



Cottage Viaduct Urgent Repair Works Water Framework Directive Assessment

CPF7163



Document Control Sheet

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Background

YGC have been commissioned by Alun Griffiths Contractors to carry out Environmental Assessments, including a Water Framework Directive Assessment, in support of a Marine Licence application, for repair works to Cottage viaduct, on the SBA Shrewsbury to Aberystwyth line between Dovey Junction station and Aberystwyth, which runs over the tidal river Afon Einion (OS Co-ordinates Easting: 268780 Northing: 296631).

Introduction

Cottage viaduct is a structure on the SBA Shrewsbury to Aberystwyth railway line between Dovey Junction station and Aberystwyth, which runs over the tidal river Afon Einion (OS Co-ordinates Easting: 268780 Northing: 296631).

The viaduct spans across the Afon Einion over 4 spans supported by 5 trestles: 2 at abutments and 3 intermediates. Each abutment trestle is packed in stone and comprises of 4 piles with a crosshead over, two diagonal bracings only on one side of the trestle and two low level horizontal wailings on either side of the trestle buried under ground level. Each intermediate trestle comprises 6 piles with a crosshead over, two low level horizontal wailings and one diagonal bracing to each trestle face providing lateral restraint.

The component parts of the viaduct are in a state of disrepair and therefore urgent work is required to replace these components, which are detailed in the proposal section below. This work is required in order to ensure that the integrity of the structure is maintained, and safe for all travelers.

The project will be delivered by utilizing TXM Road Rail Vehicles (RRVs), Mabey deck lifting system and a highly skilled workforce who have already proved themselves on other similar wooden structures in the area on the same line.

Key dates:

- | | |
|----------------------------------|--|
| • Site set up: | 17th to 28th August, including access across field |
| • Prep works including scaffold: | 31st August to 10th September |
| • Prep/delivery possessions: | Sat nights; 29th August and 5th September |
| • Main Possession: | Fri night 11th to Mon morning 14th Sept 24/7 working |
| • Removal of scaffold/snagging: | 14th to 25th September |
| • Snagging/removal of material: | Sat nights; 19th and 26th September |
| • Site demob: | 28th to 2nd October |

The proposal is subject to a Marine Licence by Natural Resource Wales, and must also follow the guidelines set out by the WFD legislation and not cause negative effects to the water environment, water quality, ecosystems or biodiversity. This report therefore highlights any impacts the work could potentially have on the waterbody, along with mitigation and an assessment (if required) of whether the proposals complies with the Water Framework Directive.

Legislative Background

The Water Framework Directive (WFD) is a European Directive which sets out a strategic planning process for the purposes of managing, protecting and improving the water environment. The WFD introduces new environmental requirements which aim to meet good status in all water bodies. For surface waters, good status is made up of 'good ecological status (GES)' (or good ecological potential (GEP) where artificial or heavily modified) and 'good chemical status'. Ecological status and potential are made up of a number of biological, hydromorphological and physio-chemical quality elements. Chemical status is recorded as either good or failing. For groundwater to be in overall 'good' status, both quantitative and chemical status must be 'good'. The WFD also requires prevention of deterioration in water body status including deterioration of any of the individual quality elements.

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.

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 deterioration in water body status. They may also render proposed improvement measures ineffective, leading to the water body failing to meet its WFD objectives for GES/GEP. Under the WFD, activities must not cause deterioration in water body status or prevent a water body from meeting GES/GEP by invalidating improvement measures.

