

Tintern Wireworks Bridge

Water Framework Directive Assessment

Gloucestershire County Council

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ATK



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1. Introduction

1.1. Background

Atkins Limited, has been appointed by Gloucestershire County Council (GCC) to provide a Water Frameworks Directive (WFD) assessment report for a proposed Scheme (hereafter referred to as 'the Scheme') to repair and refurbish Tintern Wireworks Bridge, which crosses the England / Wales border near Tintern, Gloucestershire.

This document presents the Water Framework Directive (WFD) compliance assessment for the Scheme. The aims of the document are to:

- Provide background information on the WFD legislation and the proposed works;
- Provide a high-level baseline understanding of the affected water bodies in the context of the WFD;
- Provide an assessment of the potential for the proposed works to cause deterioration in the WFD status of any water body directly or indirectly affected by the works; and
- Provide an assessment of the potential impacts on water body improvement measures and the ability to meet WFD objectives, as well as to suggest control measures where necessary.

1.2. Need for the Scheme

Tintern Wireworks Bridge needs remedial works to retain the three-tonne weight limit vehicle access and Public Right of Way (PRoW) which runs across the bridge and provides access from Tintern to the Offa's Dyke national trail.

Following planned Principal Inspections (PI) in 2006, 2015, 2021, 'Condition assessment and estimate costing for refurbishment' in 2012, a feasibility study in 2018, a scour survey in 2021 and a Structural Assessment of the main girders in 2021, several defects were reported, mainly relating to the condition of the wrought iron spans and their capacity. These now require remedial works.

The scheme aims to refurbish the bridge to full working capacity while retaining its historical Grade II listed status. Onsite repair methods and new design elements will be used to ensure longevity in a sustainable manner. Atkins has been appointed to complete the refurbishment works by Gloucestershire County Council (GCC), which is the maintaining authority.

1.3. Site Description

Tintern Wireworks Bridge spans the River Wye, which at this location is the boundary between England and Wales, with Monmouthshire (Wales) to the west and Gloucestershire (England) to the east. The bridge is located at Ordnance Survey National Grid Reference (OSNGR) SO 53012 00294 and is a five-span bridge with stone abutments approximately 85 m in length and 4 m in width.

The Scheme is located adjacent to the following statutory nature conservation designations:

- River Wye Special Area of Conservation (SAC).

The extent of the Scheme boundary is shown in Figure 1-1.

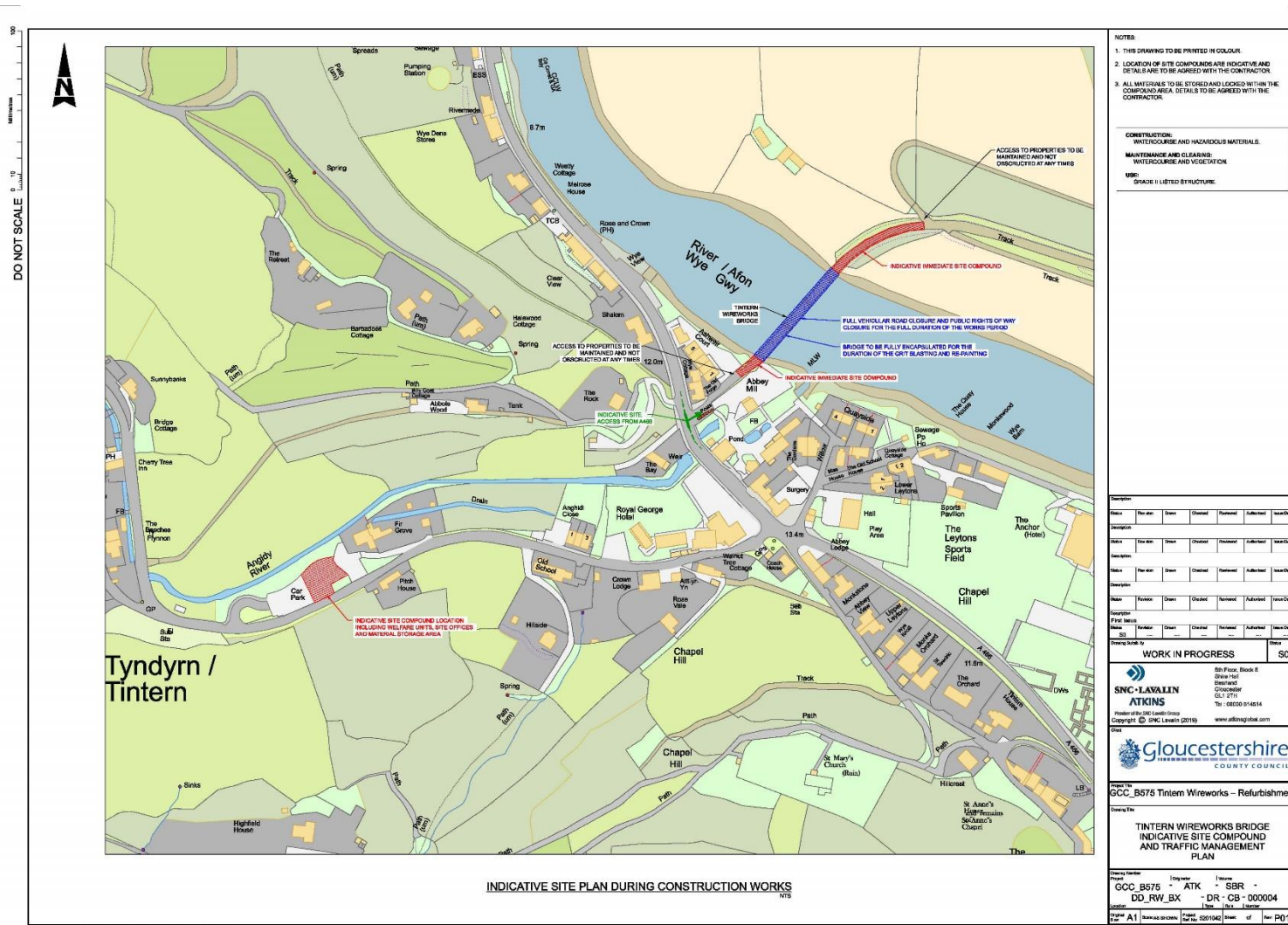


Figure 1-1 Tintern Wireworks Bridge Site Location

2. Methodology

2.1. The Water Framework Directive – Legislative Background

The Water Framework Directive (WFD) originates from the EU but has been retained in UK law following the UK's exit, via The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017, as amended. For the purposes of this assessment, the legislation will be referred to as the WFD throughout the document, with the assessment of the Scheme in relation to the Water Environment Regulations referred to as a WFD Assessment (some industry practitioners may start referring to it as a Water Environment Regulations Assessment).

