on the recent 2016-2021 WFD published data, the water body objective for the River Bandon is to *maintain* Good status, as defined by the standards specified in the Surface Waters Regulations⁸ and detailed in **Table 4.0**. BOD, Ammonia and Ortho-phosphate meet the specified standards for both the background water quality and notionally-clean scenarios.

Table 4.0: Assimilative Capacity Calculations

Parameter	Background		WWDL ELV	Predicted D/S Concentration	Relevant Standards
BOD	Actual	1.304	25	1.750	95%ile: ≤2.6 (good)
	Notionally Clean	0.26		0.726	
Ortho-phosphate	Actual	0.033	1.6	0.063	95%ile: ≤0.075 (good) Mean: ≤0.035 (good)
	Notionally Clean	0.005		0.035	
Ammonia	Actual	0.033	3	0.089	95%ile: ≤0.14 (good) Mean: ≤0.065 (good)
	Notionally Clean	0.008		0.064	

⁷ The “*notionally clean*” river approach considers a hypothetically clean stretch of river (*i.e.* river of pristine water quality where the EPA’s Office of Environmental Assessment uses background concentrations of 0.26mg/l BOD, 0.005mg/l Ortho-phosphate, 0.008mg/l Ammonia) to determine if a discharge on its own is likely to cause a significant deterioration in the status of the water body into which it enters.

⁸ S.I No. 272 of 2009, as amended

Ecological Desktop & Field Survey

The ecological receptors of the site and surrounding area are described below, informed by the desk study and site visit. In the context of this assessment, the survey focuses on aquatic habitats and species, or those terrestrial species which may interact with the aquatic environment. Particular attention is paid to identifying habitats or species listed in the Habitats or Birds directives.

Habitats & Flora

The River Bandon in 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 PS (SW004), the Network SWO (SW008) and Glasslinn PS (SW016) enter this modified river section. Two Network SWOs (SW014 and SW018) enter a tributary of the River Bandon, the Bridewell stream, in a heavily modified channelised section which joins the River Bandon at Bandon Bridge. The EO at Castlewoods PS (SW019) enters the Castlebernard stream, just upstream of the of the Bridewell stream. The outfall from Kilbrogan PS (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.



Photo 1 River Bandon (facing upstream toward Bandon Br)



Photo 2 Watergate Street PS SWO/EO SW004



Photo 3 WwTP SWO/EO SW002



Photo 4 Glasslinn Rd PS SWO/EO SW016



Photo 5 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 Pumping Station discharge location (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*.



Photo 6 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 as described in the EU Interpretation manual. NPWS (2019a)⁹ 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 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 Zol of the discharges.

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 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.

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

⁹ NPWS (2019a). 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

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. Otters are listed on Annex II of the Habitats Directive.

There are no records of Crayfish, another Annex II species in the River Bandon catchment.

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. Salmon and the three lamprey species are listed under Annex II of the Habitats Directive.

Overall, the River Bandon is known for good salmon and sea trout angling (O'Briain *et al*, 2019¹⁰). 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 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, 2022¹¹) 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.

Atkins (2016) 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, and there may be *ex-situ* populations downstream of the SAC (but upstream of Bandon). Connectivity to the discharges is indirectly established to the SAC population due to the role salmonid species play in the Freshwater Pearl Mussel life cycle.

¹⁰ 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

¹¹ 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>

Screening for AA

European Sites within the potential zone of influence of the Operational Discharges

The Bandon agglomeration operational discharges are to the River Bandon which flows eastwards to enter coastal waters in Kinsale harbour. All European Sites which could potentially interact with this waterbody, are considered for source-pathway-receptor connectivity in order to establish the potential zone of influence of the discharges. This zone of influence encompasses European Sites within any potential dilution/dispersion zone or those with mobile species for which any potential *ex-situ* effects must be considered. These 9 no. sites are presented below in **Table 5.0** and shown in **Figure 3**.

Terrestrial sites which do not interact with the receiving waterbody have no potential to support connectivity. Short-form habitat names follow NPWS (2019a).