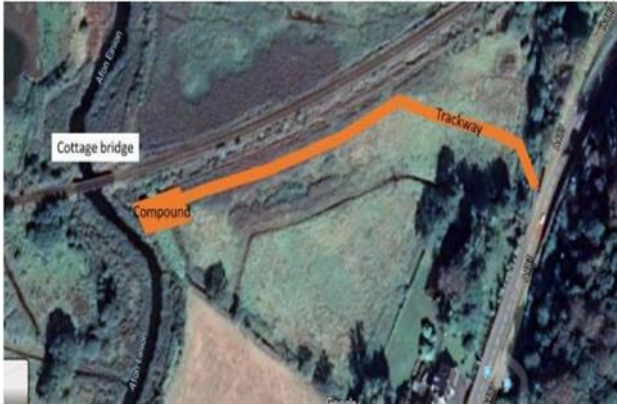
WFD Assessment in Stages

The Water Framework Directive Assessment can have up to three stages, which are

- **Screening Stage:** excludes any activities that do not need to go through the scoping or impact assessment stages
- **Scoping Stage:** identifies the receptors that are potentially at risk from your activity and need impact assessment
- **Impact Assessment Stage:** considers the potential impacts of your activity, identifies ways to avoid or minimise impacts, and shows if your activity may cause deterioration or jeopardise the water body achieving good status

The Proposal

Your activity	Description, notes or more information																																										
Name of activity	Cottage Viaduct Urgent Repair Works																																										
Brief description of activity	The activity involves repairing and replacing key component of the Cottage Viaduct, which carries the Shrewsbury to Aberystwyth railway line over the tidal river Afon Einion. Below is a summary of the components to be replaced. Full method statement is appended to the report. <table><tr><td>Trestle No.</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>Crossheads to be replaced</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td></tr><tr><td>Piles to be pile splice repaired or packed at scarf joint</td><td>0</td><td>1</td><td>1PSR</td><td>0</td><td>0</td></tr><tr><td>No. of lateral restraint diagonals to be replaced</td><td>4</td><td>0</td><td>4(1 pack)</td><td>4</td><td>4</td></tr><tr><td>Corbels to be replaced or packed</td><td>1</td><td>4</td><td>5</td><td>Resin 2</td><td></td></tr><tr><td>TA Bolts</td><td>0</td><td>0</td><td>0</td><td>13</td><td>0</td></tr><tr><td>SA1 straps</td><td>0</td><td>0</td><td>0</td><td>6</td><td>0</td></tr></table>	Trestle No.	1	2	3	4	5	Crossheads to be replaced	0	0	0	1	0	Piles to be pile splice repaired or packed at scarf joint	0	1	1PSR	0	0	No. of lateral restraint diagonals to be replaced	4	0	4(1 pack)	4	4	Corbels to be replaced or packed	1	4	5	Resin 2		TA Bolts	0	0	0	13	0	SA1 straps	0	0	0	6	0
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SA1 straps	0	0	0	6	0																																						
Location of activity (central point XY coordinates or national grid reference)	OS Easting: 268780 Northing: 296631.																																										
Footprint of activity (ha)	Further to the actual repair works, which extends to approximately 2000m2 (max), the works will also involve installing a temporary track and site compound, which would not exceed 1000m2. Therefore the footprint will be																																										

	no more than 0.3ha. See general arrangement of proposed temporary track below. 	
Timings of activity (including start and finish dates)	• Site set up: 17th to 28th August, including access across field • Prep works including scaffold: 31st August to 10th September • Prep/delivery possessions: Sat nights; 29th August and 5th September • Main Possession: Fri night 11th to Mon morning 14th Sept 24/7 working • Removal of scaffold/snagging: 14th to 25th September • Snagging/removal of material: Sat nights; 19th and 26th September • Site demob: 28th to 2nd October	
Extent of activity (for example size, scale frequency, expected volumes of output or discharge)	The activities will be confined to the areas shown on the plan above. Duration of each component of the works is detailed above.	
Use or release of chemicals (state which ones)	None	

WFD Assessment

WFD Classification

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

- 'biological elements' such as fish, invertebrates, phyto-benthos (which includes plants, macro-algae and 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 River Basin Management Plan (RBMP)¹ and provides a baseline condition against which compliance and future improvements can be measured.

The activity / proposal involves the Mersey Mouth waterbody, and a summary of key elements is provided below.