The Water Environment Regulations (referred to hereafter as the 'Regulations') apply to all coastal and estuarine waters in Wales, out to a distance of 1 nautical mile (nm). Under the Regulations, any activity or project with the potential to have an impact directly or indirectly on water body ecology will require a WFD Assessment. A WFD Assessment will consider whether the activity or project has the potential to cause deterioration in the ecological status or ecological potential of that water body or adjacent water bodies. The WFD Assessment also considers the biological, physico-chemical and hydromorphological qualities of a water body.

The framework for delivering the WFD is through a series of River Basin Management Plans (RBMPs), which requires surface water bodies to achieve both Good Chemical Status (GCS) and Good Ecological Status (GES)¹, and for groundwater bodies to achieve both Good Chemical Status (GCS) and Good Quantitative Status (GQS). The RBMPs outline the actions required to enable natural water bodies to achieve this. Artificial and Heavily Modified Water Bodies (A/HMWB) are surface water bodies that may be prevented from reaching GES due to the modifications necessary to maintain their function for essential human uses, such as flood defence, navigation or drinking water supply. They are, however, required to achieve Good Ecological Potential (GEP), through the implementation of a series of mitigation measures outlined in the RBMP.

New activities and schemes that affect the water environment may adversely impact biological, hydromorphological, physico-chemical and/or chemical quality elements (WFD quality elements), leading to a deterioration in water body status. They may also render proposed improvement measures ineffective, leading to the water body failing to meet its objectives for GES/GEP. Under the WFD, activities and schemes must not cause deterioration in water body status or prevent a water body from meeting GES/GEP by invalidating improvement measures. A summary of key WFD objectives is presented in Figure 2-1.

In addition to protecting and improving water bodies, the WFD also requires that a register of 'Protected Areas' is developed, which are "all areas lying within each river basin district which have been designated as requiring special protection under specific Community legislation for the protection of their surface water and groundwater or for the conservation of habitats and species directly depending on water". In the United Kingdom, these Protected Areas are:

- Areas with water-dependent habitats that are protected under the Birds and Habitats Directives, and (by Government policy) under the Ramsar Convention;
- Drinking Water Protected Areas;
- Shellfish Waters;
- Bathing Waters; and
- Nutrient Sensitive Areas.

¹ The WFD classification scheme for GES includes five categories: high, good, moderate, poor and bad. 'High status' means no or very low human pressure. 'Good status' means a 'slight' deviation from this condition, 'moderate status' means 'moderate' deviation, and so on.

The potential impacts of new activities and schemes on these protected areas must also be considered in order to ensure compliance with the overall requirements of the Regulations.

WFD Objectives

The WFD is a European Directive transposed into UK law which sets out a strategic planning process for the purposes of managing, protecting and improving the water environment. The main objectives of the WFD are to:

- Prevent deterioration in the status of aquatic ecosystems, protect them and improve the ecological condition of waters;
- Aim to achieve at least 'Good Status' for all waters by 2015 (2021 or 2027) where fully justified within an extended deadline under Article 4.4;
- Promote sustainable use of water;
- Conserve habitats and species that depend directly on water;
- Progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment;
- Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants; and
- Help reduce the effects of floods and droughts.

Natural Resources Wales are responsible for implementing the WFD in Wales, with the Environment Agency having joint responsibility for cross-border areas. They monitor, advise and manage many aspects of the water environment through regulating discharges, abstractions and processing environmental permits and licences. Natural Resources Wales and the Environment Agency are committed to implement environmental improvements by reducing the physical impacts of flood risk management activities within artificial or heavily modified water bodies.

WFD Classification

The WFD classification for a defined water body is produced by the assessment of a wide variety of different 'elements' which includes:

- '*biological elements*' such as fish, invertebrates, Phytobenthos (which includes plants, macro-algae, phytoplankton);
- '*supporting elements*' that include chemical measurements such as ammonia, dissolved oxygen, pH, phosphate, copper, zinc and temperature; and
- '*supporting conditions*' (sometimes referred to as hydromorphology) that assess the physical attributes of the water body such as 'quantity and dynamics of flow' and 'morphology'.

The assessment given for each element is also accompanied by a measure of certainty in the result. The status classification is published in the RBMP and provides a baseline condition against which compliance and future improvements can be measured.

WFD Compliance

There are three key objectives against which the impacts of proposed works on a water body need to be assessed to determine compliance with the overarching objectives of the WFD:

- Objective 1: The Scheme will not cause a deterioration in any element of water body classification.
- Objective 2: The Scheme will not prevent the WFD status objectives from being reached within the water body or other downstream water bodies.
- Objective 3: The Scheme will contribute to the delivery of the relevant WFD objectives. In this case, it will be what contribution the scheme can make towards the water body reaching its objective GEP through planned RBMP mitigation measures.

Objective 1 and Objective 2 must be met to avoid infringement of the WFD. The delivery of the third objective is central to the implementation of the WFD, where it can be supported through its operational activities. If it is considered that the Scheme is likely to cause deterioration in water body status or prevent a water body from meeting its ecological objectives, then an assessment would be made against the conditions listed in Article 4.7 of the WFD. Article 4.7 can be invoked if; 'new modifications' are of overriding public interest and/or the environmental and social benefits of achieving the WFD objectives are outweighed by the benefits of the new modifications to human health, safety and sustainable development; there are no significantly better environmental options that are technically feasible or not disproportionately costly; and all practicable steps for mitigation have been taken.

Figure 2-1 Background to WFD Assessments

2.2. Approach to the WFD Assessment

2.2.1. 'Clearing the Waters for All' guidance

Natural Resources Wales (NRW) is the lead authority for the implementation of the WFD in Wales. The Environment Agency (EA) is the lead authority for the WFD in England. The EA has developed guidance to support carrying out WFD assessments for new schemes in estuarine and coastal waters - "Clearing the Waters for All" (Agency, 2016), published on www.gov.uk. This guidance can be utilised in WFD assessments in Wales and is applicable to activities in the marine environment up to 1 nautical mile out to sea. This guidance recommends a three-staged process to the WFD Assessment, comprising:

- Screening – to exclude any activities that do not need to go through the scoping or impact assessment stages;
- Scoping – to identify the receptors that are potentially at risk from the proposed activity and need impact assessment; and
- Impact assessment – considers the potential impacts of the proposed activity, identifies ways to avoid or minimise impacts, and shows if the activity may cause deterioration or jeopardise the water body achieving good status.

