River Bride (Blackpool)

Certified Drainage Scheme

Supplementary Information Response

In relation to issues raised in Judicial Review

Updated Water Framework Directive

Water Body Status Assessments

March 2025

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Acronyms

ABP	An Bord Pleanála
AWB	Artificial water body
BQE	Biological Quality Elements
CJEU	Court of Justice of the European Union
EC	European Commission
EcIA	Ecological Impact Assessment
EIAR	Environmental Impact Assessment Report
EQR	Environmental Quality Ratio
EQS	Environmental Quality Standard
FCS2	Fisheries Classification Scheme 2
GEP	Good ecological potential
GES	Good ecological status
GPC	General physicochemical
HMWB	Heavily modified water body
IFI	Inland Fisheries Ireland
MEP	Maximum Ecological Potential
RBMP	River Basin Management Plan
RWB	River water body
EPA	Environmental Protection Agency
WFD	Water Framework Directive

Glossary of Terms

Good ecological potential	Good Ecological Potential (GEP) and good chemical status are the environmental objectives for designated modified waterbodies (AWB and HMWB). GEP is site specific, taking into account the constraints imposed by the effect of physical alterations upon water body hydromorphology and therefore upon its biology. It is the equivalent of achieving Good Ecological Status in unmodified water bodies where the impact of physical modifications necessary to support the specified use have been taken into account.
Good ecological status	Article 2 (22) defines good ecological status as classified in accordance with Annex V which states GES is when "*there are slight changes in the [specific biological quality element] compared to the type-specific communities*".

Good surface water status	Article 2(18) of the WFD: "*the status achieved by a surface water body when both its ecological status and its chemical status are at least 'good'*"
Good surface water chemical status	Physicochemical and nutrient conditions are within the ranges established to ensure the functioning of the ecosystem and the achievement of the values specified for the biological quality elements and (Article 2 (24) of the WFD) "*in which concentrations of pollutants do not exceed the established environmental quality standards*".
Heavily modified water body	Article 2(9) of the WFD: "*a body of surface water which as a result of physical alterations by human activity is substantially changed in character*"
Surface water status	Article 2(17) of the WFD: "*the general expression of the status of a body of surface water, determined by the poorer of the ecological status and the physicochemical status*"

1 INTRODUCTION

The Bride (Blackpool) Certified Drainage Scheme was confirmed on March 11th, 2021. Notice was subsequently served, on June 23rd, 2021, of a Court Order granting leave to an application for judicial review including a stay on works.

On foot of the issues raised in the judicial review (*Moody et al. v MPER & AG* 2021/520 JR), and to assist in a decision on confirmation of the Scheme, the Department of Public Expenditure and Reform (DPER) made a request for supplementary information.

Ryan Hanley Consulting Engineers contracted Lauren Williams (Freshwater Ecologist) to provide technical input to the supplementary information response, which requested an assessment be made on implications of the issues raised in Ground 6 of the plaintiffs' action relating to the status of the waterbodies involved and how the proposed works will impact on said waterbodies.

The aim of formal WFD assessment is to demonstrate compliance with the WFD, in that the physical modifications under the Proposed Scheme will not give rise to deterioration of water body status, nor jeopardise attainment of at least good water body status. The Bride Blackpool River is a candidate Heavily Modified Waterbody (HMWB), hence the WFD assessment needs to consider potential effects on both waterbody ecological status and ecological potential.

A report entitled River Bride (Blackpool) Certified Drainage Scheme. Supplementary Information Response in relation to issues raised in Judicial Review. Ground 6 - Water Framework Directive (WFD) Water Body Status Assessments was prepared and submitted in October 2022.

A Further Information Request was subsequently issued by DPER in 2024, part of which required an update to the 2022 WFD Assessment. The current report provides the updated WFD water body status assessment, as of January 2025, for relevant waterbodies in relation to compliance with objectives for water body status under the WFD (2000/60/EC).

2 METHODOLOGY AND SOURCES OF INFORMATION

2.1 Resources

The following resources were consulted to inform this response:

- Water Framework Directive (2000/60/EC) text;
- WFD Common Implementation Strategy (CIS) Guidance
- Relevant Litigation relating to WFD, most importantly *Sweetman v An Bord Pleanála* [2021] IEHC 16 and *Case C-461/13 Bund für Umwelt und Naturschutz Deutschland* ECLI:EU:C:2015:433 (the *Weser* case);
- Environmental Protection Agency (EPA) maps and data: https://www.catchments.ie/
- Inland Fisheries Ireland (IFI) data
- Published scientific literature / journals.

2.2 Consultation

Written consultation by email, to inform this response, is summarised in **Table 2.1.**

Table 2-1 Consultation Record

Consultee	Response 2022	Update December 2024
EPA – Emma Quinlan	Upon query about when /if the [1]MQI tool for hydromorphology assessment will be available and whether this applies to WFD assessments in Ireland it was confirmed that while there are MQI-Ireland data available, the tool is currently in development and is not yet publicly disseminated. It was also stressed that MQI-Ireland is not currently considered within the WFD hydromorphological (and therefore, ecological) status method – RHAT is still the primary tool to address hydromorphological status – only at high status and surveillance sites. Over the next year or so, EPA will consider how best to make the MQI-Ireland data available, but there are no definite timelines on these proposed tasks yet.	No change since 2022 regarding the MQI tool. However, the Water Action Plan 2024, Ireland's third cycle River Basin Management Plan (RBMP) 2022-2027 was published in September 2024. *Appendix 1: Programme of Measures: Further information on the environmental measures to 2027* contains commitments on hydromorphological pressures, including the establishment of a 'National Hydromorphology Programme' (NHP) intended to facilitate the implementation of WFD objectives relating to the control of pressures on hydromorphology. In additiona, new legislation is proposed to control physical changes in or near water where there is potential to impact on status. Neither the NHP nor the proposed legislation have been formed or published at the time of writing this report.
IFI – Ronan Matson	Upon query about potential fish status classification of the Bride (Cork City)_020, R. Matson explained that, on the basis of data in the EIAR, the fish community status would likely approximate "moderate" owing to similarities in species diversity as recorded in IFI surveys just downstream of the donor waterbody Blarney_010. It was stressed, however, that each sampling site has specific characteristics, and that overall fish status calculated using the WFD Fisheries Classification Scheme 2 (FCS2) tool, is based	No change since 2002 with regards to fish status classification and the application of the FCS2 tool.

[1] Morphological Quality Index

	on case-by-case expected versus observed fish counts which take into account a number of variables. It is very difficult to confidently assign fish status without running the data through the probability-model that calculates fish EQR and status and this is not something that is publicly available.	

2.3 Water Body Status/Potential Impact Assessment

The author developed a framework for assessing impacts on water body status/potential based on WFD CIS guidance, with full cognisance of relevant WFD case law, following examples set out in WFD Common Implementation Strategy No. 36 (EC 2017). The process evaluates the effects of new physical modifications on ecological status/potential of surface water bodies and consequently tests compliance with WFD objectives.

2.4 Statement of Competence

Lauren Williams BSc PGDip MCIEEM is a qualified freshwater ecologist with over 24yrs professional consultancy experience working in New Zealand and Ireland. Lauren holds a BSc in Zoology (University of Otago, NZ); a Certificate in Environmental Law (Open Polytechnic of NZ) and a Post Graduate Diploma in Environmental Monitoring Assessment and Engineering with distinction from Trinity College Dublin. She is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM). Lauren specialises in water quality assessment, monitoring, aquatic ecological impact assessment and protected aquatic species and habitat surveys in relation to a wide range of infrastructural developments. Lauren has 24 years of experience identifying aquatic macroinvertebrates in field and laboratory and is an accredited River Habitat Survey operator (RHS - the UK precursor to RHAT). She has contributed field expertise to EPA national river monitoring programmes.

3 GROUND 6 – WATER FRAMEWORK DIRECTIVE

3.1 Background

Ground 6 of the plaintiffs' action (*Moody et al. v MPER & AG* 2021/520 JR) relates to the status of the water bodies and the implications of the Irish High Court findings of Hyland J. in *Sweetman v An Bord Pleanála* [2021] IEHC 16.

In that case, Hyland J. quashed a planning permission for a development because the EPA were yet to assign status to a water body. This meant it was technically impossible for the Board to assess whether the proposal was compliant with Article 4(1) of the Water Framework Directive (2000/60/EC).

Article 4(1)(a) of the WFD requires that, within specified time frames, Member States shall:

(i) prevent deterioration of the status of all bodies of surface water; and;
(ii) protect, enhance and restore all surface water bodies, with the aim of achieving good status; and;
(iii) protect and enhance all artificial and heavily modified bodies of water, with the aim of achieving good ecological potential and good surface water chemical status.

Hyland J. emphasised the issue was not with the quality of scientific information presented in the EIAR (see Section 4.1.3, below), but because the EPA, had not assigned status to the water body in question. The ruling made it clear that the EPA is the only agency in the state that could legally assign status under the WFD. This meant that technically the Board could not determine two key tests of WFD compliance established by the CJEU decision delivered in the [2]*Weser* case. The *Weser* decision, as interpretated in *Sweetman v An Bord Pleanála* [2021] IEHC 16 made it clear that: *[§102] "Member States are required to refuse authorisation for an individual project where it may cause a deterioration of the status of the body of surface water or where it jeopardises the attainment of good surface water status or of good ecological potential and good surface water chemical status by the date laid down by the Directive"*

The following analysis sets out a number of clarifications that are pertinent to the competent authorities' decision on the Bride (Blackpool) scheme in relation to WFD compliance. It examines the two key tests of WFD compliance in relation to the Bride (Blackpool) scheme as to whether:

1) deterioration of status may occur; and/or
2) attainment of good surface water status could be jeopardised.

3.2 Clarifications

3.2.1 EPA assigned water body status

The most important clarification is that the EPA assigned status in early 2022 to the water bodies potentially affected by the proposed Bride (Blackpool) scheme.

At the time of EIAR preparation and submission, the affected river water bodies were "*unassigned*" status, and the scheme could technically not (on the basis of *Sweetman v An Bord Pleanála* [2021] IEHC 16) be evaluated in terms of compliance with Article 4(1) of the WFD. Assignment of baseline water body status by the EPA addresses the fundamental issue raised in Ground 6 of the Judicial

[2] Case C-461/13 *Bund für Umwelt und Naturschutz Deutschland* ECLI:EU:C:2015:433

Review, because it allows for a legally valid evaluation of WFD compliance by the Competent Authority (In this case the Minister).

The original 2022 WFD Assessment report for the Supplementary Information Request response used EPA assigned water body status classifications for the 2013-2018 reporting period, which were the most recent available at that time. There has been a subsequent update in official EPA assigned water body status, which now covers the 2016-2021 reporting period. The most recent assigned status for the river water bodies (as of January 2025) is set out Section 3.2.3, below.

3.2.2 Affected river water bodies

In relation to §30 and §34 of *Moody et al. v MPER & AG* 2021/520 JR, it is first clarified that works proposed as part of the Bride (Blackpool) scheme directly affects two (not three) river water bodies (RWBs). These are:

- Bride (Cork City)_020 (Code: IE_SW_19B140300)
- Glennamought_Trib Bride_010 (Code: IE_SW_19G880990)

The two directly affected RWBs are illustrated in **Figure 3.1**. In addition, the Bride (Cork City)_010 adjoins Bride (Cork City)_020. It is not directly affected by the proposal but is examined in terms of indirect and cumulative effects on water body status objectives and WFD compliance in §3.5.

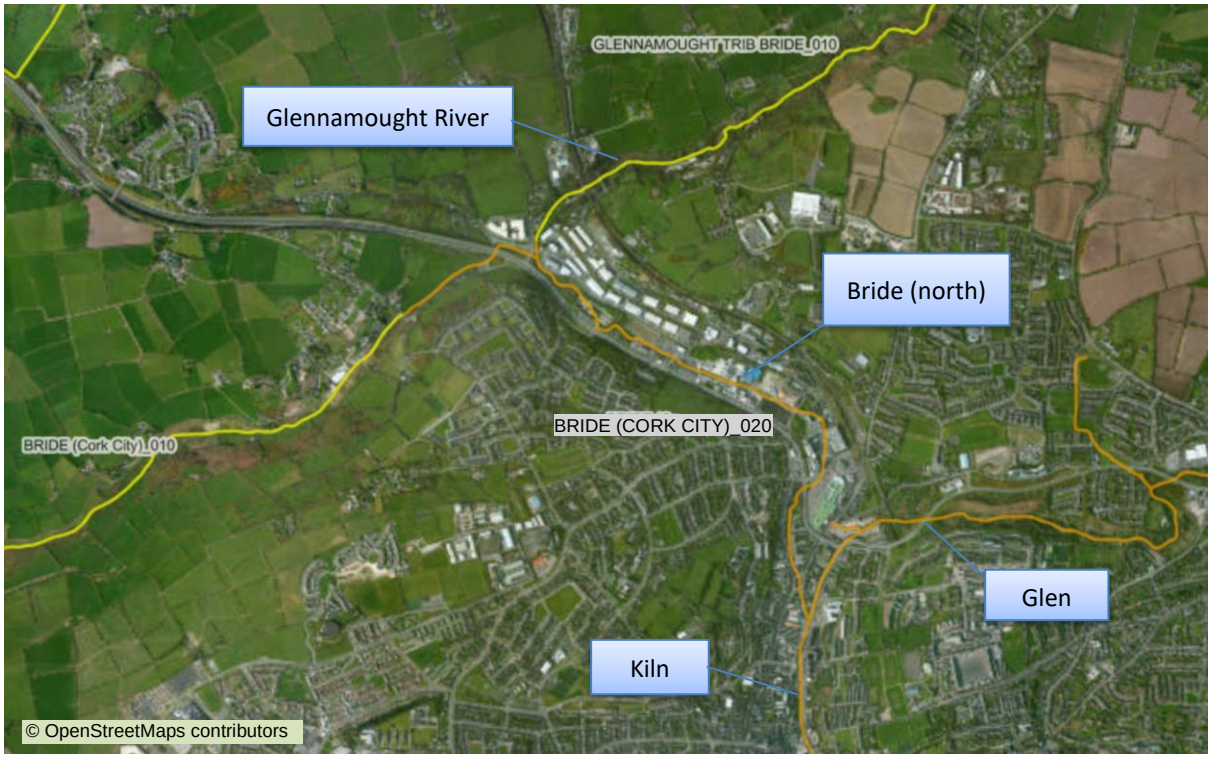

Figure 3-1 Location of RWBs with EPA status (2016-2021) (EPA watermaps)

Bride (Cork City)_020

This EPA delineated water body includes[3] river segments: Bride (north) (19B14), Glen River (19G09) and Kiln River (19K75). The Bride (Cork City)_020 will be subject to a range of measures with

[3] River segment codes are derived from the EPA online water map tool: https://gis.epa.ie/EPAMaps/

associated hydromorphological alterations under the proposed scheme. The Bride (north) is subject to most of these new interventions with minor alterations proposed on the Kiln and Glen rivers mainly relating to existing culvert maintenance.