Table 5.0: European Sites considered in defining the potential zone of influence

Site Code	Site Name	Qualifying Interests	Pathway and Distance from Primary Discharge
002171	Bandon River SAC	Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Lampetra planeri</i> (Brook Lamprey) [1096]	Located ca. 29km upstream of primary discharge
004219	Courtmacsherry Bay SPA	Great Northern Diver (<i>Gavia immer</i>) [A003] Shelduck (<i>Tadorna tadorna</i>) [A048] Wigeon (<i>Anas penelope</i>) [A050] Red-breasted Merganser (<i>Mergus serrator</i>) [A069] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Lapwing (<i>Vanellus vanellus</i>) [A142] Dunlin (<i>Calidris alpina</i>) [A149] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Curlew (<i>Numenius arquata</i>) [A160] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Common Gull (<i>Larus canus</i>) [A182]	Coastal wetlands located ca. 10km south of primary discharge

Site Code	Site Name	Qualifying Interests	Pathway and Distance from Primary Discharge
		Wetland and Waterbirds [A999]	
001230	Courtmacsherry Estuary SAC	<p>Estuaries [1130]</p> <p>Mudflats and sandflats not covered by seawater at low tide [1140]</p> <p>Annual vegetation of drift lines [1210]</p> <p>Perennial vegetation of stony banks [1220]</p> <p>Salicornia and other annuals colonising mud and sand [1310]</p> <p>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]</p> <p>Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]</p> <p>Embryonic shifting dunes [2110]</p> <p>Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]</p> <p>Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]</p>	Coastal wetlands located ca. 10km south of primary discharge
004124	Sovereign Islands SPA	Cormorant (<i>Phalacrocorax carbo</i>) [A017]	Located in coastal waters off Kinsale ca. 29km downstream of primary discharge
000091	Clonakilty Bay SAC	<p>Mudflats and sandflats not covered by seawater at low tide [1140]</p> <p>Annual vegetation of drift lines [1210]</p> <p>Embryonic shifting dunes [2110]</p> <p>Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]</p> <p>Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]</p> <p>Atlantic decalcified fixed dunes (<i>Calluno-Ulicetea</i>) [2150]</p>	Coastal wetlands located ca. 16km southwest of Bandon
004081	Clonakilty Bay SPA	<p>Shelduck (<i>Tadorna tadorna</i>) [A048]</p> <p>Dunlin (<i>Calidris alpina</i>) [A149]</p> <p>Black-tailed Godwit (<i>Limosa limosa</i>) [A156]</p>	Coastal wetlands located ca. 16km southwest of Bandon

Site Code	Site Name	Qualifying Interests	Pathway and Distance from Primary Discharge
		Curlew (<i>Numenius arquata</i>) [A160] Wetland and Waterbirds [A999]	
004191	Seven Heads SPA	Chough (<i>Pyrrhonorax pyrrhonorax</i>) [A346]	Coastal site located ca. 17km south of Bandon
004021	Old Head of Kinsale SPA	Kittiwake (<i>Rissa tridactyla</i>) [A188] Guillemot (<i>Uria aalge</i>) [A199]	Coastal headland site located ca. 18km southeast of Bandon
004090	Galley Head to Duneen Point SPA	Chough (<i>Pyrrhonorax pyrrhonorax</i>) [A346]	Coastal site located ca. 20km southwest of Bandon

Of the sites presented above, considering the source-pathway-receptor model, the Bandon River SAC is potentially within the zone of influence of the Bandon discharges, due to the fact that migratory salmonid species using or transiting through the river in Bandon are a key element of the life cycle of the Freshwater Pearl Mussel population upstream. In addition, due to their mobile nature and potential to use the River Bandon on an *ex-situ* basis, qualifying waterbird species of the Courtmacsherry Bay SPA, Clonakilty Bay SPA and Sovereign Islands SPA are potentially within the zone of influence of the Bandon discharges. The potential impacts that could arise for the qualifying interests, and likely significant effects that could result, are considered further below.

Courtmacsherry Estuary SAC and Clonakilty Bay SAC, designated for estuarine and coastal habitats are not hydrologically connected to the River Bandon (aside from *via* the Celtic Sea) and are not designated for mobile species. Seven Heads SPA and Gally Head to Duneen Point SPA are designated for chough, which are specialists of coastal heaths and grasslands, and would not interact with the River Bandon. These sites are therefore excluded from further assessment.