The guidance also recommends that all activities are considered, including each relevant stage (e.g. construction, operation and decommissioning), and that all waterbodies that could both directly and indirectly be affected by the activities are included.

This WFD assessment has broadly followed the principles outlined in the 'Clearing the Waters for All' guidance.

2.2.2. Data Sources

Where relevant, any surveys and assessments that have been carried out to inform the development of the Scheme have been used to inform this WFD assessment. Online sources of information have also been used. The key data sources that have informed this assessment are:

- Current WFD status classification data from Water Watch Wales (Natural Resources Wales, 2021)
- Data on WFD Protected Areas and WFD Higher and Lower Sensitivity Habitats (Natural England, 2021)
- Severn River Basin Management Plan (Environment Agency, 2016)
- Severn Draft River Basin Management Plan 2021 (Environment Agency, 2021)
- Wales Water Body Objectives and measures update 2017 (Natural Resources Wales, 2017)
- Magic Map Defra (Natural England, 2021)

2.2.3. Structure and Content of this Report

The structure of this report and a summary of the contents and steps undertaken to complete each section are detailed in Table 2-1.

Table 2-1: Structure of this Report

Chapter	Title	Content and Steps
1	Introduction	Introduces the purpose of the Scheme and the context of its location.
2	Methodology	Describes the legislative context to the assessment and the overall approach, including guidance used and data sources.
3	Proposed Works and Programme	Sets out the outline description of the activities that will be carried out at each Scheme stage, including construction, operation and decommissioning.
4	Screening	Identification of the activities described in Chapter 3 that may impact on the quality elements of WFD waterbodies; and identification of water bodies that are relevant to the Scheme.
5	Scoping	Presentation of the baseline conditions for the relevant quality elements of each water body screened in for assessment, and consideration of the potential risk of deterioration from Scheme activities screened in.
6	Assessment	Detailed examination of and commentary on the risks identified at Scoping, and their potential to result in deterioration of any quality elements. This step includes potential measures that may be used to avoid or reduce the potential magnitude or scale of any effects. The assessment includes consideration of effects on WFD Protected Areas.
7	Conclusion	A summary of the conclusions drawn by the WFD Assessment.

3. Proposed Works and Programme

3.1. Proposed Scheme

The estimated timescale for construction is up to 8 months, with completion anticipated before Christmas 2022. Works are programmed for May 2022 to December 2022, taking place during daylight hours (08:00 to 17:00 on weekdays and excluding Bank Holidays). It is likely that a number of activities can be done concurrently. The works will include:

- Mobilisation and site set up
- Enabling works (including excavation of abutment, backfill and installation of the pattress plate/rod system to the west abutment and wingwalls)
- Installation of suspended temporary works platform and encapsulation of bridge
- Removal of the existing deck, preparation of abutment/piers and installation of bearings
- Installation of new steel beams for the new deck system
- Grit blasting and painting of the steel work
- Installation of a new bridge timber panels
- Masonry repairs and repointing can be undertaken concurrently with other activities
- Demobilisation from site

Construction works are not anticipated seaward of MHWS but they will take place over a tidal river. A detailed breakdown of the intended works is included in this Method Statement and timing of the works is provided in the Construction Programme. Illustrations of the works, site, compounds and ingress/egress points are provided in the Detailed Design Drawings and Site Compound and Traffic Management Plan.

Mobilisation

The proposed works will begin with mobilisation and the establishment of a temporary works compound, located in the Wireworks Car park on Forge Road, Tintern, 0.5km to the south west of the structure and at the immediate access point of the bridge on the western riverbank. Some vegetation removal is proposed, including trimming of tree branches and the removal of one sapling and scrub/grassland habitat on the pathway verge. All public access will be temporarily revoked and access to the bridge will only be permitted by the workforce. A vehicle closure is already in place and a Public Right of Way (PROW) closure will be in place for the duration of the works.

Enabling works

The excavation of the western abutment is required to install a pattress plate/rod system which tie the abutments together to prolong the useable life of the structure (See Figure 1). This work will take place between the existing wing walls, using hand digging and a small excavator (when necessary), to remove existing concrete. Excavated material will be removed to a licenced disposal facility, using sheeted lorries for containment. Installation of a pattress plate/rod system will be undertaken from either side of the west wingwalls and abutment. It is expected that access will be either via rope access or the temporary works platform. This will be fixed in place and backfilled with concrete. Back fill material will be delivered to site and discharged from cement mixer lorries directly into the excavated area.

Masonry repairs, including repointing of the western abutment, wing walls and tops (top 0.5m from deck level) of the piers will also be undertaken to allow for the new deck to be placed. All masonry repairs will be enabled through the suspended works platform.

- Repointing - Using natural lime mortar (as specified by the heritage/conservation officer) to the wing walls/abutment which will be in identified locations of missing or loose mortar.
- Minor repairs - Replacing the stonework to the elevations of the wing walls which have been displaced over the years (which has already been places on site to the approached to the bridge).



Figure 1 – Location of excavation for strengthening of structure

Installation of suspended temporary works platform and encapsulation of bridge

The temporary works platform will be a suspended access system that enables full access beneath the bridge. This will sit above MHWS. The platform will be supported from the existing girders and is proposed to be installed in May 2022. It will enable access for workers and provide a 1 m minimum gap to all steel elements for painting and grit blasting operations. The bridge will be encapsulated in industry-standard sheeting material throughout the works, which will prevent any contamination such as debris and dust entering the local environment. The encapsulation will be checked for damages before each working day. Any sheeting found to be damaged during inspections will be removed and replaced. Any removed sheeting will be bagged and removed for safe disposal at an approved facility. On completion, the platform will be dismantled, and the sheeting will be bagged and removed for safe disposal at an approved facility. See Figure 2.



Figure 2 – Example of bridge encapsulation

Removal of the existing timber bridge deck, preparation of abutment/piers and installation of bearings and longitudinal beams

The existing timber deck will be removed from the bridge and disposed of off-site. Localised cutting of the piers/abutment will accommodate the bridge bearings which will support the longitudinal beams, which in turn will support the new deck (See Detailed Design Drawings). Any dust generated by stone cutting, repair, removal or replacement will be controlled at source and confined within the encapsulation. The new beams will be delivered by lorry to site and manoeuvred across the bridge and fixed into place.

Grit blasting and repainting of existing steel work

The refurbishment of the wrought iron twin girders will start with dry grit blasting to clean the main bridge structure back to bare metal. The blast material will be collected and disposed of appropriately from the access platform. Repairs to the wrought iron are not anticipated at this stage. Both painting and grit blasting will be controlled via the encapsulation to ensure that no material will be lost from the working area into the local environment.