Water body ¹	Description, notes or more information
WFD water body name	<i>Dyfi & Leri</i>
Water body ID	<i>GB511006407000</i>
River basin district name	<i>Western Wales River Basin</i>
Water body type (estuarine or coastal)	<i>Transitional</i>
Water body total area (ha)	<i>14.33km² (1,433ha)</i>
Overall water body status (2018)	<i>Moderate</i>
Ecological status	<i>Good</i>
Chemical status	<i>Fail</i>
Target water body status and deadline	<i>Not Designated</i>
Hydromorphology status of water body	<i>Not Designated</i>
Heavily modified water body and for what use	<i>No</i>
Higher sensitivity habitats present	<i>Saltmarsh habitat within 500m of the proposed work (at 305m downstream)</i>

¹ <https://www.gov.uk/government/collections/river-basin-management-plans-2015#north-west-river-basin-district-rbmp:-2015>

Lower sensitivity habitats present	<i>Rocky shore, shingle, intertidal soft sediment (mudflats and sandflats)</i>
Phytoplankton status	<i>Not Designated</i>
History of harmful algae	<i>None</i>
WFD protected areas within 2km	<i>Pen Llyn a'r Sarnau SAC, Dyfi SSSI, Dyfi Estuary SPA, Cors Fochno & Dyfi Ramsar Site.</i>

WFD Assessment - Screening:

The WFD is also required in support of a Band 2 Marine Licence Application, by NRW.

WFD Assessment – Scoping Exercise:

The scoping exercise is carried out to identify all the potential risks to each receptor element that are used to determine the status of the waterbody. The receptors / elements are:

- Hydromorphology
- biology – habitats
- biology – fish
- water quality
- protected areas

These receptors are based on the water body's quality elements (supporting elements, biological elements, and chemical elements).

The scoping exercise has been undertaken following the template provided on the gov.uk² website.

Hydromorphology:

Consider if your activity:	Yes	No	Hydromorphology risk issue(s) / observations
Could impact on the hydro morphology (for example morphology or tidal patterns) of a water body at high status	Requires impact assessment	Impact assessment not required	<i>Maintenance of an existing structure, and like for like basis.</i>
Could significantly impact the hydro morphology of any water body	Requires impact assessment	Impact assessment not required	<i>Maintenance of an existing structure, and like for like basis.</i>

² <https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters#contents>

Is in a water body that is heavily modified for the same use as your activity	Requires impact assessment	Impact assessment not required	<i>The proposed activity is not within a waterbody classed as heavily modified.</i>
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Biology - habitats:

Consider if habitats are at risk from your activity.

Higher sensitivity habitats ³	Lower sensitivity habitats ⁴
chalk reef	cobbles, gravel and shingle
clam, cockle and oyster beds	intertidal soft sediments like sand and mud
intertidal seagrass	rocky shore
maerl	subtidal boulder fields
mussel beds, including blue and horse mussel	subtidal rocky reef
polychaete reef	subtidal soft sediments like sand and mud
saltmarsh	
subtidal kelp beds	
subtidal seagrass	

Consider if the footprint ⁵ of your activity is:	Yes	No	Biology habitats risk issue(s) / observations
0.5km ² or larger	Yes to one or more – requires impact assessment	No to all – impact assessment not required	<i>No – the total area of the proposed activity is 0.3ha, which equates to 0.003km².</i>
1% or more of the water body's area			<i>No - the total area of water body is 42051.56 ha, and area of proposed activity does not exceed 0.3ha, which represents less than 0.00071% of the waterbody area.</i>
Within 500m of any higher sensitivity habitat			<i>Yes – The proposed work is within 500m and upstream of an area of Saltmarsh habitat. The Afon Einion forms a potential impact pathways, therefore impact</i>

³ Higher sensitivity habitats have a low resistance to, and recovery rate, from human pressures.

⁴ Lower sensitivity habitats have a medium to high resistance to, and recovery rate from, human pressures.

⁵ Note that a footprint may also be a temperature or sediment plume. For dredging activity, a footprint is 1.5 times the dredge area.

			<i>assessment is required, as it cannot be ruled out at the scoping stage.</i>
1% or more of any lower sensitivity habitat			<i>No – There are no lower sensitivity habitat within the area of the works. Whilst there are lower sensitivity habitat within 500m, it is not believed that the footprint of the scheme would exceed a total area of more than 1% of the habitat area</i>

Biology – 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) / observations
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	No – Whilst the work is located on the lower reaches of Afon Einion, and within 200m of the Dyfi Estuary, the work does not involve creating any physical barriers to fish movement or any works, such as piling, that would result in noise that would deter fish from migrating up the river.
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	Not applicable
Could cause entrainment or impingement of fish	Requires impact assessment	Impact assessment not required	Not applicable

Water Quality:

Consider if water quality is at risk from your activity.