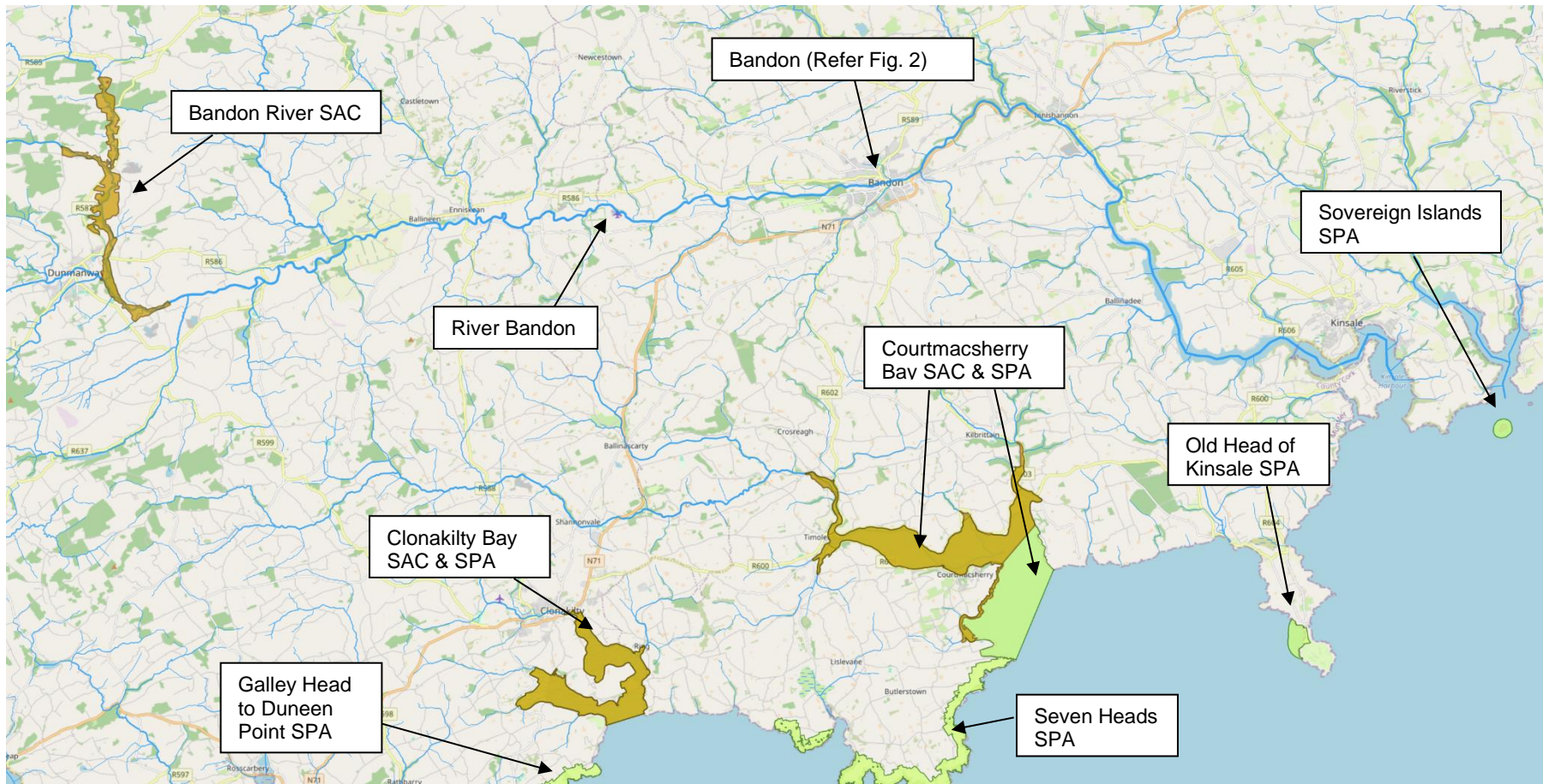


Figure 3 European Sites (Source EPA Maps accessed 24/11/2022)

Identification & Description of Potential Impacts

Elevated nutrient input from wastewater effluent into aquatic environments can lead to an altered nutrient balance (eutrophication), increased primary productivity, and the potential for algal blooms. Such impacts have the potential to affect the qualifying interests of European sites directly, indirectly or cumulatively with other activities, projects or plans.