Installation of permanent deck plates and new timber panels

To create the new bridge decking, deck plates and pre-treated timber panels will be installed across the bridge, using bolted connections for pedestrian and vehicular access.

Demobilisation

Once the refurbishment works are complete the site will be demobilised, and any work areas will be returned to their original form including making good any disturbed soil and or surface where materials or site compounds were located.

All waste materials will be returned to the contractor's premises, recycled, or disposed of to a licenced waste unit.

3.1.1. Outline Construction Programme

The works are scheduled to commence in May 2022 and be completed by December 2022, a duration of 8 months. Construction will start and end with the installation and removal of the site compounds. The construction timescale for each phase of the works has been presented in Table 3-1.

Table 3-1: Construction programme for Tintern Wireworks Bridge Scheme

Activity	Programme
Site Access and Mobilisation – Site compounds, welfare facilities, material storage and access routes	Approximately 2 weeks
Enabling works – Excavation and backfill of abutment and installation of parrass plate system into west wingwall	Approximately 4 Weeks
Installation of a suspended temporary works platform and encapsulation of the bridge	Approximately 4 Weeks
Removal of existing timber deck	Approximately 4 weeks
Bridge refurbishment including grit blasting and repainting of existing steel work	Approximately 4 weeks
Installation of bridge bearings (to support steel beams), steel bridge beams and new timber deck	Approximately 8 weeks
Demobilisation – Removal of railing, scaffolding, encapsulation and site compounds.	Approximately 4 weeks

It should be noted that these durations are weather dependent and will rely on the contractor appointed and their detailed method statement. The construction will be carried out during daylight hours Monday to Friday from 8am to 5pm. There will be no work over Christmas, New Year and Easter public holiday and Bank Holidays.

3.2. Operation and Decommissioning

Once demobilisation of the site has been completed, the bridge will be operational as a PRow and provide 3T vehicular access to the Offa Dyke national trail. No further activities will be undertaken during operation; therefore operational effects have not been considered within this assessment.

No decommissioning is required or proposed as part of the Scheme and therefore decommissioning effects have not been considered within the assessment.

4. Screening

4.1. Screening of WFD Water Bodies

A screening exercise was completed to identify waterbodies that are relevant to Scheme. A study boundary also known as zone of influence was set for the screening, which was the immediate footprint of the works, plus one waterbody upstream and one downstream of the site (for surface waters). For groundwater, only immediately underlying groundwater bodies were included in the screening, as individual groundwater bodies are designated as “hydraulically coherent” systems that do not have interactions with other groundwater bodies.

Tintern is within the Severn River Basin District (RBD) and the management strategies for this district are stated in the Severn River Basin Management Plan (RBMP). The first RBMP was published in 2009 and set out the management plan for the first cycle of six years 2009-2015. The plan was updated in 2016 to cover the second cycle 2015-2021 and a draft was made available in October 2021 (full report yet to be published), for the next cycle, and so on. The purpose of the RBMP is to protect and improve the water environment for the wider benefits to people and wildlife – to achieve ‘Good’ status. The majority of baseline data within the study area was obtained from Natural Resources Wales (NRW) Water Watch Wales (See Section 2.2.2 for further details).

In the Severn RBD, the following surface water bodies, from upstream to downstream, are classified as within the zone of influence:

- Wye - conf Walford Bk to Bigsweir Bridge (ID: GB109055037111) – River
- Wye – (ID: GB530905415406) Transitional
- Severn Lower (ID: GB530905415401) Transitional

Wye - conf Walford Bk to Bigsweir Bridge (ID: GB109055037111) is a river water body 34km in length which lies approximately 5km (most direct route) upstream of the Scheme. Its most recent ecological status is classified as ‘Moderate’ and chemical status is classified as ‘Fail’. Wye - conf Walford Bk to Bigsweir Bridge waterbody has been screened out, due to the scale of the works, the ability for impacts to travel upstream are limited and the distance of the waterbody from the Scheme.

The River Wye – (ID: GB530905415406) is a transitional waterbody covering an area of 2.6km². The works will take place within this waterbody. Its most recent ecological status is classified as ‘Moderate’ and chemical status is classified as ‘Good’.

Severn Lower (ID: GB530905415401) is a transitional waterbody that covers an area of 466km² and lies over 10km downstream of the Scheme by the most direct route. The Wye connects to the Severn Lower near the mouth of the Severn Estuary. The Severn Estuary eventually flows out into the Bristol Channel. The Severn Lower’s most recent ecological status is classified as ‘Moderate’ and its chemical status is classified as ‘Fail’. This waterbody has been screened out from further assessment due to the scale of the works and its distance from the Scheme.

A summary of the screened surface water bodies’ WFD classifications are provided in Table 4-1 below. The location of the Scheme in relation to screened surface water bodies is shown in Figure 4-1.

Table 4-1 Summary of WFD Classification for Surface Water Bodies

Name	Type	Hydromorphological designation	Waterbody ID	Area (km ²)	Protected Area Designation	Overall Status Cycle 1	Overall Status Cycle 2	Overall Status Objective
Wye - conf Walford Bk to Bigsweir Bridge	River	Not HMWB Supports Good	GB109055037111	34 km (length)	Special Area of Conservation (SAC) Drinking Water Protected Area (DrWPA)	Moderate	Moderate	Good by 2021
Wye	Transitional	Not HMWB Supports Good	GB530905415406	2.6	SAC	Moderate	Moderate	Good by 2021
Severn Lower	Transitional	HMWB Supports Good	GB530905415401	466	SPA, SAC	Moderate	Moderate	Good by 2021

4.1.1. Groundwater Bodies

The groundwater body underlying Tintern is the Wye Minor groundwater body (ID: GB40902G20410). Under the Severn RBD, this groundwater body forms part of a Drinking Water Protected Area (DrWPA) and is also protected under the Nitrates Directive. Wye Minor's groundwater body's quantitative status has been classified as 'Good' and its chemical status as 'Poor', achieving an overall status of 'Poor'. The RBMP determined some of the following sources that can impact on groundwater bodies and prevent them from being able to achieve 'Good' status, such as:

- Pollution from towns, cities and transport;
- Changes to the natural flow and level of water;
- Pollution from rural areas e.g. excessive use of nitrates; and
- Pollution from abandoned mines.

The Wye Minor groundwater waterbody has been screened out, as no ground-penetrating works will be undertaken; therefore, there is no hydrological connection between the works and Wye Minor which may prevent the ground waterbody from achieving 'Good' status. Furthermore, any potential pollution impacts will be suitably mitigated by contractors following the Guidance on Pollution Prevention (GPPs)² in particular GPP5 Work in or Near Water, and the Construction Industry Research and Information Association (CIRIA) guidance on the control of water pollution from construction sites. A summary of the Wye Minor WFD classification is provided in Table 4-2 below. The location of the Scheme in relation to the extent of the groundwater body is shown in Figure 4-1.