Consider if your activity:	Yes	No	Water quality risk issue(s) / observations
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	No – the proposed work would predominantly be carried out above tide level, and as such would not directly impact water clarity, temperature, oxygen levels, nutrients or microbial patterns of the water body, especially not for continuous periods longer than 14 days. There may be some discolouration and sediment resuspension due to piling activities, however, this would clear within 1 tidal cycle i.e. high water – low water – high water
Is in a water body with a phytoplankton status of moderate, poor or bad	Requires impact assessment	Impact assessment not required	No – From available information, the waterbody does not have a phytoplankton status of moderate, poor or bad.
Is in a water body with a history of harmful algae	Requires impact assessment	Impact assessment not required	No – As far as we are aware, the waterbody does not have a history of harmful algae.

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) / observations
The chemicals are on the Environmental Quality Standards Directive (EQSD) list	Requires impact assessment	Impact assessment not required	Plant machinery will be required to undertake the proposed activity, and therefore there is an inherent risk of releasing oils and fuels into the environment, albeit, the risk is considered to be low.

It disturbs sediment with contaminants above Cefas Action Level 1	Requires impact assessment	Impact assessment not required	No – we have no reason to believe that the activity would disturb sediments with contaminants above Cefas Action Level 1.

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

WFD Protected Areas

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

- Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)
- Shellfish waters
- Bathing Waters
- Nutrient Sensitive Areas

Consider if your activity is:	Yes	No	Protected areas risk issue(s) / observations
Within 2km of any WFD protected area ⁶	Requires impact assessment	Impact assessment not required	The proposed work is within and / or within 2km of <i>Pen Llyn a'r Sarnau SAC, Dyfi SSSI, Dyfi Estuary SPA, Cors Fochno & Dyfi Ramsar Site.</i>

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) / observations
Introduce or spread INNS	Requires impact assessment	Impact assessment not required	The NRW coastal risk assessment shows that Leri & Dyfi is at risk from the following INNS: • Chinese Mitten Crab • Leathery Sea Squirt • Colonial Tunicate And is at an overall INNS risk of deterioration by 2050. Floating Pontoons will be the only equipment used in the water, and at this stage it cannot be ruled out completely that the pontoons would be free from INNS, as it is unknown where the plant would be used immediately prior to mobilisation to this site. However, the risk is deemed to be low since it is common practice to wash down equipment following a period working in marine environments (to ensure longevity of equipment and reduce ongoing maintenance and repair costs), and the risk can be easily managed by ensuring the plant are cleaned before leaving the existing / preceding site, and are clean on arrival onto this site.

Summary of Scoping:

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	No	It is concluded that it is unlikely that the proposed work would have any impact on hydromorphology, due to the maintenance nature of the works, which does not alter the overall dimensions or physical characteristics of the structure, therefore this receptor has been scoped out from further assessment.
Biology: habitats	Yes	There is a Higher Sensitivity Habitat within 500m of the proposed work, and the Afon Einion provides a potential impact pathway, therefore, impact could not be ruled out at the scoping stage.

Biology: fish	No	Whilst the work is located on the lower reaches of Afon Einion, and within 200m of the Dyfi Estuary, the work does not involve creating any physical barriers to fish movement or any works, such as piling, that would result in noise that would deter fish from migrating up the river.
Water quality	Yes	Plant and machinery will be required to undertake the proposed activity, and therefore there is an inherent risk of releasing oils and fuels (PAHs) into the environment, albeit, the risk is considered to be low.
Protected areas	Yes	The proposed activity is being undertaken within Protected areas, therefore, potential impact to protected sites cannot be ruled out at scoping stage. Risk / issues for impact assessment include physical change, disturbance and pollution.
Invasive non-native species	Yes	Plant and machinery will be used, and at this stage it cannot be ruled out completely that the plant would be free from INNS, as it is unknown where the plant would be used immediately prior to mobilisation to this site. Risk of introducing INNS to the waterbody cannot be ruled out at scoping stage.