Glennamought_Trib Bride_010

This EPA delineated water body encompasses the Glennamought River sub-basin, a tributary of the Bride (Blackpool) adjoining the Bride (Cork City)_020 at the Commons Road roundabout. The Glennamaought_010 will be subject to a small number of measures (flood wall, embankment), affecting only a 400m reach upstream of the Commons Road roundabout. Approximately 2.5% of the overall water body channel length is affected by the proposal.

3.2.3 Current EPA status of affected river water bodies

Status was first assigned by the EPA to these previously unclassified water bodies on 1 March 2022 for the 2013-2018 reporting period. At that time the EPA techniques used to classify the affected RWBs were “Extrapolation” and “Expert Judgement”. “Extrapolation” relied on the concept of a ‘donor’ RWB to assign status, but that technique is no longer utilised. **Table 3.1** sets out EPA classification of the three RWBs for the most recent reporting period (2016-2021) which assigned status using either “Modelling” or “Expert Judgement” techniques. None of the three RWBs are physically monitored (in the field) by the EPA.

Table 3-1 EPA assigned status for relevant RWBs

RWB Code	RWB Name	EPA Assessment Technique (2016-2021)	EPA EcoStatus 2016-2021
IE_SW_19B140300	Bride (Cork City)_020	Modelling	Poor
IE_SW_19G880990	Glennamought Trib Bride_010	Expert Judgement	Moderate
IE_SW_19B140110	Bride (Cork City)_010	Modelling	Moderate

In the absence of monitoring by the EPA, field surveys to ascertain [4]’representative’ status of water bodies were undertaken for both the original EIAR for the Proposed Scheme, with surveys and data updated in 2024 as part of this Further Information Request. **Table 3.2** and **Figure 3-2** summarise the most recent (2024) Q-value data, corresponding ‘representative’ WFD status (Triturus, 2024a) and comparisons to the official EPA RWB status.

Following the WFD one out, all out (OOAO) rule - if more than one site within the water body is monitored, the poorest result defines overall status. On this basis, the Bride (Cork City)_020 is at OOAO ‘representative’ ‘poor’ status using field based survey (2024), i.e., Q3 at Site B2, B5 and C1, which aligns with ‘poor’ status assigned by the EPA using modelling.

In contrast, field based OOAO ‘representative’ status (2024) is ‘poor’ for both the Glennamought Trib Bride_010 and Bride (Cork City)_010 which is poorer than EPA assigned status of ‘moderate’ for both RWBs using expert judgement and modelling, respectively. See Section 3.2.4 for further discussion on use of ‘representative’ / proxy status within the EIAR.

[4] The term ‘representative’ status is used to signify it is outside the formal EPA River Monitoring Programme and reporting required under the WFD. Only the EPA can assign formal status, which is reported to Europe and is the legally valid baseline status for water status impact assessment. This does not mean the results have no merit - the methods used for these studies follow EPA protocols / published methods for calculating the Q-value.

Table 3-2 RWB – field based 'representative' status and formal EPA (2016-2021) status

Site no.	EPA river segment	Location	X (ITM)	Y (ITM)	Q-value (2024)	Representative status by site	EPA River Water Body	EPA RWB status (2016 - 2021)	'Representative' OOAO status by RWB
A1	19G88	Glennamought River - Old Mallow Road crossing	567159	575354	Q4	Good	Glennamought Trib Bride_010	Moderate	Poor
A2	19G88	Glennamought River - Kilnap Bridge	566529	575115	Q3	Poor			
B1	19B14	River Bride - Blackstone Bridge	565659	574520	Q3	Poor	Bride (Cork City)_010	Moderate	Poor
B2	19B14	River Bride - North Point Business Park	566289	574706	Q3	Poor	Bride (Cork City)_020	Poor	Poor
B3	19B14	River Bride - Fitz's Boreen	566881	574302	Q3-4	Moderate			
B4	19B14	River Bride - Orchard Court	567367	573478	Q3-4	Moderate			
B5	19B14	River Bride - Watercourse Road	567401	572758	Q3	Poor			
C1	19G09	Glen – Glen River Park	568102	573626	Q3	Poor			

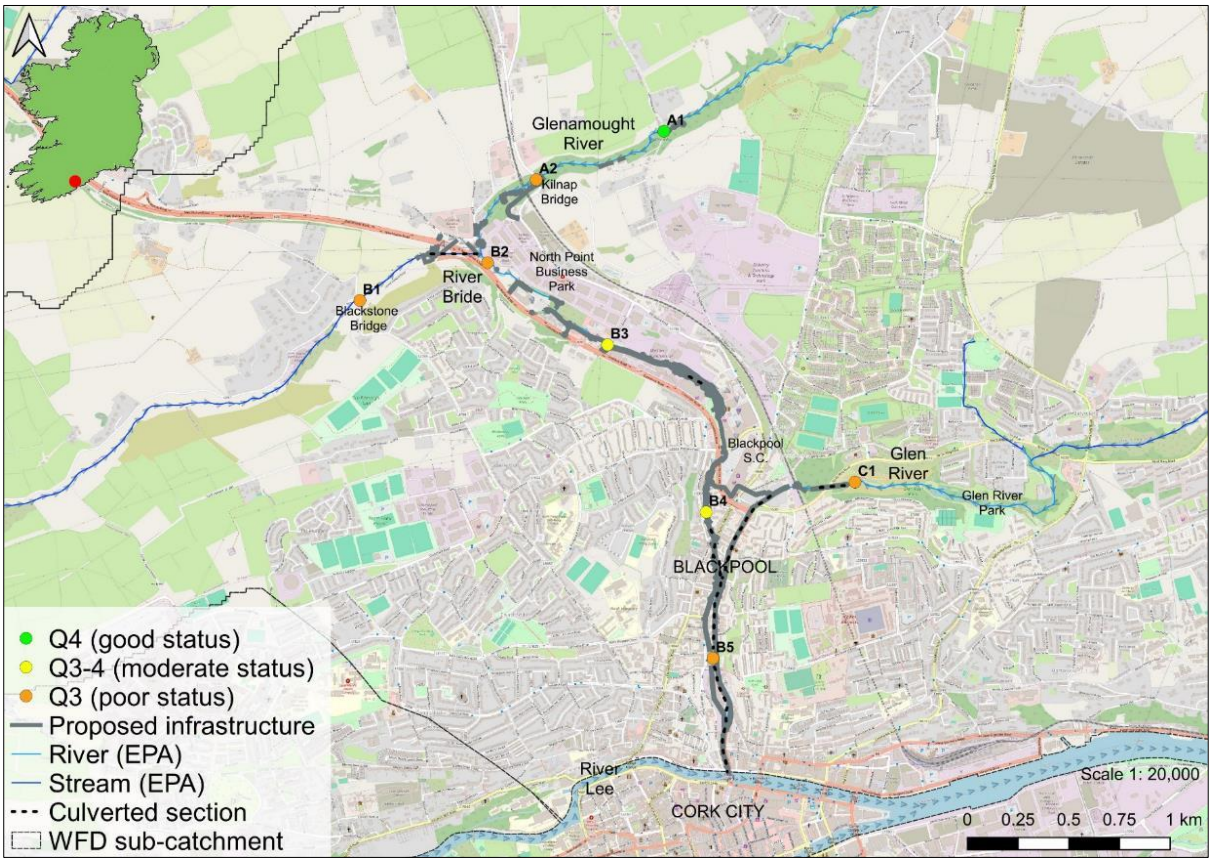

Figure 3-2 Q-value results 2024 field surveys (from Triturus, 2024a)

It is noted that water sampling in 2021 on the Bride, Kiln and Glen segments of the Bride (Cork City)_020 RWB showed elevated nutrient concentrations (phosphorus, ammonia, nitrate, BOD); the Glen and Kiln segments being particularly poor. The Kiln River segment (lower Bride near the Lee confluence) is seriously polluted, suggesting an organic input somewhere along the existing Blackpool culverts. By the time the catchment discharges to the Lee estuary at Christy Ring Bridge, it is certainly at poor status or worse.

To summarise, if the water body was physically monitored by the EPA, it would be at 'poor' status which is consistent with their currently assigned status for the 2016-2021 WFD reporting period. Furthermore, the Kiln/Glen river segments would continue to limit overall waterbody status regardless of proposed new modifications to the Bride river segments upstream of Blackpool church.

3.2.4 Proxy analysis of status

The ruling of *Sweetman v An Bord Pleanála* [2021] IEHC 16 delivered in January 2021 made it clear there was an issue in Ireland surrounding the legal treatment of 'unassigned" status water bodies insofar as the EPA had the sole responsibility to assign status. "Proxy" (i.e., "representative") status cannot be a legal substitute for EPA assigned status: *[§135] "Given the failure by the EPA to provide a status for [the water body], it was impossible for the Board to evaluate the proposed works by reference to the requirements of the WFD. The reliance… on some type of proxy evaluation referring to concepts said to stem from the WFD but which did not follow the steps identified by the WFD, does not constitute compliance with the WFD."*

Of note is that Hyland J. did make special reference to the validity of the EIAR baseline studies, impact assessment and mitigation measures, noting: *[§133] "I should acknowledge that considerable effort on*

the part of the notice party went into carrying out the studies that I have referred to above, analysing the impact of the proposed [development] upon the [water body], and devising mitigation measures that would ensure that the [development] would not adversely impact upon it. [§134] …But I cannot evaluate the efficacy or appropriateness of those mitigation measures by reference to the WFD for the reasons set out above."

The reasons described made it clear that it was the lack of EPA assigned status that ultimately led to the decision to quash the planning permission, and not the scientific method and analysis employed in the EIAR baseline studies and impact assessment.

The plantiff's action *(Moody v MPER & AG* 2021/520 JR) implied in §33 that evidence-based characterisation of water body "proxy" status provided in the EIAR for the Bride (Blackpool) scheme "*could not be relied upon*", in line with the decision of *Sweetman v An Bord Pleanála* [2021] IEHC 16. As set out above, however, Hyland J. made it quite clear that the reliability and quality of the scientific and technical information underpinning "proxy" status was not in question, simply that the EPA is the only legal entity that can assign status to water bodies under the WFD.

Prior to *Sweetman v An Bord Pleanála* [2021] IEHC 16, it was (and still is) standard industry practice to collect field-based scientific data to ascribe a representative / indicative status to a water body that was not assigned status by the EPA. It continues to be standard industry practise to corroborate status on a more site-specific basis in relation to a particular project. This is because EPA data, whilst useful as a broad characterisation of river catchment condition over time, is often not site-specific enough to form an adequate baseline against which to make a well-informed, scientifically robust, ecological impact assessment in relation to a particular project.

Noted also is the EPA make water body status classifications based on a monitoring programme comprising Q-value survey every three years, plus several water samples per annum. This often occurs only at one fixed, representative [5]monitoring site within an entire water body. Whilst such a survey resolution fulfils the monitoring and reporting requirements of the WFD, it can fall short of providing the level of detailed, project- and site-specific baseline information required for comprehensive Ecological Impact Assessment (EcIA) required in accordance with Annex IV to the [6]EIA Directive (2011/92/EU) as amended (2014/52/EU), and the Nature Directives: Birds Directive (79/409/EEC, as amended 2009/147/EEC) and Habitats Directive (92/43/EEC).

Chapters 5 (Biodiversity) and 7 (Water) of the EIAR for the Bride (Blackpool) scheme provided the necessary detailed, site-specific data on which the original impact assessment was based. Updated Q-value surveys (Triturus, 2024a) show that 'representative' (proxy) status of the Bride (Cork City)_020 water body is 'poor', which is in agreement with the assigned EPA status of 'poor' for this water body in the current 2016-2021 reporting period.