Table 4-2 Summary of WFD classifications for Groundwater Waterbodies

Name	Type	Waterbody ID	Protected Area Designation	Overall Status Cycle 1	Overall Status Cycle 2 ²	Overall Objective ³
Wye Minor	Ground water	GB40902G204100	DrWPA, Nitrates Directive	Good (2009)	Poor	Good by 2027

² Documents are available at <http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppps-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/>. GPPs provide environmental good practice guidance for the whole UK, and environmental regulatory guidance directly to Northern Ireland, Scotland and Wales only.

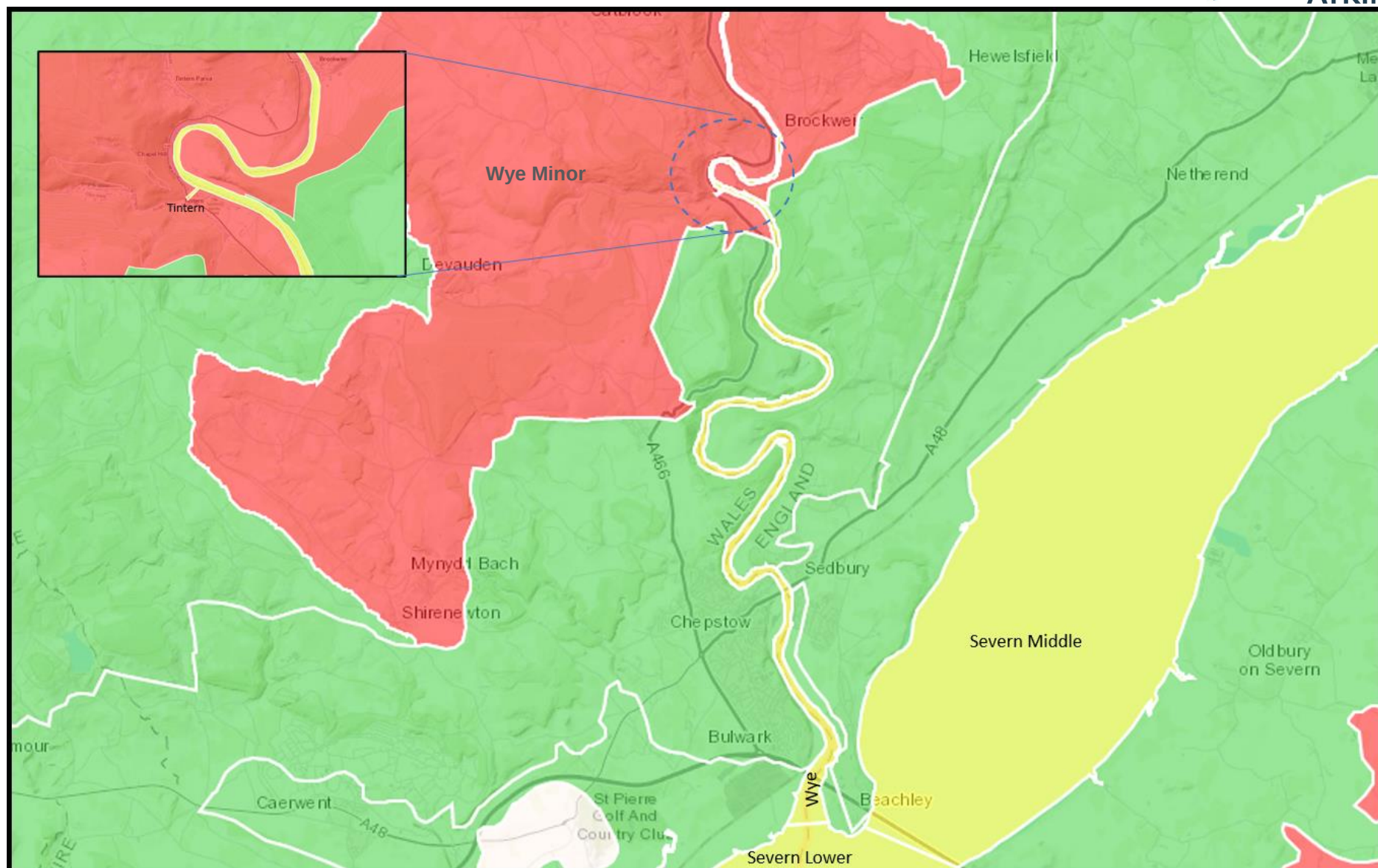


Figure 4-1 Waterbodies Relevant to the Scheme

4.1.2. Screening Summary

The following WFD waterbody has been screened in for further assessment:

- Wye (ID: GB530905415406)

4.2. Screening of Relevant Scheme Activities

For the waterbody screened in for further assessment, activities that could impact on its status were identified for construction stages. The activities that should be screened in for further assessment are detailed in Table 4-3.

Table 4-3 Screening of Scheme Activities: Construction Stage

Scheme element	Activity(s)	Screening rationale
Site establishment and demobilisation	Site establishment and removal of site compounds, welfare facilities, material storage and access routes.	Screen out – All the works associated with site establishment and demobilisation will be undertaken either away from or above the water column. There will be no direct pathways for any of the site compound activities resulting in water quality impacts to the surrounding surface water bodies.
Enabling works – Excavation and backfill of abutment and installation of pattress plate system into west wingwall	Excavation of eastern end of bridge, install pattress (anchor) plate system for structural support and backfill.	Screen out – All the works associated with the installation of an anchor plate will be undertaken above the water column. There will be no direct pathways for these works resulting in water quality impacts to the surrounding surface water bodies.
Installation of a suspended temporary works platform and encapsulation of the bridge	Installation of a suspended temporary works platform and encapsulation of the bridge.	Screen out – All the works associated with the 'Installation of scaffolding and encapsulation' will be undertaken above the water column. There will be no direct pathways for these works resulting in water quality impacts to the surrounding surface water bodies.
Removal of existing timber deck	Removal of timber decking.	Screen out – All the works associated with the 'Removal of the timber deck' will be undertaken above the water column. There will be no direct pathways for these works resulting in water quality impacts to the surrounding surface water bodies.
Bridge refurbishment including grit blasting and repainting	High pressure removal of the existing paint and repainting the twin girder bridge structure.	Screen in – High pressure removal of paint has the potential to enter the river Wye surface water body and may impact on physico-chemical quality elements.
Installation of bridge bearings, steel box beams and new timber deck	Installation of box beams for structural support using girder and rail system and new decking panels.	Screen out - All the works associated with the 'Installation of box beams and new timber deck' will be undertaken above the water column. There will be no direct pathways for these works resulting in water quality impacts to the surrounding surface water bodies.