Assessment of impacts on waterbody quality elements

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 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 Good Ecological Potential (GEP) through planned RBMP mitigation measures.

The first two objections 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.

Biology: habitats

The scoping exercise identified that the proposed activity is within 500m upstream of a Saltmarsh that is a Habitat of Higher Sensitivity. The work is being undertaken on a viaduct structure, spanning Afon Einion, and the Einion provides a potential impact pathway between the works and the Saltmarsh. Whilst accepting that there is an impact pathway, the proposed work would not take any land from the saltmarsh, would not affect any factors such as inundation of the marshes (changes in hydromorphology) or the characteristic of the water inundating the marshes, therefore, it is considered unlikely that the proposed activity would contravene Objective 1 for this particular element.

Water Quality

Plant and machinery will be required to undertake the proposed activity, and therefore there is an inherent risk of releasing oils and fuels into the environment, although the risk is considered to be low, impact on the waterbody could not be completely ruled out at the scoping stage. The following Reasonable Avoidance and Mitigation Measures will be implemented during the course of the proposed work:

- Vehicles to use biodegradable oils.
- Use of spill kits and personnel trained to use the kit will be available on site on case of oil leak.
- Good working practices will be taken, such as adhering to GPP5 Works and maintenance in or near water.
- The contractor has a designated company, which they use to deal with accidental spillages this forms part of their emergency plan.
- The staff will be trained to contain any oil/diesel and clean up.
- NRW emergency help line (0300 065 3000) will be contacted in the case of an emergency spill.

Since the plant and machinery would not directly enter the waterbody, and assuming that machinery used are well maintained, it is considered unlikely that the proposed activity would result in a contravention of Objective 1. However, accidents do happen – and by having the above measures in place it will reduce any impact should an accident occur.

Protected Areas

The proposed work is located within and within 2km of WFD Protected Areas, namely Pen Llyn a’r Sarnau SAC, Dyfi SSSI, Dyfi Estuary SPA, Cors Fochno & Dyfi Ramsar Site. Since there are engineering

works within and within 2km of these protected areas, and a potential impact pathways in the form of the Afon Einion, impact upon these receptors could not be ruled out at scoping stage.

A Habitat Regulations Assessment (CPF7163 Cottage Viaduct Urgent Works Habitat Regulations Assessment v.01 – available as a separate document), has been produced for the works. Whilst Likely Significant Effect could not be ruled out in the screening stage (Stage 1 – Test of Likely Significant Effect), due to potential pollution and potential impact on otters. A conclusion of No likely Significant Effect was reached at Stage 2 with the implementation of Reasonable Avoidance Measures. Therefore it is considered that the proposed activity will not result in the contravention of Objective 1.

Invasive Non Native Species

The NRW coastal risk assessment shows that Leri & Dyfi is at risk from the following INNS:

- Chinese Mitten Crab
- Leathery Sea Squirt
- Colonial Tunicate

And is at an overall INNS risk of deterioration by 2050.

Floating Pontoons will be the only equipment used in the water, and at this stage it cannot be ruled out completely that the pontoons would be free from INNS, as it is unknown where the plant would be used immediately prior to mobilisation to this site. However, the risk is deemed to be low since it is common practice to wash down equipment following a period working in marine environments (to ensure longevity of equipment and reduce ongoing maintenance and repair costs), and the risk can be easily managed by ensuring the plant are cleaned before leaving the existing / preceding site, and are clean on arrival onto this site.

By implementing the simple protocol of Check, Clean and Dry, it is considered that the proposed activity would not result in a contravention of Objective 1.

Conclusion

It is established through the assessment above that by implementing good working practices and reasonable avoidance measures that the proposed works would not lead to deterioration of any quality element of the waterbody (objective 1) nor would prevent the overall objectives for the waterbody being met (Objective 2).

Appendix

Cottage Viaduct Urgent Works – Methodology (available as separate document)