The assimilative capacity calculations demonstrate that based on background water quality, future loads and 95%ile flows that the proposed ELV's are sufficient to ensure the waterbody EQS's can be met for the key parameters BOD, Ortho-phosphate and Ammonia. Biological water quality monitoring indicates that invertebrate status downstream of the agglomeration has improved from Moderate to Good recently. This is also reflected in the recently published 2016-2021 WFD data, where the Bandon_090 has been assigned Good status. The overflow discharges remain a significant pressure on the local waterbody, however.

The SWO's remaining in the upgraded sewerage network meet the required design criteria, and provision has been made for storage and/or screening. The adequacy of the upgrades to the agglomeration, in the context of European Sites require further consideration.

The likely significant effects (including *ex-situ*) to the qualifying interests of the Bandon River SAC, Courtmacsherry Bay SPA, Clonakilty Bay SPA and Sovereign Islands SPA that may directly or indirectly arise from the ongoing discharges are considered below.

Likely Significant Effects

The purpose of this section of the Screening is to examine the possibility whether the agglomeration discharges, either individually or in combination other plans and projects, are likely to result in significant effects to any European Site. It further considers the water dependent qualifying interests which may be sensitive to the potential impacts of the discharges, in the context of the nature and scale of these discharges.

The Conservation Objectives and associated Supporting Documents of the relevant European Sites were reviewed as part of this Screening Assessment:

- NPWS (2019) Conservation Objectives: Bandon River SAC 002171. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.
- NPWS (2014) Conservation Objectives: Courtmacsherry Bay SPA 004219. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
- NPWS (2014) Conservation Objectives: Clonakilty Bay SPA 004081. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
- NPWS (2022) Conservation objectives for Sovereign Islands SPA [004124]. Site Specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage.

The discharges are not directly connected with or necessary to the management of any site for nature conservation.

With regard to mobile bird species associated with Courtmacsherry Bay SPA, Clonakilty Bay SPA and Sovereign Islands SPA, their qualifying bird species, being highly-mobile, may occasionally forage within the River Bandon system. Optimal habitat however is available within their respective designated areas. Occasional use of more distant habitats in the River Bandon is not considered likely to significantly affect the populations of these species associated with the SPA's. 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. There is no potential for their conservation objectives in the SPA sites to be affected and consequently for significant effects to occur, consequently these sites are excluded from further consideration in the AA.

The Bandon River SAC, located ca. 29km upstream of the primary discharge point, is designated for Freshwater Pearl Mussel, Vegetation of flowing waters, Alluvial woodland and Brook lamprey. There is no pathway for impacts to the qualifying habitats which are associated with the designated channel ca. 29km upstream of the primary discharge point, and no pathway for impacts to brook lamprey which undertake only localised migrations. Freshwater Pearl Mussel however relies on migratory salmonid '*host fish*' for part of their life cycle. Salmonid species are also sensitive to water quality impacts, requiring Good status water quality conditions. While the Bandon discharges comply with the relevant standards, and the sewer network has been upgraded, on a precautionary basis the likelihood of significant effects to Freshwater Pearl Mussel within the SAC cannot be excluded at this stage without more detailed examination of the site's conservation objectives and targets in the context of the data on water quality.

Consequently, with the exception of the Bandon River SAC, there is no potential for direct or indirect significant effects to the qualifying interests of the SAC's and SPA's listed in **Table 5.0**.

Potential Cumulative or In-combination Effects

As part of AA Screening, in addition to the agglomeration discharges, other relevant projects and plans in the region must also be considered. This report aims to identify at this early stage any possible likely significant effects on the European Sites from the existing discharge in-combination or cumulatively with other plans and projects.

Plans

Plans of relevance include Irish Waters WSSP, the Cork County Development Plan, and the National River Basin Management Plan.

In 2015, Irish Water published the **Water Services Strategic Plan**, 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 Irish Water'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 Pumping Station upgrade, and the Bandon IDA Laragh Pumping Station and rising main works have been completed.