Once demobilisation of the site has been completed, the bridge will be operational as a PRow and enable vehicular access to the Offa's Dyke national trail. No further activities will be undertaken and no decommissioning is required as part of this Project.

5. Scoping

5.1. Waterbody Baseline Data

The waterbody data in Table 5-1 below has been taken from both the Wales Classification Data 2009 – 2015 data (Natural Resources Wales, 2017a) and updated using the Wales Waterbody Objectives and Measures 2017 data (Natural Resources Wales, 2017). The most up to date information was used unless information was missing from the updated dataset.

5.1.1. Wye

Table 5-1 WFD Status – Wye (Surface waterbody)

Waterbody: – Wye Overall status: Moderate Ecological status: Moderate Chemical status: Good Mitigation measures: Not Yet Assessed		
Biological quality elements:	Physico-chemical quality elements:	Hydromorphological supporting elements:
Fish: Not Assessed	Temperature: Not Assessed	Hydrological Regime: Supports Good
Invertebrates: Not Assessed	pH: Not Assessed	Morphology: Supports Good
Macroalgae: High	Dissolved oxygen: Not Assessed	Flow: Pass
Phytoplankton: Not Assessed	Dissolved Inorganic Nitrogen: Moderate	HMWB: No
	All metal assessed: Not Assessed	

The extent of the designated WFD Wye waterbody reaches approximately 4km upstream of the Scheme at Bigsweir bridge, where its tidal limit also ends and transitions into the Wye - conf Walford Bk to Bigsweir Bridge (See Section 4.1.1). The entire river is a designated Special Area of Conservation (SAC) of which a variety of fish and aquatic ecology are designated features. It is inhabited by the most well establish otter (*Lutra lutra*) population in Wales, and the best site known for White-clawed crayfish (*Austropotamobius pallipes*) both listed Annex II species.

5.1.2. Protected Areas and Sensitive Habitats

The WFD Protected Areas and WFD sensitive habitats within a 2km proximity to the site (as per the EA recommendation (EA, 2016)) are summarised in Table 5-4. Terrestrial protected areas have not been considered here. The majority of the information provided on Sensitive Habitats has been sourced from Natural England's interactive MAGIC online mapping service.

Table 5-2 Summary of WFD Protected Areas and Sensitive Habitats

WFD Protected Areas	Location in relation to the Scheme
Special Area of Conservation (SAC)	River Wye (Afon Gwy) – The entire length of the River Wye. The Scheme lies within this SAC.
WFD Sensitive Habitats	Location in relation to the Scheme
Intertidal Soft Sediments – sand, mud and mixed (Lower Sensitivity)	Continuous sections are located along the eastern embankment of the River Wye.

5.2. Scoping of Scheme Activities

A Scoping exercise has been undertaken to identify the potential risks of each Scheme activity that was screened in for further assessment. See Table 5-5 for further details. The Scoping process has followed the Environment Agency's 'Clearing the Waters for All' guidance, and has considered the risks of the Scheme activities during the construction and operation stages (as screened in in Section 4.2) to the following receptors for surface water bodies:

- Hydromorphology;
- Biology – habitats;
- Biology – fish;
- Water quality (physico-chemical); and
- Protected Areas.

The Scoping exercise is documented in Appendix A. Table 5-5 presents the summary results of the identified risks and receptors that have been taken forward to the assessment stage for the River Wye.

Table 5-3 Scoping for Wye waterbody

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	No	None of the works will be undertaken within the waterbody. Therefore, there are no risks to the local hydromorphological supporting elements.
Biology: habitats	No	None of the works will be undertaken within the waterbody. The total footprint of the works is approximately 0.002km ² which is less than 1% of lower sensitivity habitat -Intertidal Soft Sediments and there are no higher sensitivity habitats within 500m of the Scheme.
Biology: fish	No	None of the works will be undertaken within the waterbody. Therefore, it is extremely unlikely that the works will impact on normal fish behaviour such as movement, migration or spawning.
Water quality (physico-chemical)	Yes	None of the works will be undertaken within the waterbody. Therefore, there are limited risks that could affect water quality supporting elements. However, there is potential for lead paint to enter the waterbody during the grit blasting works, which could impact the physico-chemical quality elements as lead is a chemical listed on the Environmental Quality Standards Directive (EQSD).
Protected areas	Yes	The Scheme lies above the River Wye which is a designated SAC.

5.3. WFD Assessment of Impacts

Tables 5-3 presents the results of the WFD assessment for the Wye surface waterbody. This assessment considers the effects of the Scheme during the construction phase on the scoped in WFD quality elements of the waterbody. Where necessary, mitigation measures are proposed to support good practice and address potential residual risks.