What this means is that the previous absence of EPA assigned status to the water bodies in question did make it legally impossible for WFD compliance to be evaluated, but there is no reason for the Competent Authority (in this case the Minister) to not rely upon the scientific information and analysis provided in the EIAR or the updated field survey data relevant to the project.

3.2.5 Surface Water Regulations - Article 29

Moody v MPER & AG 2021/520 JR states in §34, that the development *"may jeopardise the attainment of good status… particularly… where the scheme will result in significant changes to the*

[5] In some cases there is more than one EPA monitoring station within a waterbody, in which case the poorest result of the stations defines overall RWB status, which may also not be site-specific enough for a particular project in the RWB

[6] Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment

hydromorphology of the River Bride … and where these hydromorphological impacts are identified in Article 29(2) [sic] *of the Surface Water Regulations as significantly impacting the attainment of good status"*

This interpretation of Surface Water Regulations Article 29(2) is inaccurate. Article 29(2) of [7]surface water regulations pertain to rules around designation and classification of water bodies that are artificial or heavily modified (AWBs and HMWBs) and are, by definition, not expected to attain "good status" under the WFD, but instead have the objective of "*good ecological potential"*.

To clarify, hydromorphology is mentioned in Article 29 in the context of water bodies which have existing physical modifications for specific reasons of beneficial use and sustainable development (e.g., flood protection, water supply) where it is explicitly acknowledged that "good status" may never be achieved because the necessary modifications prevent it. Such modifications cannot be mitigated or removed without compromising the specific beneficial use of the water body or having significant impacts on the wider environment, e.g., removal of existing culverts, thereby increasing flood risk (see §3.2.7, below).

Physical habitat conditions certainly do play a role in supporting the biological quality elements that contribute to ecological status / potential classification, but (as explained in Section 3.3 below) it is by no means a foregone conclusion that changes to hydromorphology will prevent achievement of good status, because status is defined under the WFD by the poorer of the biological and physicochemical quality elements. A waterbody can have poor hydromorphology but still achieve good status if the biological quality elements (BQEs) and physicochemical conditions achieve good status because hydromorphology "supports" the attained biological status within the meaning of Annex V of the WFD. If good status is achieved in the BQEs then, by definition, the physical conditions are conducive to good status. There are many waterbodies of poor hydromorphology that are at good ecological status / potential based on their biological elements, and hence assigned good status overall.

3.2.6 Highly Modified Water Body (HMWB) designation

Bride (Cork City)_020 RWB has been identified as a candidate heavily modified water body (HMWB) in the "urban" category. This category includes rivers in urban areas that have been substantially altered by culverting, channelization, and reinforcement to prevent flooding or support construction. The alterations often constrain the river, impacting natural fluvial processes, and reduce instream habitat quality and riparian vegetation (EPA 2022).

HMWB designation acknowledges that the hydromorphological modifications present may prevent attainment of good ecological status (an objective that only applies to unmodified water bodies) but that the water body has been altered for a specified use that society needs to be continued.

The WFD objective for HMWBs is <u>good ecological potential</u> (including good chemical status) instead of good ecological status. WFD standards for other quality elements (nutrients and chemicals) must still be met, and any modifications must be mitigated as far as practicable: *"Good ecological potential represents an ecological status slightly lower than the best one that could be achieved without significant adverse effects on the specified water uses dependent on the modifications or on the wider environment"* (WFD Art. 4(3)(a)).

Bride (Cork City)_020 is a good candidate for HMWB designation owing to the nature of existing modifications, including extensive culverts and hard engineering between Blackpool and the River Lee confluence. The existing modifications must be maintained for urban purposes, including flood risk reduction; however, they may impede the attainment of 'good' status as defined for unmodified water bodies.

[7] Can only be referring to S.I. No. 272/2009 EC Environmental Objectives (Surface Waters) Regulations

For this reason, the following sections will examine the scenario whereby Bride (Cork City)_020: (1) remains as an unmodified waterbody (with “good ecological status” objective), or (2) receives HMWB designation (with “good ecological potential” objective).

3.2.7 Meaning of “deterioration” in ecological status/potential

The concept of “deterioration” of water body status is not defined in the WFD. The decision provided by the CJUE in *Weser*, provided the following clarifications on the way in which WFD compliance should be interpreted:

- Consent for the development must not be granted by an authorising authority where the project may cause a deterioration in the status of a body of surface water or where it compromises the attainment of good surface water status or of good ecological potential and good surface water chemical status by the date laid down in the directive, unless a derogation is granted;
- Deterioration in water body status occurs when the status of at least one of the quality elements, within the meaning of Annex V to the directive, falls by one class, even if this does not result in a fall in the overall classification of the water body.
- If the quality element is already in the lowest class (bad status), any deterioration of that element represents a deterioration of the status within the meaning of WFD Article 4(1)(a)(i).

The decision in *Weser* placed emphasis on the interpretation of the words “*protect, enhance and restore*” in Article 4(1). The objectives carry not only the obligation to prevent deterioration, but also the obligation to “enhance” (Art. 4 (1)(a)) status. That is why, when a quality element is in the lowest quality class (bad), any deterioration within that class band, challenges the Article 4 obligation of “enhancement”. Hence, any degree of further deterioration within the bad status class is considered a contradiction, as it drives the water body further away from achieving WFD objectives.

Examination of the *Weser* decision shows the court tested this concept of deterioration within class bands other than the lowest (bad), but it does not apply. Deterioration in high, good, moderate or poor status water bodies only occurs when at least one of the biological quality elements or the physicochemical element falls by one status class, regardless of whether that results in a fall in overall classification.

With regards to WFD assessments the following are important to note:

- Temporary short-term effects on status during the construction or maintenance phase do not constitute “deterioration of status” and are not required to be addressed so long as there are no long-term adverse consequences and no delayed deterioration in the status of the defining quality elements expected in the water body thereafter (EC, 2017).
- Mitigation measures within the proposed project are taken into account in the Article 4(7) Applicability Assessment as they form an inherent element of the design and implementation of a project (EC, 2017).

Furthermore, it is important to examine here the role of the quality elements in assigning status/potential, particularly hydromorphology which is a “supporting element” within the meaning of WFD Annex V and is only used to verify high status sites under Part III (36) of the surface water regulations (S.I. 272 of 2009).

3.3 Role of Hydromorphology in Status Classification

The quality elements that feed into status classification are: (1) biological elements, (2) hydromorphological elements supporting the biological elements; and (3) chemical and physicochemical elements supporting the biological elements. The poorer of the biological and physicochemical elements determines surface water status. Biological quality elements employ standard methods for calculating a metric (EQR) that equates to the status classes: high, good, poor or

bad. Physicochemical elements are compared to statutory Environmental Quality Standards (EQS) published in the surface water regulations. **Figure 3.3** illustrates the relative roles of quality elements in status classification in river water bodies.

The hydromorphology quality element is defined in the Annex V (1.1.1) as "*supporting the biological elements*". CIS guidance establishes that assignment to status classes good, moderate, poor or bad is: "*made on the basis of the monitoring results for the biological quality elements … and… physico-chemical quality elements….because if the biological quality element values relevant to good, moderate, poor or bad status are achieved, then by definition the condition of the hydromorphological quality elements must be consistent with that achievement and would not affect the classification of ecological status*".(CIS 2005, §2.5, p. 3).

The hydromorphological quality element is therefore only considered when assigning water bodies to the high ecological status class. For good and moderate status, hydromorphological conditions (morphology, hydrology, continuity) are, by default, "*consistent with the achievement of the values specified …for the biological quality elements*." (WFD Annex V (1.2.1)).

In the case of the Bride (Cork City)_020 (unmodified RWB), which is currently at 'poor' status (2016-2021), a change in the hydromorphological conditions cannot alter overall status classification on its own, unless the proposed physical modifications cause the value of either the biological quality element(s) to decline to 'bad' status.

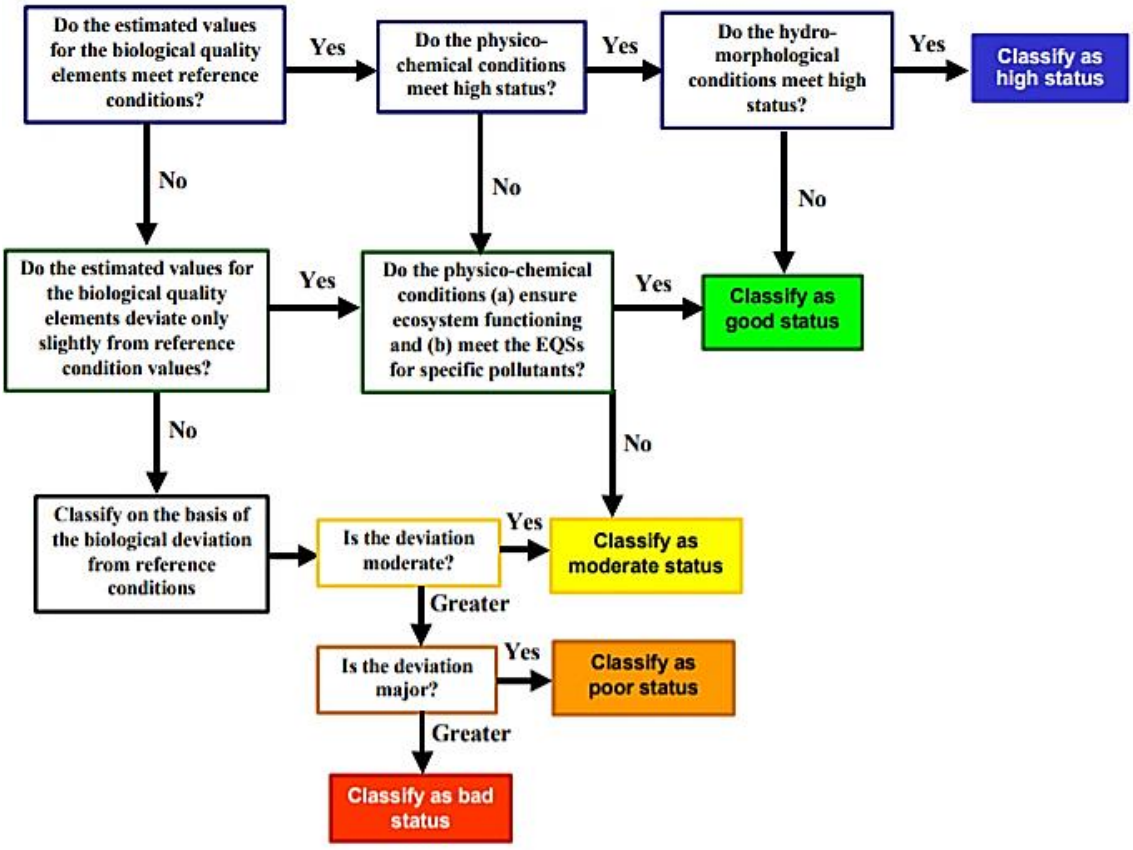

Figure 3-3 Relative roles of biological, physicochemical and hydromorphological elements in ecological status classification (from CIS Guidance EC, 2005)

3.4 Role of Quality Elements in Ecological Potential Classification

Figure 3.4, reproduced from CIS (2005), illustrates the relative roles of quality elements used for assigning ecological potential, where hydromorphology is (by definition) the primary determinant.

Site specific determination of Maximum Ecological Potential (MEP) must be carried out to represent reference conditions for the individual HMWB. Good ecological potential (GEP) can then be determined with reference to site-specific MEP. The MEP values for the biological quality elements (BQEs) are set on a case-by-case basis depending on the hydromorphological constraints of the water body.

For example, in a HMWB river with extensive culverting for specified urban and flood protection use, such a system may only ever be expected to support a fish community of reduced diversity, even after realistically achievable mitigation of hydromorphological conditions were carried out. This means that the fish community index value (FCS2 in Ireland) for the HMWB will only ever be a fraction of that expected for a natural (unmodified) water body.

Once MEP is established, GEP is the condition where expected biological community indices (e.g., macroinvertebrates, fish) only deviate slightly from the site-specific MEP, and the physicochemical conditions must be capable of supporting the defined biological community.