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)
 - 11.5.12 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.
 - 11.5.13 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 is identified as an Area For Action (AFA) with a Restoration objective. The catchment assessment points to the Irish Water infrastructural improvements in Bandon, which are 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 maintains 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 hydro morphology. Hence considered cumulatively with the Project, there is no potential for negative cumulative effects on any qualifying interest.

Projects

Cork Co.Co. planning system was reviewed for any recent 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. Irish Water reviews available capacity for treatment prior to any connection to the IW 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 qualifying interest.

Screening Conclusions

The likely impacts that will arise from the Bandon discharges have been examined in the context of a number of factors that could potentially affect the integrity of the Natura 2000 network.

On the basis of the information set out, and documentation referenced, in this AA Screening, the likelihood of significant effects to the Bandon River SAC cannot be excluded, and a Stage Two Appropriate Assessment is therefore provided.

Appropriate Assessment

The European Site which has been determined as requiring AA, is described and all the potential impacts resulting from the Bandon discharges are discussed in relation to the conservation objectives of Bandon River SAC. This European Site and its qualifying interests are described below.

Description of the European Sites

Bandon River SAC (002127)¹²

The Bandon River SAC consists of relatively short adjoining stretches of the Bandon and Caha Rivers. These rivers flow in a southerly direction to the east of Dunmanway, Co. Cork. Towards the southern end of the site the River Bandon takes an easterly course. Wet broadleaved semi-natural woodland is found in an undisturbed area of braided river channels and islands below Dunmanway. The river channels are well defined and the islands appear solid. Floating river vegetation is found along the length of the river and is dominated by water-crowfoots (*Ranunculus* spp). Heath in mosaic with wet grassland, exposed rock, scrub and improved grassland covers up to 30% of the site north of Long Bridge. Some small areas of woodland occur within the site north of Long Bridge. A population of Freshwater Pearl Mussel is found in the river. This species is listed on Annex II of the E.U. Habitats Directive. The river also supports populations of protected fish species, notably Brook Lamprey and Salmon (*Salmo salar*), both of which are also listed on Annex II of the E.U. Habitats Directive. This site contains good examples of two habitats listed on Annex I of the E.U. Habitats Directive - alluvial forest and floating river vegetation - and supports populations of four Annex II species - Otter, Salmon, Brook Lamprey and Freshwater Pearl Mussel. The presence of a number of Red Data Book plant and animal species adds further interest to the site.

Description of the Conservation Interests of the SAC

Qualifying Interests:

- Water courses of plain to montane levels with the *Ranunculus fluitantis* and *Callitriche-Batrachion* vegetation [3260]
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]
- *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029]
- *Lampetra planeri* (Brook Lamprey) [1096]

Vegetation of Flowing Waters, Alluvial Forests and Brook Lamprey are associated with the SAC designated area which is located ca. 29km upstream of the primary discharge point, and not hydrologically connected to the zone of influence of the discharges (which relates to the river within and downstream of Bandon). As noted at Screening stage however, Freshwater Pearl Mussel maintain a lifecycle link to salmonid species which may interact with the zone of influence of the discharges.

¹² Extracted from NPWS Site Synopsis Version Date 16.12.2013

Freshwater Pearl Mussel are widespread in the Bandon catchment (from the upper Bandon downstream of Cullenagh Lake to above Inishannon and in the Caha, Blackwater and other smaller tributaries); however, only part of the population and habitat is within the SAC (NPWS, 2019a). The braided channels downstream of the Long Bridge in Dunmanway are unique in Ireland having high mussel density in a wet woodland. High ranking threats and pressures identified in NPWS (2019b¹³) include physical modification of watercourses, agricultural activities and forestry activities. Urban waste water is noted as a medium-risk pressure/threat. The overall national assessment of the conservation status of Freshwater Pearl Mussel is Bad (*Deteriorating*) (NPWS, 2019b). Their mapped habitat detailed in the conservation objectives document is a combination of 1) the area of habitat adult and juvenile mussels can occupy and 2) the area of spawning and nursery habitats the host fish can occupy. The conservation objectives apply to the portion of the population and habitat in the Caha and main channel Bandon within the SAC only. While there is no potential direct connection to the mapped freshwater pearl mussel habitat, which lies beyond the direct zone of influence of the Bandon agglomeration discharges, the potential for water quality impacts to host salmonid species and consequent indirect effects must be considered.