Table 5-4 Assessment of Impacts on the Wye waterbody

Hydromorphology	Biology	Physico-chemical	Protected Areas	Control Measures that will be employed throughout the works
Hydrological regime: Quantity and dynamics of water flow, tidal prism. Morphological conditions: water column depth variation; Structure and substrate of the sea bed. Mitigation Measures: Conflict with or contribution to Mitigation Measures for HMWBs	Sensitive Habitats: Extent and quality of habitats Fish fauna: Species composition and abundance; Presence of type-specific disturbance sensitive species; Age structure of fish communities. Other elements: Invertebrates and macroalgae.	Parameters: Salinity, Nutrient concentrations, pH, Oxygen balance; Acid neutralising capacity, Temperature, Transparency. Pollution by all priority substances identified as being discharged into the waterbody. Pollution by other substances identified as being discharged in significant quantities into the waterbody.	Areas with water-dependent habitats that are protected under the Birds and Habitats Directives and the Ramsar Convention, Drinking Water Protected Areas, Shellfish Waters, Bathing Waters and Nutrient Sensitive Areas.	
Assessment of Impact	Assessment of Impact	Assessment of Impact	Assessment of Impact	
None of the works will be undertaken within the waterbody. Therefore, there are no risks to the local hydromorphological supporting elements.	None of the works will be undertaken within the waterbody. The total footprint of the works is approximately 0.002km² which is less than 1% of lower sensitivity habitat - Intertidal Soft Sediments and there are no higher sensitivity habitats within 500m of the Scheme. Furthermore, it is extremely unlikely that the works will impact on normal fish behaviour such as movement, migration or spawning.	The proposed Scheme has the potential to impact on physico-chemical supporting elements of the river Wye waterbody during the grit blasting associated with the refurbishment works of the bridge. The encapsulated scaffold is designed specifically to contain any dust/ debris and prevent any contamination from engineering works to the local environment. However, without suitable mitigation there is the potential for excess contaminants such as lead paint to enter the river waterbody. Therefore, the following mitigation measures are recommended to prevent contamination of the river. • All gaps around scaffold tubes will be sealed prior to grit blasting to ensure dust is not released. • The works to the piers and main structure, via scaffolding platforms (or similar), will take place using Monoflex polythene sheeting and debris netting arranged to fill any voids between the platforms and the watercourse. • Daily checks of the encapsulation will be undertaken to ensure it is still working as designed. Otherwise remedial action will be taken. • On completion of the works, all sheeting will be carefully bagged up for safe disposal. If any contaminants from the grit blasting managed to enter the waterbody once discussed mitigation measures were in place, the risk at a waterbody scale is not expected to be significant enough that it will deteriorate the physico-chemical supporting elements and prevent the river Wye from achieving overall ‘Good’ status in 2021.	The works will be undertaken above the River Wye which is a designated SAC - River Wye/ Afon Gwy SAC and could indirectly affect the qualifying features of the SAC including: • Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation; • White-clawed (or Atlantic stream) crayfish; • Sea lamprey; • Brook lamprey; • River lamprey; • Twaite shad; • Atlantic salmon; • Bullhead; • Allis shad; and, • Otter. A Stage 1 and 2 Habitat Regulations Assessment (HRA) has been undertaken to assess whether the Scheme would be likely to result in any likely significant effect on any European Sites as required by the Conservation of Habitats and Species Regulations 2017 (as amended), (hereafter referred to as ‘the Habitats Regulations’). Results from the HRA determined that the Scheme will not have an adverse effect on the integrity of the River Wye/Afon Gwy SAC either alone or in-combination with other projects if the following mitigation measures are implemented: • Those discussed in the physico-chemical supporting elements assessment; • Grit blasting will be undertaken outside the key ecologically sensitive periods for fish species - March to July (inclusive) • Site vehicles will be confined to the site compound area, approximately	• Site compounds, materials and equipment will be appropriately secured and fenced off • The Scheme will make use of well-maintained equipment and plant to minimise potential for fuel/oil and chemical leaks. Plant and machinery will be switched off when not in use and refuelling will take place well away from the watercourse. • All equipment and materials used will be in a clean condition prior to their arrival on site, and on removal from site. • The proposed works will follow the Guidance on Pollution Prevention (GPPs)³ in particular GPP5 Work in or Near Water, and the Construction Industry Research and Information Association (CIRIA) guidance on the control of water pollution from construction sites.

³ Documents are available at <http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/>. GPPs provide environmental good practice guidance for the whole UK, and environmental regulatory guidance directly to Northern Ireland, Scotland and Wales only.

Hydromorphology	Biology	Physico-chemical	Protected Areas	Control Measures that will be employed throughout the works
Hydrological regime: Quantity and dynamics of water flow, tidal prism. Morphological conditions: water column depth variation; Structure and substrate of the sea bed. Mitigation Measures: Conflict with or contribution to Mitigation Measures for HMWBs	Sensitive Habitats: Extent and quality of habitats Fish fauna: Species composition and abundance; Presence of type-specific disturbance sensitive species; Age structure of fish communities. Other elements: Invertebrates and macroalgae.	Parameters: Salinity, Nutrient concentrations, pH, Oxygen balance; Acid neutralising capacity, Temperature, Transparency. Pollution by all priority substances identified as being discharged into the waterbody. Pollution by other substances identified as being discharged in significant quantities into the waterbody.	Areas with water-dependent habitats that are protected under the Birds and Habitats Directives and the Ramsar Convention, Drinking Water Protected Areas, Shellfish Waters, Bathing Waters and Nutrient Sensitive Areas.	
			30m west of the SAC boundary, with an additional area for vehicles, materials and equipment and at Forge Road (Wireworks carpark), approximately 0.5km away from the structure; - An otter survey will be undertaken of at least 100m upstream and downstream of the Scheme. If otter holts are found within this area, measures will be put in place to avoid adverse effects to otter which may include obtaining a licence from the appropriate national regulatory body prior to works commencing; and - A Precautionary Method of Working (PMW) will also be produced and followed throughout the works.	
The proposed Scheme will not result in any deterioration to hydromorphological supporting elements. The proposal is deemed to be COMPLIANT with this WFD quality element.	The proposed Scheme will not result in any deterioration to biological supporting elements. The proposal is deemed to be COMPLIANT with this WFD quality element.	The proposed Scheme will not result in significant deterioration to physico-chemical supporting elements. The proposal is deemed to be COMPLIANT with this WFD quality element.	The proposed Scheme will not result in any deterioration to protected areas that could affect the integrity of them. The proposal is deemed to be COMPLIANT with this WFD quality element.	

6. Conclusion

This report details the WFD assessment carried out for the proposed bridge refurbishment scheme at Tintern Wireworks Bridge. It has assessed the Scheme against the biological, physico-chemical and hydromorphological quality elements of the River Wye surface waterbody.

The Scheme will not result in deterioration to any of the elements for the waterbody assessed if the recommended mitigation measures are implemented. To further support this, it is recommended that the control measures provided are also implemented once a contractor is appointed.

7. References

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Appendix A Scoping of Project Activities

PROJECT INFORMATION

Your activity	Description, notes or more information
Name of activity	Tintern Wireworks Bridge Project
Brief description of activity	Tintern Wireworks Bridge needs remedial works to retain the three-tonne weight limit vehicle access and Public Right of Way (PRoW) which runs across the bridge and provides access from Tintern to the Offa's Dyke national trail. The proposed Scheme remedial works include: • Site mobilisation – Site compounds, access routes • Enabling works – Excavation of abutment and installation of pattress (anchor plate) system into west wingwall • Installation of temporary works scaffolding (V Deck) and encapsulation • Removal of existing timber deck • Twin girder refurbishment including grit blasting and repainting and installation of box beams • Installation of new timber deck • Demobilisation – Removal of railing, scaffolding, encapsulation and site compounds.
Location of activity (central point XY coordinates or national grid reference)	National Grid Reference (OSNGR) SO 53012 00294
Footprint of activity (ha)	0.2 hectares approximately
Timings of activity (including start and finish dates)	May – December 2022 (estimated)

Extent of activity (for example size, scale frequency, expected volumes of output or discharge)	Limited to site extent (14 ha).
Use or release of chemicals (state which ones)	None.