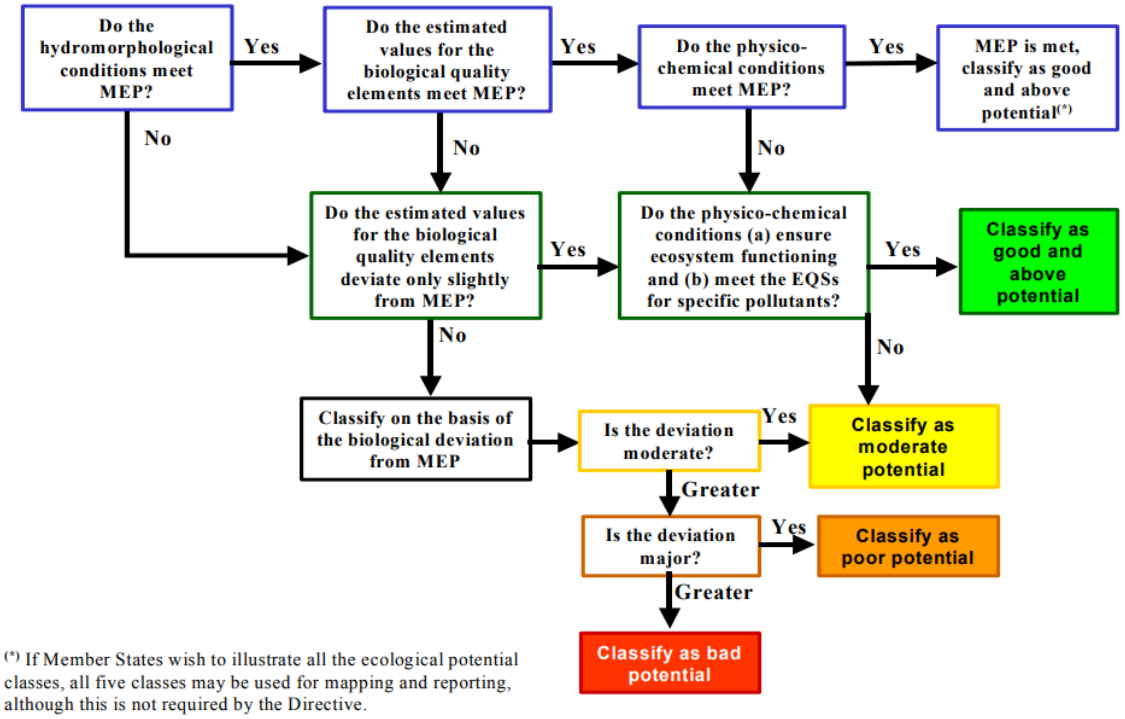

Figure 3-4 Relative roles of biological, hydromorphological and physicochemical quality elements in ecological potential classification (from CIS 2005)

3.5 Water Body Status Impact Assessments

This section examines the two key tests of WFD compliance as a result of the proposed Bride (Blackpool) scheme. The analysis of water body status impact in §3.5.3 and §3.5.4 will focus on the Bride (north) segment of the Bride (Cork City)_020 water body. This is where predicted hydromorphological impacts are principally confined. The Glen and Kiln River branches will undergo minor repair works and continuing channel maintenance (formalised as part of this scheme) but do not undergo significant new physical alterations in themselves.

The Bride (north) segment of the Bride (Cork City)_020 water body is examined in §3.5.3 and §3.5.4, respectively, for two scenarios as follows: (1) remains as an unmodified waterbody with the objective of "good ecological status"; or (2) receives HMWB designation (with "good ecological potential" objective).

WFD compliance tests in relation to proposed new modifications are applied at the water body level with reference to *Weser* and CIS guidance to answer the key questions:

1) Is there a deterioration of ecological status/potential?
2) Is attainment of good ecological status/potential jeopardised?

The examination first establishes the ecological effect of proposed hydromorphological changes on biological quality elements (§3.5.1) then establishes the relevant WFD Annex V biological quality elements to be used in the status assessments (§3.5.2).

3.5.1 Assessment of Effects of Hydromorphological Changes

The Bride (north) segment of the water body is already highly modified throughout its run from the city outskirts to the Lee, with features including realignment, channelisation, flood walls, bank engineering and culverting. Several new modifications are proposed under the Bride (Blackpool) scheme (listed in EIAR §1.2), including new and replacement bridges / culverts; new flood walls / earthen embankments; sedimentation trap; local ground regrading and other ancillary works.

Culvert installation and removal have potential to alter aquatic habitat the most notably. In this regard, there will be 342m of new culvert through Orchard Court, plus 72m of culvert removal at Sunbeam Industrial Estate, the latter being restored to open (walled) channel. The proposed modifications are shown on **Figure 3-5**.

Figure 3-5 Location of Bride (North) fisheries enhancement reaches as part of the proposed scheme

The Orchard Court reach of the Bride was most recently surveyed for Q-value and hydromorphology ([8]RHAT score) in late summer 2024. This reach merited Q3-4, equating to representative 'moderate' status, with hydromorphology (RHAT) score in the 'poor' status band. Previous water sampling in this reach (in 2021) revealed persistently elevated phosphorus (MRP), at concentrations in excess of EQS for 'good' status, indicative of a pollutant source. At a reach scale, representative status is 'moderate' at Orchard Court, but the water body status is 'poor' using the OOAO rule.

The reach is currently open channel but constrained by defences, including hard engineered banks of concrete, rock armour, gabion and set-back walls (see Images in **Appendix 1**). Instream morphology comprises glide and riffle/run flows over stony substrates: mainly cobble and gravel, but with anoxic, smelly silt deposits in slack flows. Instream surveys of 2021 recorded dumped household rubbish, frequent on river banks and instream, with bags of rotting organic contents. Bankside vegetation was generally disturbed and extensively herbicide sprayed, with non-native tree cover (e.g., Sycamore, Buddleia) and patches of invasive Japanese knotweed. Instream habitat was resurveyed in 2024 showing substrata dominated by compacted large boulder and cobble with mixed gravels and sand locally, with moderate to heavy siltation (Triturus, 2024a). Despite evident water quality and hydromorphological pressures, electrofishing survey of 2024 showed the Orchard Court reach supported high numbers of mixed cohort trout (including juvenile 0+ fish). Patchy, good quality spawning habitat locally was present in 2024 for both salmonids and lamprey (e.g. gravels in pool tailings) although siltation and eutrophication depress ecological value of the site.

Culverting of this reach will result in loss of the above fisheries habitat replacing it with fully engineered concrete bed substrate and banks and precluding riparian zone inputs and light (other than at light boxes included within the design). Conversely, the Bride will regain 72m of open, restored channel upstream at the Sunbeam Industrial Estate.

To quantify the net loss in terms of fisheries habitat, the works are calculated to represent a loss of approximately 2.2% of available macroinvertebrate and trout foraging habitat in the upper Bride catchment. The estimate takes into account all fluvial habitat potentially available to fish upstream of Blackpool Church, i.e., Bride (north) segment of Bride (Cork City)_020, Glennamought_Trib Bride_010 and Bride (Cork City)_010).

To mitigate this habitat loss, fisheries enhancements, as set out in **Appendix 2,** are proposed as an integral part of this scheme. The proposed enhancements cover approximately 9.8% of the fluvial habitat potentially available to fish upstream of Blackpool Church. **Fig. 3.5**, above, shows the location of enhancement reaches in relation to proposed culvert works.

The late Dr Martin [9]O'Grady (former IFI chief fisheries scientist) drew up the fisheries enhancement proposals (see Appendix 2), concluding that the enhancements "*will significantly improve the rivers capacity to support a brown trout population and the net gain in fish stock terms will more than offset the permanent loss caused by culverting in the lower reaches of the proposed drainage scheme*".

3.5.2 Discussion on Fish as Biological Quality Element

Background

Where RWBs are physically monitored, the most widely used Biological Quality Element (BQE) to define status is the macroinvertebrate Q-value. Fish status is not a routinely monitored BQE on small water bodies as part of the EPA's WFD monitoring programme.

Should fish BQE be included in RWB status assessment for the Bride?

[8] RHAT = River Hydromorphology Assessment Technique

[9] O'Grady (2016) Fisheries Enhancement Proposals, included as part of the Bride(Blackpool) EIAR.

Because fish are one of the primary ecological receptors potentially affected by the scheme, it would seem appropriate to include fish status in the conceptual assessment of impact on overall water body status. This is because of the specific emphasis in Annex V of the WFD on links between hydromorphology and the biological quality elements. In addition, WFD monitoring programmes "*must use parameters indicative of the quality element or elements most sensitive to the pressure[s] to which the [water] body is subject*" (CIS, 2005).

Alternatively, it could be argued that the fish BQE would never apply to the Bride (Cork City)_020 and therefore not affect water body status classification because fish status is not a routinely monitored BQE on small water bodies as part of the EPA's WFD monitoring programme.

WFD fish surveys are conducted by IFI on some channels (primarily main stem rivers), but it is an uncommon BQE within the national monitoring programme. Fish status was used in overall status classification of just 10.8% of Irish water bodies (266 out of 2454) for the 2013-2018 WFD reporting period ([10]EPA RWB data). However, in the interests of thoroughness, and taking into account that fish are one of the WFD Annex V biological quality elements affected by hydromorphology pressures, the following water body status assessment will conceptually include fish as a BQE.

Extrapolation of current fish status for Bride (Cork City)_020

Where fish status is used as a BQE, the Fisheries Classification Scheme 2 (FCS2 – Ireland) produces a metric that will fall into a WFD class bands of high, good, moderate, poor or bad. FCS2 uses probability-based comparisons of observed fish counts with expected (predicted) fish counts under reference (un-impacted) conditions (Kelly & Harrison, 2016). The model accounts for environmental, geographical and pressure variables, including natural impassable barriers (e.g., waterfalls). Conversely, artificial barriers (dams, impassable culverts) are interpreted as pressures. The FCS2 tool is used only by IFI fisheries scientists, however, Kelly & Harrison (2016) sets out that a site at 'good' status under the FCS2 would have ~80% of the expected fish species present, plus at least one of the type-specific disturbance-sensitive species and the catch is 80% of the expected total catch. For 'moderate' fish status sites, assume 55% of expected species are present (the most likely) and for these the catch equals 55% of the expected total catch.

In terms of water quality in Ireland, it has been identified, that brown trout are the dominant species at 'moderate' (Q3) through to 'high' (Q5) status sites, with salmon mainly at 'good' and 'high' status. There is known to be a shift at the Good-Moderate status boundary, whereby the trout dominated community shifts to a more tolerant fish community (e.g., 3-spined stickle-back, minnow). Salmonids are absent at 'poor' (Q2/2-3) and 'bad' (Q1) status sites (Kelly & Harrison, 2016).

With the above in mind, it is noted that fish sampling was conducted by IFI immediately downstream of the Blarney_010 waterbody sampling site at Horgan's Bridge in 2018 (RS19B020500). The Blarney_010 waterbody was used by the EPA as a 'donor' waterbody to infer status of the Bride (Cork City) _020 for the 2013-2018 WFD reporting period. The Blarney_010 site was 'moderate' status using the FCS2 tool (Matson et al., 2019). The Blarney fish community composition was brown trout dominant, with salmon absent; presence of lamprey; no coarse fish species and no stickleback.

Electrofishing surveys of 2024 covered three sites on the Bride main channel upstream of the Blackpool culverts that will be subject to alterations as part of the scheme. The reach at Orchard Court (Site B4) which will be culverted as part of the scheme recorded brown trout (n=53), lamprey (*Lampetra* sp.) (n=4) and European eel (n=5) (Triturus, 2024b). Sites B2 (North Point Business Park) and B3 (Fitz's Boreen) had a similar community composition, i.e., brown trout dominated, salmon absent, brook lamprey present with no coarse species or stickleback. The community composition was therefore very similar to that of the Blarney_010 which was classified by IFI (for WFD purposes) as 'moderate' fish

[10] Online data download from https://gis.epa.ie/GetData/Download (accessed March 2022)

status ((Matson et al., 2019). This indicates the River Bride, upstream of the Blackpool culverts is at 'moderate' fish status.

IFI were consulted on the availability of the FCS2 tool, and the possible sensitivity of the tool to presence/absence of certain species. The tool is not publicly available and requires numerous inputs based on site-specific conditions and expert judgment of expected community type devised by IFI scientists and is only usable by IFI. However, on the basis of: (1) fish data provided in the original EIAR and recent 2024 fish surveys, (2) criteria set out in Kelly and Harrison (2016) and (3) IFI consultation, the inferred fish status on the Bride (Cork City)_020 is 'moderate' status. Supporting evidence that fits with 'moderate' status is: (1) biological water quality of Q3-4, (2) good fish abundance including 0+; (3) salmonid (trout) dominated; (4) no pollution-tolerant fish species recorded; (5) eels present.

With regards to how presence or absence of migratory lamprey might alter fish status within the FCS2, it was suggested by IFI that small numbers of these groups won't necessarily impact fish status on the river further because it is primarily the presence of brown trout that would be expected to keep the river within the "moderate" classification.

The current barrier to salmon migration presented by the existing Blackpool culverts will continue to prevent 'good' fish status from being achieved in this RWB, as has been the case historically. Salmon have not been recorded in the Bride (Blackpool) sub-catchment and are unlikely to have been present for many years given the level of historical modification on the lower reaches of the system. First edition [11]OSI 6-inch maps (1829-1841) clearly show culverting of the Kiln River segment (upstream as far as Blackpool) occurred prior to the mapping period, meaning salmon migration is likely to have been precluded in the Bride (Blackpool) catchment for at least ~200 years, meaning 'good' fish status (in FCS2 terms) would have been impossible throughout that time.

Noted also are studies which demonstrate that even where fish in modified waterbodies are impacted by hydromorphological effects of a specified water use, the established fish populations and their metrics are still more greatly influenced by the intensity of water quality impairment (Blabolil, 2016). In this regard, EPA water sampling data ([12]online and presented in the EIAR) demonstrates that physicochemical conditions of the Bride (Cork City)_020 are persistently impaired and not meeting 'good' status criteria. Water quality pressures include agricultural inputs in the upper catchment areas of Glen and Glennamought rivers, as well as municipal, industrial and urban stormwater inputs in the lower reaches. The proposed Bride (Blackpool) scheme will have no significant impact on the existing, persistently impaired physicochemical conditions, which are largely determined by upstream pressures and poor-quality discharges along urban reaches of the river.

Unless pre-existing background pollution sources are remedied, the Bride (Cork City)_020 RWB will not attain good status/potential on the basis of the physicochemical quality elements, nor fish status, regardless of whether the proposed Bride (Blackpool) scheme goes ahead or not.