Conservation Objectives of the SAC

Article 6 of the Habitats Directive states that:

Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications of the site in view of the site's conservation objectives.

The importance of a site designated under the Habitats Directive is defined by its qualifying features or interests. Qualifying interests for any Natura 2000 site are listed on a *pro forma*, called the Natura 2000 standard data form, which forms the basis of the rationale behind designation, and informs the Conservation Management Plan for targeted management and monitoring of key species and habitats.

Favourable conservation status of a habitat is achieved when:

- Its natural range, and area it covers within that range, are stable or increasing;
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and
- The conservation status of its typical species is favourable.

The attributes and targets of the detailed conservation objectives for the relevant qualifying interest of the SAC (i.e., Freshwater Pearl Mussel) are presented below.

¹³ NPWS (2019b) Article 17 Species Conservation Assessments 2019 Volume 3
<https://www.npws.ie/publications/article-17-reports/article-17-reports-2019>

Bandon River SAC

Site specific conservation objectives are available for this SAC (NPWS, 2019¹⁴) and are described below.

Freshwater Pearl Mussel

To restore the favourable conservation condition of Freshwater Pearl in the Bandon River SAC, which is defined by the following list of attributes and targets:

- Attribute: Distribution;
Target: Restore distribution to 12.2km.
- Attribute: Population size;
Target: Restore population to at least 50,000 adult mussels.
- Attribute: Population structure - recruitment;
Target: Restore to at least 20% of population no more than 65mm in length, and at least 5% of population no more than 30mm in length.
- Attribute: Population structure – adult mortality;
Target: No more than 5% decline from previous number of live adults counted dead shells less than 1% of the adult population and scattered in distribution.
- Attribute: Suitable habitat- extent;
Target: Maintain habitat extent at 12.2km in the Bandon system and any additional stretches necessary for salmonid spawning.
- Attribute: Suitable habitat - condition;
Target: Restore condition of suitable habitat.
- Attribute: Water quality- macroinvertebrate and phytobenthos (diatoms);
Target: Restore water quality -macroinvertebrates: EQR greater than 0.90 (Q4-5 or Q5);
phytobenthos: EQR greater than 0.93.
- Attribute: Substratum quality – filamentous algae (macroalgae), macrophytes (rooted higher plants);
Target: Restore substratum quality – filamentous algae absent or trace (<5%)
macrophytes absent or trace (<5%).
- Attribute: Substratum quality - sediment;
Target: Restore substratum quality - stable cobble and gravel substrate with very little fine material, no artificially elevated levels of fine sediment.
- Attribute: Substratum quality – oxygen availability;
Target: Restore no more than 20% decline from water column to 5cm depth in substrate.
- Attribute: Hydrological regime -flow variability;
Target: Restore appropriate hydrological regimes.
- Attribute: Host fish;
Target: Maintain sufficient juvenile salmonids to host glochidia larvae.
- Attribute: Fringing habitat – area and condition;
Target: Restore the area and condition of fringing habitats necessary to support the population.

¹⁴ NPWS (2019) Conservation Objectives: Bandon River SAC 002171. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

Impact Prediction

The potential impacts on water quality from the agglomeration operational discharges, alone and cumulatively with other catchment pressures is discussed below. The potential for water quality impacts to give rise to significant effects on the Freshwater Pearl Mussel (FWPM) population of the Bandon River SAC is then considered.

Impacts on water quality

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 which occur downstream of the ongoing Bandon discharges. Water chemistry data (**Table 3.0**) also indicates that predominately Good status conditions are met. As described earlier, on the basis of future loads and proposed ELV's, 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 Project is 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 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.

Adverse effects on Annex II Species

The operational discharges, considered in the context of background pressures, meet 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, 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 of and improve the quality of intermittent discharges entering the river, addressing this localised pressure.

The maintenance of Good status conditions is sufficient to ensure that 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. The conservation objective target for Freshwater Pearl Mussel, relating to host fish (*'maintain sufficient juvenile salmonids to host glochidial larvae'*) will be met, as Good water quality conditions support the upstream migration of salmonid fish crucial to the Freshwater Pearl Mussel life cycle. The ongoing discharges will not affect the movement of salmonid species through Bandon and will not prevent them reaching spawning grounds or affect recruitment of juvenile fish.