SCOPING: PLYMOUTH TAMAR WATERBODY

Water body	Description, notes or more information
WFD water body name	Wye
Water body ID	GB530905415406
River basin district name	Severn
Water body type (estuarine or coastal)	Transitional
Water body total area (ha)	260
Overall water body status (2016)	Moderate
Ecological status	Moderate
Chemical status	Good
Target water body status and deadline	Good by 2021
Hydromorphology status of water body	Supports Good
Heavily modified water body and for what use	Not a HMWB
Higher sensitivity habitats present	No
Lower sensitivity habitats present	Yes
Phytoplankton status	Not assessed
History of harmful algae	Not stated
WFD protected areas within 2km	Yes

Specific risk information

Consider the potential risks of your activity to each of these receptors: hydromorphology, biology (habitats and fish), water quality and protected areas. Also consider invasive non-native species (INNS).

Section 1: Hydromorphology

Consider if hydromorphology is at risk from your activity.

Use the water body summary table to find out the hydromorphology status of the water body, if it is classed as heavily modified and for what use.

Consider if your activity:	Yes	No	Hydromorphology risk issue(s)
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status	Requires impact assessment	Impact assessment not required	There are no High status water bodies.
Could significantly impact the hydromorphology of any water body	Requires impact assessment	Impact assessment not required	None of the works will impact the hydromorphology of any water body.
Is in a water body that is heavily modified for the same use as your activity	Requires impact assessment	Impact assessment not required	The River Wye is not a heavily modified water body (HMWB).

Record the findings for hydromorphology and go to section 2: biology.

Section 2: Biology

Habitats

Consider if habitats are at risk from your activity.

Use the water body summary table and Magic maps, or other sources of information if available, to find the location and size of these habitats.

Higher sensitivity habitats	Lower sensitivity habitats
N/A	Intertidal Soft Sediments – sand, mud and mixed (Lower Sensitivity)

Consider if the footprint of your activity is:	Yes	No	Biology habitats risk issue(s)
0.5km ² or larger	Yes, to one or more – requires impact assessment	No to all – impact assessment not required	No – The footprint of the works is approximately 0.002km ² or 0.2ha
1% or more of the water body's area			No – The works are being undertaken above the water column.
Within 500m of any higher sensitivity habitat			No – The closest higher sensitivity habitats are approximately 3km downstream of the works.
1% or more of any lower sensitivity habitat			No – The works will be undertaken above the river bed and the footprint is not more than 1% of the total area of Intertidal soft sediments which are present along the length of the River Wye eastern embankment.

Fish

Consider if fish are at risk from your activity, but only if your activity is in an estuary or could affect fish in or entering an estuary.

Consider if your activity:	Yes	No	Biology fish risk issue(s)
Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary	Continue with questions	Go to next section	Yes – During grit blasting there is the potential for indirect pollution impacts from the removal of lead paint which could impact water quality supporting elements of the River Wye.
Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)	Requires impact assessment	Impact assessment not required	During construction no works will take place in the river channel. Therefore, it is extremely unlikely that the works could impact on normal fish behaviour such as movement, migration or spawning.
Could cause entrainment or impingement of fish	Requires impact assessment	Impact assessment not required	Not considered to be a risk

Record the findings for biology habitats and fish and go to section 3: water quality.

Section 3: Water quality

Consider if water quality is at risk from your activity.

Use the water body summary table to find information on phytoplankton status and harmful algae.

Consider if your activity:	Yes	No	Water quality risk issue(s)
Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)	Requires impact assessment	Impact assessment not required	Not considered to be a risk
Is in a water body with a phytoplankton status of moderate, poor or bad	Requires impact assessment	Impact assessment not required	Not assessed for this water body
Is in a water body with a history of harmful algae	Requires impact assessment	Impact assessment not required	Not stated for this water body

Consider if water quality is at risk from your activity through the use, release or disturbance of chemicals.

If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	Yes	No	Water quality risk issue(s)
The chemicals are on the Environmental Quality Standards Directive (EQSD) list	Requires impact assessment	Impact assessment not required	Without suitable mitigation there is the potential for lead paint removed during grit blasting to enter the River Wye. Lead is a priority substance on the EQSD list. Lead is a priority substance on the EQSD list.
It disturbs sediment with contaminants above Cefas Action Level 1	Requires impact assessment	Impact assessment not required	Not considered to be a risk . All of the works will be undertaken above the water column and therefore it is extremely unlikely that there will be any disturbance to sediments.

If your activity has a mixing zone (like a discharge pipeline or outfall) consider if:	Yes	No	Water quality risk issue(s)
The chemicals released are on the Environmental Quality Standards Directive (EQSD) list	Requires impact assessment ⁵	Impact assessment not required	Not relevant.

Record the findings for water quality go on to section 4: WFD protected areas.

Section 4: WFD protected areas

Consider if WFD protected areas are at risk from your activity. These include:

• special areas of conservation (SAC)	• bathing waters
• special protection areas (SPA)	• nutrient sensitive areas
• shellfish waters	

Use Magic maps to find information on the location of protected areas in your water body (and adjacent water bodies) within 2km of your activity.

Consider if your activity is:	Yes	No	Protected areas risk issue(s)
Within 2km of any WFD protected area	Requires impact assessment	Impact assessment not required	The works lie above the River Wye which is a designated SAC.

Section 5: Invasive non-native species (INNS)

Consider if there is a risk your activity could introduce or spread INNS.

Risks of introducing or spreading INNS include:

- materials or equipment that have come from, had use in or travelled through other water bodies
- activities that help spread existing INNS, either within the immediate water body or other water bodies

Consider if your activity could:	Yes	No	INNS risk issue(s)
Introduce or spread INNS	Requires impact assessment	Impact assessment not required	No – INNS have not been recorded on the site to date. However, construction activities will be managed through on-site ‘toolbox’ talks and bio-security measures to avoid the introduction of INNS from plant and machinery used in other locations or coming from overseas.

Record the findings for INNS and go to the summary section.

Summary

Summarise the results of scoping here.

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	No	None of the works will impact the hydromorphology of any water body.
Biology: habitats	No	The works will be undertaken above the water column and riverbed. The total footprint of the works is approximately 0.002km ² which is less than 1% of any lower sensitivity habitat and there are no higher sensitivity habitats within 500m of the Scheme.
Biology: fish	No	It is extremely unlikely that the works will impact on normal fish behaviour such as movement, migration or spawning.
Water quality	Yes	There is the potential for lead paint removed during grit blasting to enter the River Wye. Lead is a priority substance on the EQSD list.
Protected areas	Yes	The Scheme lies above the River Wye which is designated as a Special Area of Conservation (SAC)
Invasive non-native species	No	The works will be managed through on-site 'toolbox' talks and bio-security measures to avoid the introduction of INNS from plant and machinery used in other locations or coming from overseas.

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