3.5.3 RWB Status Assessment - Bride (Cork City)_020

The proposed modifications occur overwhelming on the Bride (north) segment of the RWB, hence potential impacts affecting status also occur on the Bride (north).

Current EPA assigned 'poor' status 2016-2021 (modelled) for the Bride (Cork City)_020 RWB is the legally valid baseline against which to assess: (1) potential impact on (unmodified) water body status; and, (2) tests of WFD compliance.

Examples of how to carry out the assessment are presented in §3.4.1 of CIS guidance No. 36 (CIS 2017), published with cognisance of the decisions in *Weser* on the meaning of "deterioration". **Table 3.3**, based on the "Article 4(7) Applicability Assessment" framework set out in CIS (2017), provides a

[11] Geohive maps available online at: https://www.geohive.ie/ (Accessed April 2022)

[12] Available to download at www.catchments.ie for the Kiln sub-catchment

formal template to examine how the proposed project is expected to affect the WFD objectives of the affected Bride (Cork City)_020 water body.

Table 3-3 Bride (Cork City)_020 – water body status impact assessment

BRIDE (CORK CITY)_020							
Starting point: EPA assigned status (2016 - 2021) is 'poor', on the basis of 'modelling'. Biological Quality Elements are not physically monitored by the EPA in this RWB. 'Poor' status in the macroinvertebrate BQE is inferred from the EPA status classification of 'poor' for the waterbody as a whole (which is supported by OOAO field based survey data). Moderate status is inferred for the fish BQE on the basis of the trout dominated community type present on the Bride main channel upstream of the Blackpool culverts.							
Effect of modification (Proposed Scheme): Overall ecological status does not deteriorate as a result of the proposed modifications. Morphology changes are net zero because of re-opening the Sunbeam Industrial Estate reach, plus fisheries enhancements integral to the Scheme. Fish status will remain at least 'moderate', with potential for improved capacity (O'Grady, 2016). Q-values will not change because of proposed physical modifications; these are largely governed by evident, impaired water quality (elevated nutrient). The failure of physico-chemical quality elements to attain good status (arising from upstream and catchment pressures) is considered to be the primary limiting factor preventing good status in the macroinvertebrate community. Overall ecological status will not deteriorate, and attainment of good status is not prevented by the Proposed Scheme.							
Quality elements	**Biological quality elements (BQEs) 2016-2021** (see note below)		**Hydromorphological quality elements supporting the BQEs**			**GPC**	**Overall status**
	Macroinverts (Q-value)	Fish	Hydrology	Morphology	Continuity		
Starting point	P	M	≤M*	≤M*	≤M*	≤M*	P
Effect owing to modification	P	M	≤M*	≤M*↑↓	≤M*	≤M*	P
Ecological Status Classes - H: High; G: Good; M: Moderate; P: Poor; B: Bad							
**"supporting conditions" are by definition equal to, or poorer than, highest BQE value*							
Note: The BQEs are not physically monitored in this RWB, hence the BQEs are inferred, but equate to overall EPA assigned 'poor' status which aligns with field-based results.							

The summary in **Table 3.4** shows there is no fall in status class in any of the quality elements. Overall ecological status will not deteriorate, and attainment of good status is not prevented by the Scheme.

Fish status would remain at least 'moderate' in the channel as a whole owing to incorporation of fisheries habitat enhancements. Brown trout will continue to drop down from the spawning habitats of the Glennamought River (as is the case currently) to forage and occupy areas of improved nursery habitat in the Bride (north). Post-scheme, the reach through Orchard Court will no longer be valuable to fish, but the fisheries enhancement reaches, including the Sunbeam Industrial Estate culvert removal reach, are predicted to result in a quantitative increase in habitat opportunities and increased trout abundance locally.

Table 3.5 summarises that as a result of the proposed new modifications: (1) water body status will not deteriorate, and (2) attainment of 'good' status will not be prevented any further than it currently is owing to existing modifications and pre-existing poor water quality. The project could theoretically be authorised as it does not compromise WFD objectives.

Table 3-4 Summary of WFD compliance tests - Bride (Cork City)_020 unmodified waterbody

Bride (Cork City)_020 unmodified waterbody (Code IE_SW_19B020500)	Note - it is considered unlikely this water body will remain categorised as unmodified, given the extensive nature of existing physical modifications and

	the fact that these existing modifications need to be retained for the specified urban use (including flood protection).
WFD RWB Objective	Good Status (good ecological status + good physicochemical status)
Is there a deterioration of water body status as a result of the proposal?	No - fish status will remain within the 'moderate' status class band, with a trout dominant community. Morphology changes are considered net zero owing to inclusion of fisheries enhancements. No significant change to existing continuity issues, which are imposed by existing Blackpool culverts.
Does the proposal prevent attainment of good status?	No – new modifications do not change the fact that the quality elements are limited to 'poor' status overall. The best that could be achieved would be 'moderate' status, as the fish community will never reach good status owing to existing barrier effects of downstream Blackpool culverts which prevents upstream migration of salmon (likely for at least the past ~200 years).
Recommendation	The tests of "non-deterioration" and "not jeopardizing attainment of good status" both pass. The project could be authorised as it does not compromise WFD objectives.

3.5.4 HMWB Ecological Potential Assessment - Bride (Cork City)_020

The assessment of impact on ecological potential follows the examples set out in §3.4.1 of CIS guidance No. 36 (CIS 2017), published with cognisance of the decisions in *Weser* on what constitutes "deterioration". First, it is necessary to establish a theoretical description of what could constitute Good Ecological Potential (GEP) for this [13]*HMWB. This requires estimation of maximum ecological potential (MEP) against which the values for GEP can be predicted.

MEP / GEP for theoretical Bride (Cork City)_020 HMWB

Technical guidance and case studies attest that determination of MEP/GEP for a particular HMWB is not an easy task (AMBER, 2019; Bussettini et al. 2018; CIS 2006; CIS 2019). The work of establishing MEP and GEP would legally need to be carried out by the EPA with input from IFI (for an Irish HMWB), but is approached for the purpose of this examination with the support of WFD technical guidance (**Fig 3.5**).

[13] * Denotes theoretical HMWB – the water body is a candidate HMWB, but is not yet designated (EPA 2022)

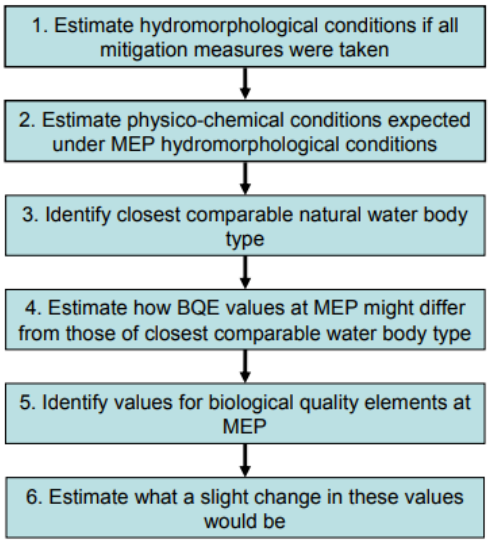

Figure 3-6 Steps in defining GEP as described in CIS Guidance Document No. 4 (from CIS 2006, p. 27)

According to WFD Annex V 1.2.5, MEP is a state where quality elements correspond totally, or almost totally, to the undisturbed conditions associated with the surface water body type most closely comparable to the HMWB concerned. GEP is then defined as an ecological state in which "*there are slight changes in the values of the relevant biological quality elements as compared to the values found at [MEP]*" (WFD Annex V 1.2.5).

MEP effectively reflects the best achievable value for the biological quality element(s) whilst taking into account the physical conditions imposed by the heavily modified characteristics of the water body. It is also a requirement that MEP reflect the value of biological quality elements once all "technically feasible" mitigations are employed, particularly with regard to ensuring the best approximation of the ecological continuum (CIS, 2019). In this regard, the WFD allows, under strict conditions set out in Articles 4(5) and 4(7) that certain potential mitigation measures may be ruled out based on "technically infeasibility" and/or "disproportionate costs". The mitigation measures for MEP must also not compromise the specified use and/or on the wider environment.

In the case of the Bride (Cork City)_020 *HMWB, the existing hydomorphological impacts directly connected with urban use (and consequent flood protection) are summarised, with biological effects described, in **Table 3.5**.

Table 3-5 Existing hydromorphological features and potential mitigation used in MEP estimation

Hydromorphological feature	Biological effects	Is mitigation possible within context of specified urban use?
Long culverts on the Kiln segment (Brewery Branch and Back Watercourse Branch (~980m)) and Glen segment (Back Watercourse Branch and Spring Branch (~1050m) which control and carry water beneath the highly urbanised area between Blackpool and the River Lee outfall.	Habitat fragmentation, reduces continuity between upstream and downstream habitats; interrupts and/or excludes fish passage. Habitat loss – culvert footprints are largely unusable by instream biota, especially with regards to spawning and nursery.	**No** - removal of the culverts and restoration of natural continuity would severely compromise urban use and flood protection. It is not possible to install fish passage mitigations as any internal roughness in the culverts can trap debris and severely compromise urban use and flood protection. (i.e., "technically infeasible")
Culvert maintenance – periodic removal of accumulated sediment and debris from within culverts to avoid blockages that would compromise flow and risk increasing flooding.	Removal of sediments can decrease incidental hydraulic refugia and "roughness" that some fish may take advantage of to migrate up the culverts (e.g., eel, lamprey);	**No** – if sediment and debris were allowed to accumulate within culverts the resulting blockages would severely compromise urban use and flood risk and could lead to significant consequences on the wider

	reduction in downstream sediment transport.	environment (people/assets) (i.e., "technically infeasible")
Hard engineered river walls (concrete and/or gabion), mainly on the Bride (north) segment, to control and convey water through the Commons Road and Orchard Court reaches upstream of Blackpool Church.	Constricted river flow reduces lateral connectivity, leading to high instream water velocities and changes in sediment transport / settlement; diminished habitat suitability for instream biota especially spawning and nursery.	**No** – could use more environmentally friendly methods such as 2-stage / overflow channels or set-back green embankments with natural bank vegetation, but this is likely to be "technically infeasible" and/or "disproportionately costly" in terms of land availability / acquisition in a densely urbanised area.

To approximate MEP, the closest comparable natural (unmodified) water body to one with indispensable (for specific reasons) artificial hydromorphological features described in **Table 3.6**, would be a small-to-moderate sized river with a natural fish barrier such as an impassable waterfall, subterranean section or long, fast rapid of sheet flow over smooth bedrock. The fish community in a natural Irish water body with these types of natural fish passage barriers would be dominated by non-migratory salmonid species indicative of good water quality, i.e., brown trout, in a range of size/age cohorts (0+, 1+ and older). Salmon would be absent because of the natural migration barrier. Other species could include brook lamprey and occasional eel (the latter being a good climber of natural features).

The best achievable fish population upstream of a natural barrier in an unmodified water body is therefore brown trout dominated and lacks salmon. At such sites, the FCS2 tool output can be 'good' status because of the way the FCS2 model accounts for the natural barrier that excludes migratory fish, i.e., salmon are not "expected". In contrast, a brown trout dominated system with impassable artificial barriers (which are not accounted for in FCS) would only ever reach a maximum of 'moderate' status under FCS2 because the artificial barrier prevents migration, and the absence of migratory species is not expected.

Taking into account the hydromorphological characteristics of the water body that need to be retained for the specified urban (and flood protection) purpose, the best achievable values (MEP) for biological and physicochemical quality elements on the Bride (Cork City)_020 are realistically considered to be:

- 'High' macroinvertebrate EQR (0.9-1.0) (Q4-5, Q5), and;
- FCS2 value equivalent to 'High' fish status assuming a natural impassable barrier, i.e., trout dominated with expected catch numbers for high quality waters;
- Physicochemical conditions meet EQS for 'high' status as set out in [14]surface water regulations

GEP would therefore be conditions that deviate slightly from the above MEP as follows:

- 'Good' macroinvertebrate EQR (0.8) (Q4), and;
- FCS2 value equivalent to 'good' fish status assuming a natural impassable barrier, i.e., trout dominated with ~80% expected species composition and 80% expected total catch;
- Physicochemical conditions meet EQS for 'good' status as set out in surface water regulations

As for all WFD biological quality metrics, the assignment to ecological potential class involves a comparison between what is expected and what is observed, then calculating an Environmental Quality Metric (EQR) that translates to maximum, good, moderate, poor or bad ecological potential.

Impact of proposed project on ecological potential

[14] S.I 272 of 2009, as amended by S.I. 77 of 2019

Table 3.6, based on the "Article 4(7) Applicability Assessment" framework set out in CIS (2017), examines how the proposed project is expected to affect the environmental objectives of the affected Bride (Cork City)_020 if it was a designated heavily modified water body (HMWB). Note that the HMWB would currently be at 'moderate ecological potential' according to the definition in WFD Annex V 1.2.5 *"There are moderate changes in the values of the relevant biological quality elements as compared to the values found at maximum ecological potential. These values are significantly more distorted than those found under good quality."* Physicochemical elements supporting the biological elements are also 'moderate', as they currently (based on EPA data) do not meet criteria for good status (EQS) according to surface water regulations.