On the basis of the data considered above, adverse effects of the agglomeration discharges alone on the qualifying interests conservation objectives can be excluded.

Potential Cumulative or In-combination Effects

It is for the EPA catchments unit and licensing unit to determine and balance the proportion of assimilative capacity each sector should be permitted to take up, in the context of the relative pressures on the catchment. The assimilative capacity calculations for Bandon at future loadings have considered upstream pressures though use of background water quality data. It is proposed that the Ortho-phosphate ELV be reduced from 3mg/l as specified in the current licence to 1.6mg/l to ensure that adequate capacity remains downstream of Bandon for further inputs, while maintaining Good status.

As described earlier, the County Development Plans and River Basin Management Plan 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.

By meeting the proposed ELV's, and by addressing the significant pressure through the network upgrade, the agglomeration will not cumulatively affect the restoration conservation objective for Freshwater Pearl Mussel in the Bandon River SAC, or the conservation objectives of any other qualifying interests.

Mitigation Measures

The assessment has concluded that the discharges from the Bandon agglomeration do not have the potential to adversely affect the qualifying interests of the Bandon River SAC or any other European Site. Consequently, there is no requirement for mitigation measures.

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

NIS Conclusion Statement

This NIS has been prepared following the EPA (2009) '*Note on Appropriate Assessments for the purposes of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. No. 684 of 2007)*'. The Department of the Environment, Heritage and Local Government guidance '*Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities*' (DoEHLG, 2009) has also been taken into account. This NIS for the Waste Water Discharge Licence Review investigates the potential adverse effects on the aquatic qualifying interests of the Natura 2000 network arising from the plant discharge, in combination with other plans / projects affecting the aquatic environment. The assessment considers whether the Bandon agglomeration operational discharges, alone or in combination with other projects or plans, will have adverse effects on the *integrity* of a European site, and includes consideration of any mitigation measures that may be necessary to avoid, reduce or offset negative effects. Its purpose is to assist the competent authority in carrying out its AA of the proposed licence review.

Good status water quality conditions will be maintained in the River Bandon, thus supporting the salmonid population relied upon by Freshwater Pearl Mussel in the Bandon River SAC. Based on the assessment herein it has been concluded that there will be no adverse effects on the integrity of the Bandon River SAC, in view of this site's conservation objectives and that the conservation status of the Annex I habitats, Annex II species or Annex I bird species, will not be compromised by the agglomeration discharges either directly, indirectly or cumulatively.

It is therefore concluded that the Bandon agglomeration discharges, alone or in-combination with other plans and / or projects will not give rise to adverse effects on the integrity of the Bandon River SAC or any other European Site.

APPENDIX A

WASTE ASSIMILATIVE CAPACITY CALCULATIONS

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
m ³ /d	95%ile m ³ /d	BOD mg/l	BOD kg/d	BOD mg/l	Treatment Plant Capacity
2602	135,648	70.15	182.54	1.750	10 year design
m ³ /d	95%ile m ³ /d	NH ₃ mg/l	NH ₃ kg/d	NH ₃ mg/l	
2602	135,648	5.73	14.91	0.089	10 year design
m ³ /d	95%ile m ³ /d	OP mg/l	OP kg/d	OP mg/l	
2602	135,648	2.25	5.86	0.063	10 year design
					Yes
					Yes
					Yes
					Yes

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

Note 2: using 180 lpd

Project Number: 20893 Project Name: Bandon Sheet: 1 of 1	Rev	Date	By
	1.0	07-Aug-22	CAS
	2.0	19-Oct-22	CAS

Waste Assimilative Capacity (WAC) Calculation

Name of River	Bandon_090	WFD 2016 -2021 Status	Good
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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	(mg/l)	95%ile mg/l ^{Note 1}	Data Ref	
Carbonaceous BOD	0.260	25.00	2.60	SW Regulations - Good Status EQS	Good
Total Ammonia (NH ₂)	0.008	3.00	0.14	SW Regulations - Good Status EQS	Good
Ortho-Phosphate (OP)	0.005	1.60	0.075	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