Notional 'moderate ecological potential' is therefore a valid baseline against which to evaluate WFD objectives for this hypothetical HMWB.

There is no deterioration of ecological potential from 'moderate' as a result of the scheme. There is no fall in ecological potential class in any of the quality elements.

Fish potential will remain at 'moderate' in the channel as a whole owing to incorporation of fisheries habitat enhancements. Brown trout will continue to drop down from the spawning habitats of the Glennamought River (as is currently the case) to forage and occupy areas of improved nursery habitat in the Bride (north). Post-scheme, the reach through Orchard Court will no longer be valuable to fish, but the fisheries enhancement reaches and the Sunbeam culvert removal reach are predicted to show an overall increase in trout numbers.

Table 3-6 Bride (Cork City)_020 – *HMWB ecological potential impact assessment

BRIDE (CORK CITY)_020 HMWB							
Starting point: The conceptual HMWB would likely not reach GEP at water body scale owing to low fish abundance, e.g., on the Glen River, and parts of the River Bride main channel (even when existing hydromorphological conditions are taken into account). The conceptual HMWB is considered to be at 'poor' ecological potential under the definition in Annex V 1.2.5, based on the biological and physico-chemical element in worst condition (in this case 'poor').							
Effect of modification (Proposed Scheme): Overall ecological potential does not deteriorate as a result of the proposed modifications. Morphology changes are net zero as a result of re-opening the Sunbeam Industrial Estate reach, plus fisheries enhancements integral to the Scheme. Fish status will remain at least moderate potential, with scope for improved capacity (O'Grady, 2016). Q-values will not change as a result of the proposed physical modifications, these are largely governed by evident, impaired water quality (elevated nutrient). The failure of physico-chemical quality elements to attain good ecological potential (arising from upstream and catchment pressures) is considered to be the primary limiting factor preventing GEP in the macroinvertebrate community. Overall ecological potential will not deteriorate and attainment of GEP is not prevented by the Proposed Scheme.							
Quality elements	**Biological quality elements (BQEs) 2016-2021** (see note below)		**Hydromorphological quality elements supporting the BQEs**			**GPC**	**Overall Eco. Potential**
	Macroinverts (Q-value)	Fish	Hydrology	Morphology	Continuity		
Starting point	P	M	≤M*	≤M*	≤M*	≤M*	P
Effect owing to modification	P	M	≤M*	≤M*↑↓	≤M*	≤M*	P
Ecological Status Classes - H: High; G: Good; M: Moderate; P: Poor; B: Bad							
**"supporting conditions" are by definition equal to, or poorer than, highest BQE value*							
Note: The BQEs are not physically monitored in this RWB, hence the BQEs are inferred, but equate to overall 'poor' ecological potential which aligns with field-based results.							

Tables 3.7 summarises that as a result of the proposed new modifications: (1) water body ecological potential will not deteriorate, and (2) attainment of good ecological potential will not be prevented any further than it currently is owing to existing modifications and pre-existing poor water quality. The project could theoretically be authorised as it does not compromise WFD objectives.

Table 3-7 Summary of WFD compliance tests - Bride (Cork City)_020 as *HMWB

Bride (Cork City)_020 heavily modified waterbody (*HMWB)	It is considered very likely this water body will become a designated HMWB, given the extensive nature of existing physical modification and the fact that existing modifications need to be retained for the specified urban use (including flood protection).
WFD *HMWB Objective	Good Ecological Potential (GEP + good chemical status)
Is there a deterioration of *HMWB ecological potential as a result of the proposal?	No - fish status would remain least 'moderate' ecological potential as a result of net zero morphology changes (modifications + fisheries enhancements) and no significant change to existing continuity issues (existing Blackpool culverts).
Does the proposal prevent attainment of good ecological potential?	No – if background water quality improved (unrelated to this project) higher densities of trout may in time occupy available channel sections, including spawning in the fisheries enhancement areas, with greater carrying capacity for juvenile fish that drop down from the Glennamought. If supporting water quality conditions were improved there is no reason this *HMWB could not reach GEP based on sampling of suitable riffle areas in the fisheries enhancement areas, i.e., GEP can be attained for fish, macroinvertebrates and physicochemical elements.
Recommendation	The tests of "non-deterioration" and "not jeopardizing attainment of good ecological potential" both pass. The project could be authorised as it does not compromise WFD objectives.

**denotes theoretical HMWB – the water body is currently a candidate HMWB, but is not yet designated*

3.5.5 Glennamought_Trib. Bride_010 (RWB)

Table 3-8 Glennamought_Trib. Bride_010 – water body status impact assessment

GLENNAMOUGHT TRIB. BRIDE_010				
Starting point: EPA assigned status (2016 - 2021) is 'moderate', on the basis of 'expert judgement'. Biological Quality Elements are not physically monitored by the EPA in this RWB. "Moderate' status in the macroinvertebrate BQE is inferred from the EPA status classification for the waterbody (OOAO field-based survey data equates to 'representative' 'poor' status based on Q-value data 2024). Moderate status is inferred for the fish BQE based on 2024 survey showing trout dominated community type with no tolerant species present, noting that this RWB is also limited by the existing Blackpool culverts downstream, i.e., salmon cannot access.				
Effect of modification (Proposed Scheme): Overall ecological status does not deteriorate as a result of the proposed modifications. There will be no deterioration in hydromorphology quality elements that could impinge on instream habitat for macroinvertebrates or fish to the extent that status class would decline. Fish status will remain at least 'moderate', with potential for improved capacity (O'Grady, 2016) in continuum with the trout population of the downstream RIver Bride. There is no reason that the affected reach of this waterbody will not remain trout dominated, with good numbers, owing to suitable spawning and nursery habitats which will not be affected at waterbody scale. Q-values will not change as a result of the proposed physical modifications, as Q-value is largely governed by upstream (non-related) catchment water quality. Overall ecological status will not deteriorate, and attainment of good status is not prevented by the Proposed Scheme.				
Quality elements	**Biological quality elements (BQEs) 2016-2021** (see note below)	**Hydromorphological quality elements supporting the BQEs**	**GPC**	**Overall status**

GLENNAMOUGHT TRIB. BRIDE_010							
	Macroinverts (Q-value)	Fish	Hydrology	Morphology	Continuity		
Starting point	M	M	≤M*	≤M*	≤M*	≤M*	M
Effect owing to modification	M	M	≤M*	≤M*↑↓	≤M*	≤M*	M
Ecological Status Classes - H: High; G: Good; M: Moderate; P: Poor; B: Bad							
**"supporting conditions" are by definition equal to, or poorer than, highest BQE value*							
Note: The BQEs are not physically monitored by the EPA in this RWB, hence the BQEs are inferred, but equate to overall EPA assigned 'poor' status which aligns with field-based results.							

Table 3.8, based on the "Article 4(7) Applicability Assessment" framework set out in CIS (2017), examines how the proposed project is expected to affect the environmental objectives of the Glennamought_Trib. Bride_010 RWB.

Field sampling results for the original EIAR align with current (2016-2021) [15]EPA assigned 'moderate' status for the Glennamought_Trib. Bride_010 RWB. More recent (2024) field sampling showed "good" and "poor" macroinvertebrate status (Q4, Q3), which would equate to OOAO 'poor' status, however, this assessment uses the EPA assigned 'moderate' status as a baseline which is not unreasonable, as moderate status falls between good and poor and the fish community is considered to represent 'moderate' status on the basis of a healthy trout population with a range of size/age cohorts (0+, 1+ and above) (Triturus, 2024b). This helps confirm that 'moderate' ecological status is a scientifically valid baseline against which to assess: (i) potential impact on water body status, and (ii) tests of WFD compliance. **Table 3.9** summarises the implications for WFD compliance.

Table 3-9 Summary of WFD compliance tests - Glennamought_Trib. Bride_010 waterbody

Glennamought_Trib. Bride_010 waterbody (Code IE_SW_19G880990)	Note – this water body is directly upstream of the Bride (Cork City)_020, and is examined here as part of cumulative water status impact assessment. There are no significant physical modifications to the 400m of this channel affected by the scheme.
WFD RWB Objective	Good Status (good ecological status + good physicochemical status)
Is there a deterioration of water body status as a result of the proposal?	No – there are no significant hydromorphological impacts (on morphology, continuity or hydrology) that would cause overall status to decline, with low risk of any measurable deterioration in any of the quality elements as a direct result of the proposed scheme.
Does the proposal prevent attainment of good status/potential?	No – there is no additional impact on this water body as a result of new modifications on the downstream Bride (Cork City)_020 RWB. New modifications downstream in the Bride (north) do not change the fact that the quality elements are limited to 'moderate'. The best that could be achieved would be FCS2 'moderate' status, as the fish community will never reach 'good' status owing to existing barrier effects of downstream culverts which prevent migration of salmon (for at least the past ~200 years). Note that if the downstream Bride (Cork City)_020 was a designated HMWB, then 'good' fish status could be attained on the Glennamought_Trib Bride_010 because there would be an acknowledgement of the impassable barrier created by the existing Blackpool culverts and therefore no expectation (within the FCS2

[15] EPA status was assigned by EPA "expert judgement"

	tool) that migratory fish species be present in this upstream adjoining water body.
Recommendation	The tests of "non-deterioration" and "not jeopardizing attainment of good ecological status/ potential" both pass. The project could be authorised as it does not compromise WFD objectives.

3.5.6 Bride (Cork City)_010 (RWB)

Table 3.10, based on the examples of §3.4.1 of CIS guidance No. 36 (CIS 2017), examines how the proposed project is expected to affect the environmental objectives of the Bride (Cork City)_010 water body. **Table 3.11** summarises the implications for WFD compliance. 'Moderate' ecological status, as assigned by the EPA (modelled) is used as the baseline against which to: (i) assess potential impact on water body status, and (ii) conduct tests of WFD compliance.

Table 3-10 Bride (Cork City)_010 – water body status impact assessment

BRIDE (CORK CITY_010)							
Starting point: EPA assigned status (2016 - 2021) is 'moderate', based on 'modelling'. Biological Quality Elements are not physically monitored by the EPA in this RWB. ''Moderate' status in the macroinvertebrate BQE is inferred from the EPA status classification for the waterbody as a whole (noting that field based survey data equates to 'representative' 'poor' status based on Q-value data 2024). 'Moderate' status is inferred for the fish BQE, noting that 2024 fish surveys indicate 'poor' fish status, at least locally, with low numbers of trout and tolerant species (stickleback) present. This RWB is also limited by the existing Blackpool culverts downstream, i.e., salmon cannot access.							
Effect of modification (Proposed Scheme): Overall ecological status does not deteriorate as a result of the proposed modifications. There are no direct changes to this RWB as part of the scheme, and the changes downstream will not indirectly impinge on the BQEs of this RWB. ted) catchment water quality. Q-value will not change as a result of the downstream water body physical modifications, these are largely governed by upstream (non-related) catchment water quality. Overall ecological status will not deteriorate and attainment of good status is not prevented by the Proposed Scheme.							
Quality elements	**Biological quality elements (BQEs) 2016-2021** (see note below)		**Hydromorphological quality elements supporting the BQEs**			**GPC**	**Overall status**
	Macroinverts (Q-value)	Fish	Hydrology	Morphology	Continuity		
Starting point	M	M	≤M*	≤M*	≤M*	≤M*	M
Effect owing to modification	M	M	≤M*	≤M*↑↓	≤M*	≤M*	M
Ecological Status Classes - H: High; G: Good; M: Moderate; P: Poor; B: Bad							
Effect of modification (Proposed Scheme): Overall ecological status does not deteriorate as a result of the proposed modifications. There are no direct changes to this RWB as part of the scheme, and the changes downstream will not indirectly impinge on the BQEs of this RWB. ted) catchment water quality. Q-value will not change as a result of the downstream water body physical modifications, these are largely governed by upstream (non-related) catchment water quality. Overall ecological status will not deteriorate and attainment of good status is not prevented byt the Proposed Sche+X25:AE31me.							
Note: The BQEs are not physically monitored by the EPA in this RWB, hence the BQEs are inferred, but equate to overall EPA assigned 'poor' status which aligns with field-based results.							

Table 3-11 Summary of WFD compliance tests - Bride (Cork City)_010 waterbody

Bride (Cork City)_010 waterbody (Code IE_SW_19B14011)	Note – this water body is directly upstream of the Bride (Cork City)_020, and is examined here as part of cumulative water status impact assessment. There is no footprint of the Bride (Blackpool) scheme in this water body.
WFD RWB Objective	Good Status (good ecological status + good physicochemical status)
Is there a deterioration of water body status as a result of the proposal?	No – there are no significant hydromorphological impacts (on morphology, continuity or hydrology) that would cause overall status to decline, with a low risk of any measurable deterioration in any of the quality elements as a direct result of the proposed scheme.
Does the proposal prevent attainment of good status?	No – there is no additional impact on this water body as a result of new modifications on the downstream Bride (Cork City)_020 RWB. New modifications downstream in the Bride (north) do not change the fact that the quality elements are limited to 'moderate'. The best possible outcome is a 'moderate' status because downstream culverts have blocked salmon migration for around 200 years, preventing the fish community from achieving good status. Note that if the downstream Bride (Cork City)_020 was a designated HMWB, then 'good' fish status could potentially be attained on the Bride (Cork City)_010 (water quality and habitat permitting) because there would be an acknowledgement of the impassable barrier created by the existing downstream culverts and therefore no expectation (within the FCS2 tool) that migratory fish species would be present in this adjoining water body.
Recommendation	The tests of "non-deterioration" and "not jeopardizing attainment of good ecological status/ potential" both pass. The project could be authorised as it does not compromise WFD objectives.

3.6 Conclusions of WFD Compliance Tests

Table 3.12 summarises that the project is not expected to cause deterioration, or compromise the achievement of good status/potential in the three relevant RWBs: Bride (Cork City)_020, Glennamought_Trib. Bride_010 and Bride (Cork City)_010. This conclusion applies whether the Bride (Cork City)_020 receives HMWB designation, or not.

The following points are noted from CIS No. 36 (2017):

1) *"If a project is expected not to cause deterioration or compromise the achievement of good status/potential (e.g., due to the application of mitigation measures which should be an inherent element of a project), then no Article 4(7) Test is required and the project can be authorised under the WFD."* (CIS, 2017; §3.1, p16)
2) *"Competent authorities may authorise a project in absence of Article 4(7) test when there is sufficient certainty that it will not cause deterioration or compromise the achievement of good status / potential. The evidence on which this decision is based should be documented."* (CIS, 2017; §3.2, p19)

On point (1) - the proposed Bride (Blackpool) drainage scheme incorporates mitigation measures (fisheries enhancements) as an inherent element of the project. On point (2) - this document provides evidence on which such a decision could be made. These points provide sufficient confidence that Article 4(7) test is not required for the proposed scheme.

Table 3-12 Summary of WFD compliance tests – all water bodies, all scenarios

Water body (scenario)	Deterioration of status/potential?	Prevention of good status/potential?	Recommendation
Bride (Cork City)_020 [unmodified]	No	No	The project can be authorised as it does not compromise WFD objectives.
Bride (Cork City)_020 heavily modified waterbody [*HMWB]	No	No	The project can be authorised as it does not compromise WFD objectives.
Glennamought_Trib. Bride_010 *[when Bride (Cork City)_020 RWB is unmodified]*	No	No	The project can be authorised as it does not compromise WFD objectives.
Glennamought_Trib. Bride_010 *[when Bride (Cork City)_020 is *HMWB]*	No	No	The project can be authorised as it does not compromise WFD objectives.
Bride (Cork City)_010 *[when Bride (Cork City)_020 RWB is unmodified]*	No	No	The project can be authorised as it does not compromise WFD objectives.
Bride (Cork City)_010 *[when Bride (Cork City)_020 is *HMWB]*	No	No	The project can be authorised as it does not compromise WFD objectives.

3.7 Implication of Issues in Ground 6

In answer to the question on implications of Ground 6 of the plaintiffs' action relating to the status of the waterbodies involved and how the proposed works will impact on said waterbodies:

First Key Issue

The EPA have assigned status to the water bodies in question, the most recent reporting period being 2016-2021, meaning there is a legally valid baseline against which the competent authority can assess impact on water body status. This removes the issue with respect to the decision in *Sweetman v An Bord Pleanála* [2021] IEHC 16 whereby status changes could not be legally assessed in the absence of EPA assigned status classification.

The Minister is not precluded from granting permission for the development on the basis of this issue as asserted by the plaintiff throughout Ground 6 (§30 - §34).

Second Key Issue

The above evidence verifies the project is not expected to cause deterioration, or compromise the achievement of good status/potential in the three relevant RWBs: Bride (Cork City)_020, Glennamought_Trib. Bride_010 and Bride (Cork City)_010.

This conclusion applies regardless of whether the Bride (Cork City)_020 receives HMWB designation in the forthcoming RBMP cycle or not. The conclusions were reached by applying the WFD compliance tests established in the litigation (*Weser*) and in line with WFD Common Implementation Strategy (CIS, 2017) guidance regarding the legal interpretation of "deterioration".

The Minister is not precluded from granting permission for the development on the basis of this issue as asserted by the plaintiff throughout Ground 6 (§30 - §34).

3.8 REFERENCES

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APPENDIX 1 Images of Bride (North) Orchard Court

Image A1: Bride River – view upstream from entry bridge into Orchard Court showing boulder rip-rap, hard engineered walls and sprayed riparian zone. Natural in-stream substrates.

Image A2: Bride River – view upstream from within Orchard Court showing existing defences (concrete walls, boulder rip-rap).

APPENDIX 2 Fisheries Enhancement Proposals

Fishery Enhancement Proposals

in relation to the

Proposed River Bride (Blackpool) Certified Drainage Scheme

Professor Martin O'Grady

April, 2016.

1. Introduction.

Ryan/Hanley on behalf of OWP has requested the author to review the River Bride (Blackpool) Certified Drainage scheme proposals with a view to modifying same, where possible, for the benefit of the fish stocks without compromising the functionality of the proposed drainage scheme. This report provides specific details in relation to achieving the aforementioned objective.

2. Methodologies.

The proposals in this document were generated following; -

1. The author reviewing all of the background biological data which had been compiled in relation to this study.
2. Looking at the detail of the proposed drainage scheme as outlined in the exhibition drawings for the scheme (Smyth, 24/11/2015).
3. Meeting with Ryan/Hanley personnel, following a site visit, to clarify some of the drainage proposals.
4. Visiting and walking the appropriate channel length on two occasions' accompanied by Mr Michael McPartland (Senior Environmental Officer with Inland Fisheries Ireland) (February, 23rd and April, 13th.

3. Recommendations

The reader should note that all of the coded references in this document are those used in the Exhibition Drawings Document (Smyth, 2015).

3.1 General Issues

3.1.1 Channel Reach of Concern to Fishery Interests.

The specific length of channel, within this proposed flood relief scheme, of concern from a fishery perspective, is the section from the bridge immediately downstream of McDonalds Restaurant (C06 _B01) downstream to where it is proposed to construct a trash rack as part of the flood relief scheme (CO6_ TO2) adjacent to Blackpool Shopping Centre.

3.1.2. The Nature of Channel Substrate Post-Drainage.

Within the channel reach of concern to fisheries it would be most desirable if the substrate on the wetted width of the channel be composed of the same cobble/gravel mix evident in the channel presently – it is accepted that cobble/gravel removal from the proposed gravel trap (CO6 _ CO3) will be necessary, from time to time, as part of a drainage maintenance programme.

3.1.3. Low Flow Wetted Channel Base width.

From a fishery perspective, it is crucial that post-drainage, there should be a "two stage" channel with the wetted width in low flow regimes having the same base width as is evident to-day – the concept of a "two stage" channel is illustrated in "Channels and Challenges" (O'Grady, 2006) (see also Fig. 1 below).

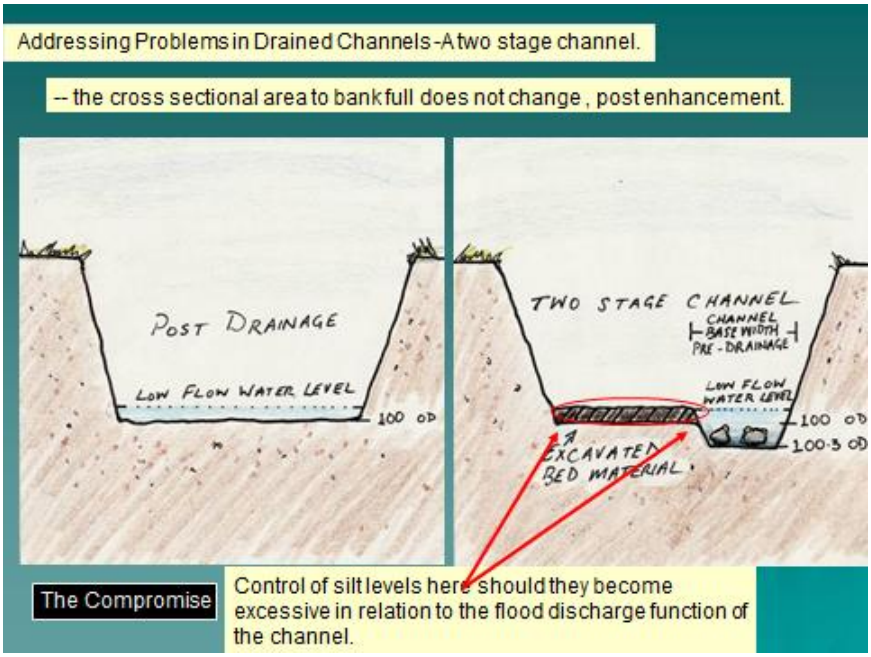

Figure 1. An illustration of the proposed "two stage" channel.

3.1.4. Channel Meander Pattern within the Low Flow Channel.

The channel reach within this programme of concern to fisheries, as defined in section 3.1.1 above, has a number of natural meanders. On each of these meanders the deposition of river silt presently illustrates the natural curvature of the channel. Essentially, post-drainage, the construction of a two-stage channel should mimic the existing pattern at a lower bed level at each meander point (see Figure 2 below by way of example).

Figure 2. Channel morphology at an existing meander bend just d/s of CO6 _ 2250.

3.1.5 Reorganisation of Channel Form, Post-Drainage, in a currently unnaturally broad shallow reach which is braided in nature (from the bridge at CO6 _ LO6 downstream to the bridge at CO6 _ L10).

Currently this artificially broad reach is braided in nature (Figure 3). Following drainage, it suggested that a meandering two stage channel be constructed with the low flow wetted area being circa 1/3 of the existing channel base width. An outline sketch of the proposal is provided in Figure 3. It is suggested that there be a total of four meander bends in the channel length between the two bridges. These should be equally spaced apart over the length of the channel in question.

The creation of a two-stage channel both in straight and meander sections of this channel will necessitate the construction of stone deflectors to function as the “higher tier” of the two bed levels. A suitable design for such a structure is illustrated in Figure 4.

Whenever maintenance of this channel is required, post drainage, the excess silt deposits which will lodge on top of the higher tier in the channel can be removed. Care needs to be taken to ensure that the original “two tiered” design remain in place following maintenance and that the bed of the wetted low flow tier is not disturbed by maintenance operations.

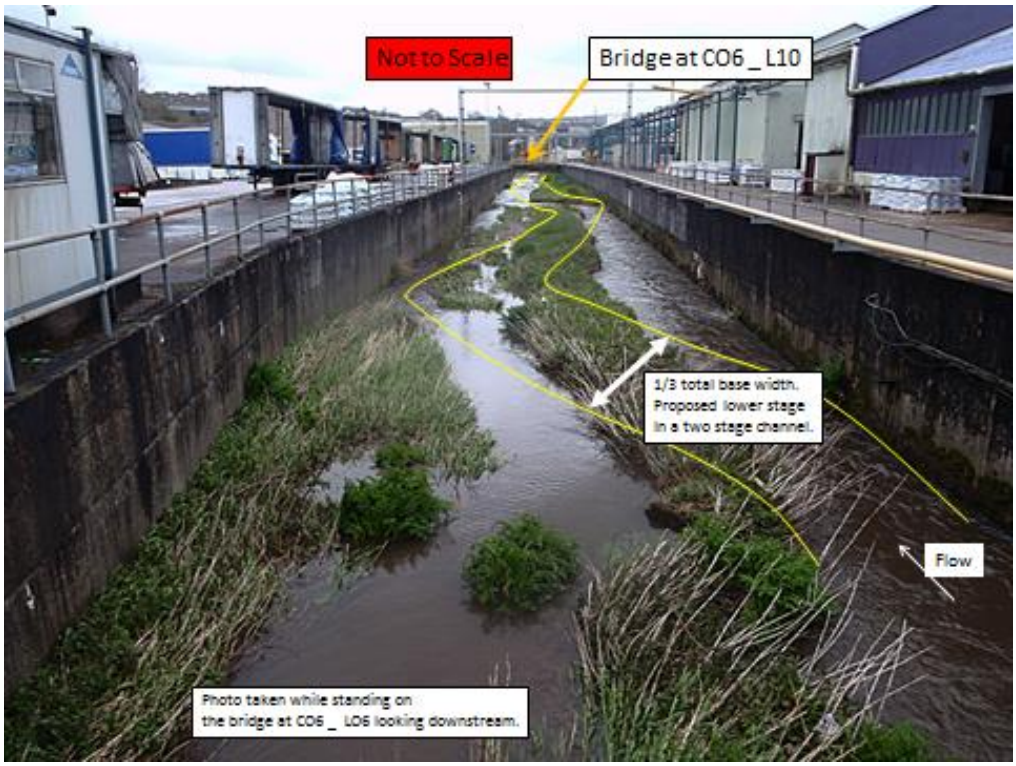

Figure 3. An outline sketch of the enhancement proposal for this reach following the implementation of the drainage programme.

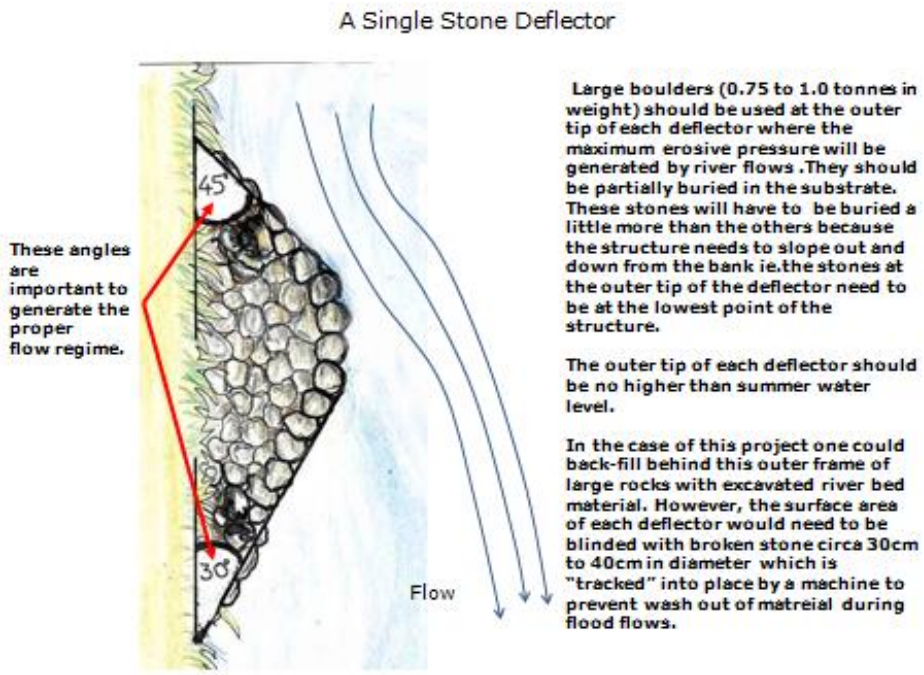

Figure 4. Construction detail in relation to the proposed" higher tier" in a two stage channel.

3.1.6. Introduction of boulders to the channel.

The introduction of boulders to the entire channel length of fishery interest (see Section 3.1.1.) would significantly enhance the morphology of this channel from a fishery perspective; -

- Localised hydrological alterations, caused by boulder placement, would provide resting places for trout and result in localised minor accumulations of the smaller gravels in the channel bed, downstream of individual boulders which would provide spawning opportunities for the trout.
- Stable boulders also provide an area which can be colonised by aquatic plants and invertebrates (Figure 5).

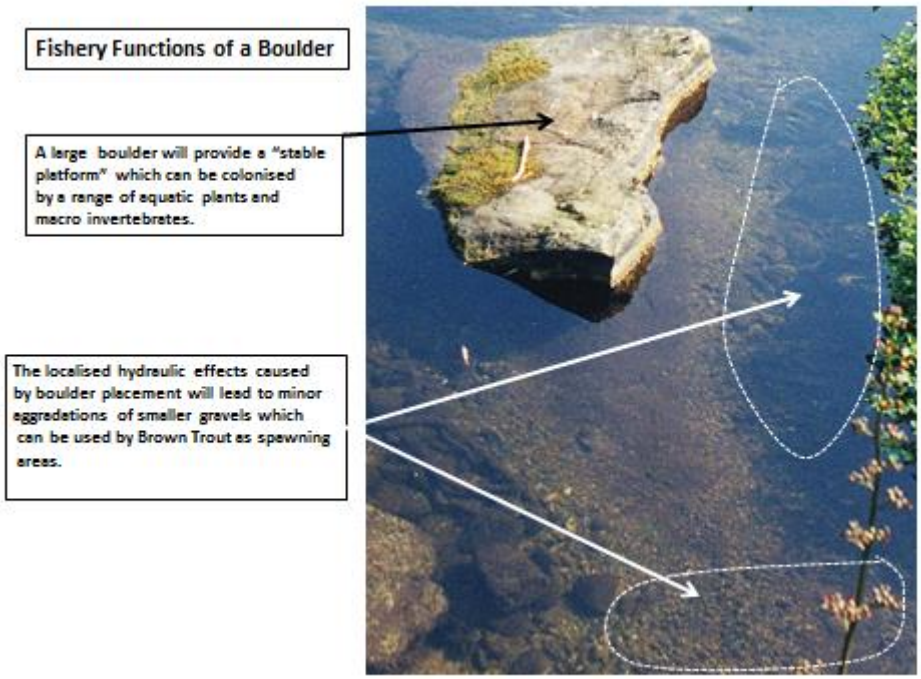

Figure 5. Visual evidence of the value of an introduced boulder.

3.1.6.1. Boulder Requirements and Distribution.

Suitable boulders for this project would be 1.0 to 1.5 tonnes in weight.

They should be at circa 10.0m centres, relative to one another, over the entire channel length in question (excluding the gravel trap area).

The distribution of all boulders should be confined solely to the low flow wetted area.

3.1.7. Providing a Riparian Zone.

The channel in question will have no vegetated riparian zone following the implementation of the proposed drainage programme. The complete absence of bankside vegetation, apart from some marginal grasses poses some severe ecological restrictions from a fishery perspective; -

- Marginal trees and shrubs partially shade channels providing camouflage for fish and help to maintain summer water temperatures beneath lethal levels for trout.
- Most aquatic insects have a short aerial phase in their life cycle during which time they mate and return to the river to lay their eggs. During their terrestrial phase they rest and shelter from storms in shrubbery adjacent to the river – in the absence of such vegetation few are likely to survive long enough to complete their life cycle thereby reducing the overall fish food supply.
- In the summer/autumn period many terrestrial insects, living in a riparian zone, fall into the watercourse. They constitute an important food source for trout during this seasonal period.

In order to counter these negative effects to some extent the author would make the following suggestion; - construct “concrete window boxes” on the upper inner face of the

flood relief walls on selected channel reaches – wherever the low flow wetted reach is adjacent to the flood protection wall (Figure 6). Given the limited growing zone within these boxes the "weeping willows" will remain dwarf in nature and not interfere with flood flows (Figure 6).

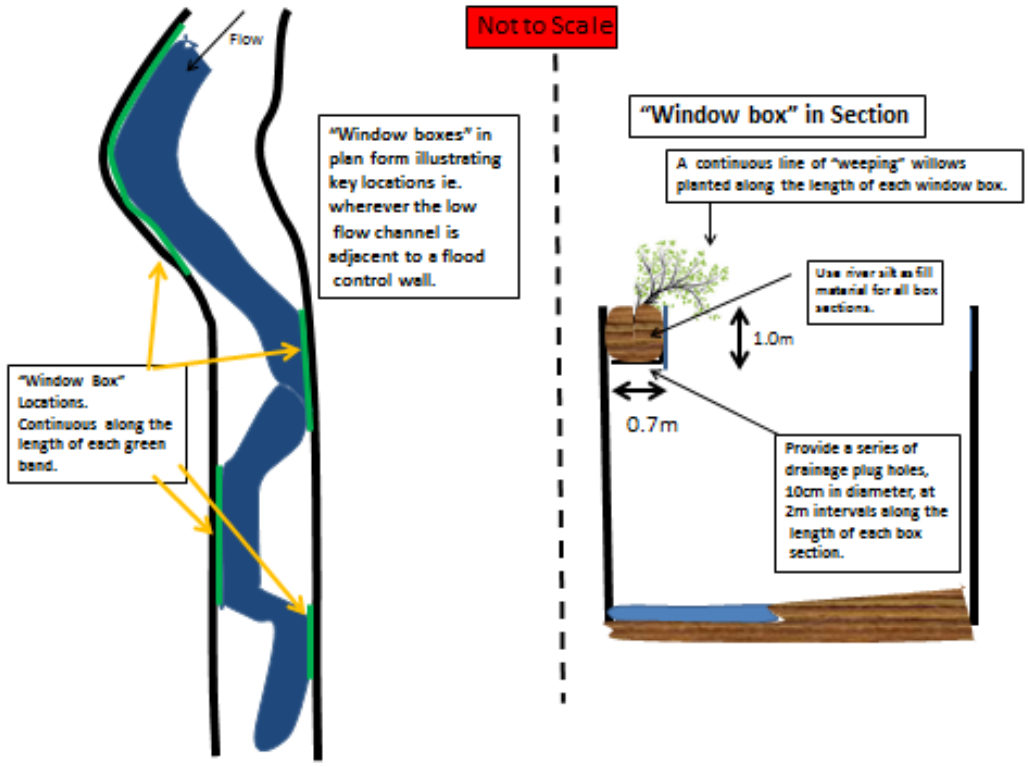

Figure 6. Detail in relation to the Willow planting proposal.

3.2. Specific Issues

There are two particular issues where minor alterations to particular aspects of the drainage proposal would help fishery interests.

3.2.1. Proposed construction of a "trash rack" at CO6 _ TO2 adjacent to Blackpool Retail Park.

It is important from a fishery perspective that trout (≤ 35.0 cm in length) have freedom of passage both upstream and downstream through the proposed "trash rack".

3.2.2. Nature of the left bank on the channel reach where the sedimentation trap is proposed (CO6 _ CO3).

A proposed new wall is proposed here subject to structural assessment (CO6 _ L12). From an ecological perspective, a grassed embankment would be preferable.

4. Summary Comment.

The relevant reach of the River Bride (Blackpool) (see Section 3.1.1) is already in a very poor morphological and ecological state prior to the implementation of this proposed drainage scheme. In the authors opinion if the recommendations outlined in this document can be incorporated into the proposed drainage design (Smyth, 2015) it will significantly improve its capacity to support a brown trout population. In the authors opinion, the net gain in fish stock terms should more than offset the permanent loss caused by culverting in the lower reaches of the proposed drainage scheme.

5. References

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6. Acknowledgements

The author is most grateful to Sinead Gavin (Ryan/Hanley) for supplying me with all relevant background information.

A special thanks is due to Michael McPartland (IFI) for sharing both his time and expertise with the author.

Additional fisheries enhancement area upstream of Commons Inn Hotel

The reach of the Bride shown in Fig A2 is taken from Public Exhibition Drawing No. RB_203 Proposed Flood Defences - Plan Layout (Sheet 3 of 10) available online in the Project Documents page of the Bride (Blackpool) scheme website.

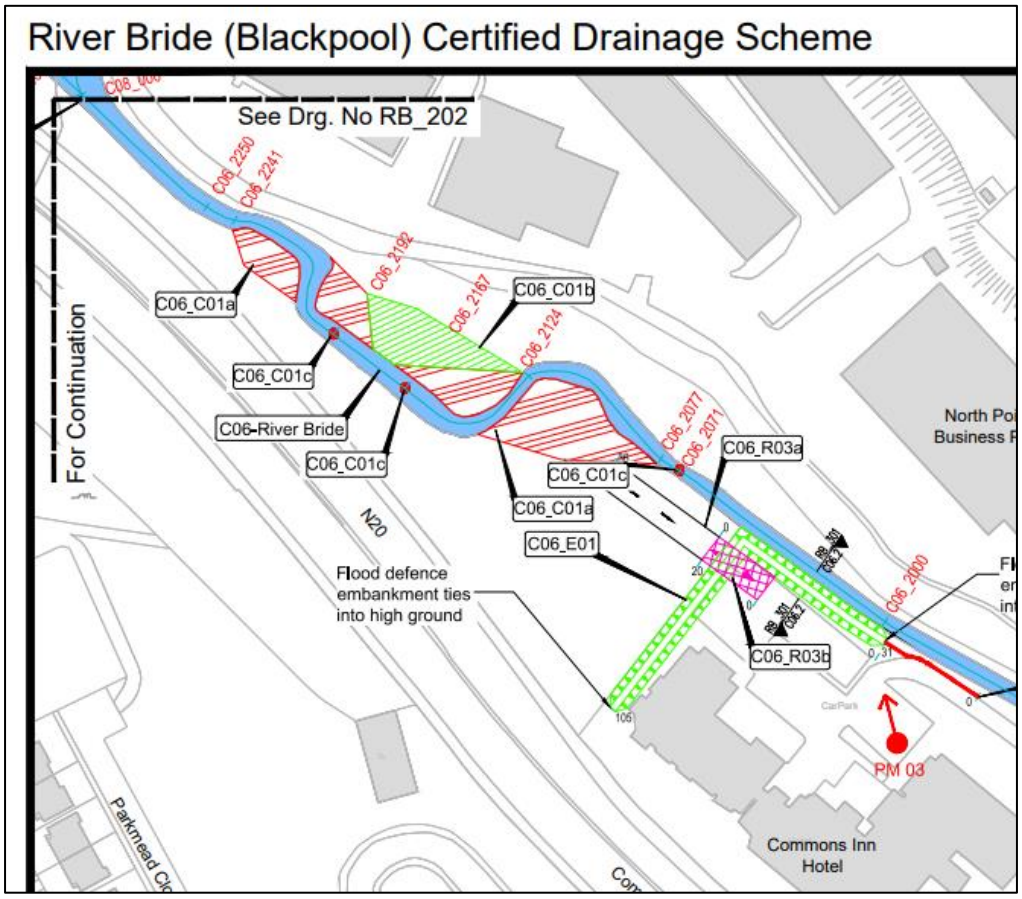

Figure A2: Fisheries enhancement area upstream Commons Inn Hotel

The elements of measures are described with reference to fisheries enhancement below:

- C06_C01a Chainage 2077 to 2241 - Proposed flood scalping and lowering on the inside channel bends to create a second stage channel to reduce velocities in lower order floods. This measure maintains the natural low flow channel, and mimics lateral connectivity in allowing overbank flow to the stage-2 level during larger flood events. The effects are instream velocity reduction and reduction of erosion/scouring in the low flow channel, which is beneficial for instream habitats and fish.
- C06_C01c 2071 to 2192 - Provisionally proposed geomorphic features, such as riffles, to be constructed within the channel. These features would improve local nursery habitats for juvenile trout that drop down from the Glennamought River.