

# Bridgetown Weir

## Fish Passage Improvements

### Summary & Supporting Information Planning Application



Part of the Strategic Exe Weirs  
programme





## Strategic Exe Weirs

**Westcountry Rivers Trust** is an environmental charity established in 1995 to restore, protect and improve the rivers, streams, and water environments in the region for the benefit of wildlife and people.

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## 1. Introduction

Westcountry Rivers Trust (WRT) and the River Exe and Tributaries Association (RETA) are improving migratory access for threatened and iconic fish species in the River Exe. Migratory fish in the South West hold important socioeconomic value, are integral to the ecological function of local rivers, and are classed as Species of Principal Importance. Strategic Exe Weirs (SEW) is supported by the Environment Agency (EA) as contributing to national efforts to protect and restore native fish populations and proper ecological function of resident rivers. Improving migration over obstacles is a key action under the Government's Salmon Five Point Approach. The Government's 25 Year Environment Plan, specifically Goal 3 'Thriving Plants and Wildlife' promotes action in the freshwater environment to recover threatened, iconic or economically important species, and to prevent human-induced extinction or loss of known threatened species in England.

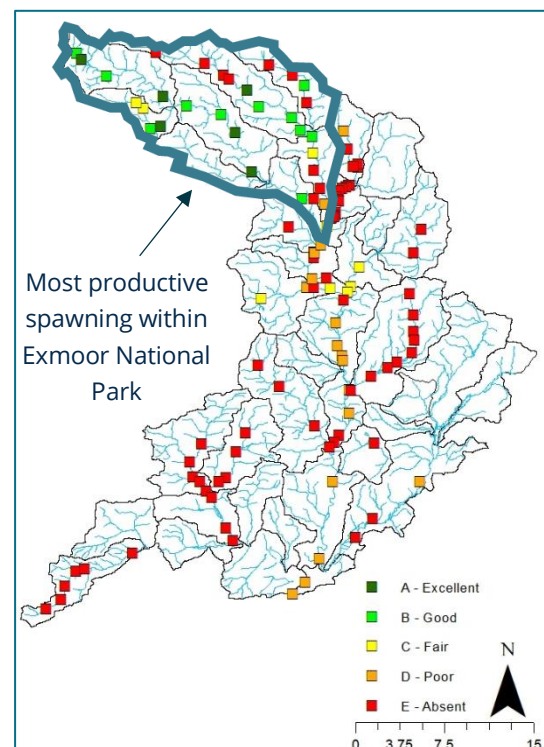
The Exmoor National Park Local Plan<sup>1</sup> promotes conserving habitats in a changing climate and improving links between land and sea (4.45), action for Priority Habitats including freshwater rivers (4.56), action for Priority Species and breeding areas (4.65), encouraging landscape permeability for healthy wildlife populations (4.68) and recognising importance of ecological networks (4.69). The proposals are specifically designed for conservation and restoration of Priority Species cited as most important in the current partnership plan<sup>2</sup>, and meet conditions under Policy CE-S3.

Bridgetown Weir was highlighted by an options and constraints assessment as viable for SEW project delivery in 2021. This document accompanies the planning application for a technical fish pass, and fish screen, maintenance walkway and fish chute, to improve migration at Bridgetown Weir to meet environmental conservation targets.

### 1.1 Project Background

Migratory fish populations have declined globally by 76%, or 93% if considering Europe alone<sup>3</sup>. This is reflected in the River Exe by the recent EA assessment of salmon stocks as At Risk<sup>4</sup> and not currently long-term sustainable. Reasons for this decline include direct pressure on habitats, barriers to open migration, and indirect pressures such as climate change affected rainfall patterns causing increasingly extreme high and low flow events.

To complete the life cycle migratory fish require access to and from multiple habitats. WRT annual Fry Index Surveys (FIS) indicate the River Barle SSSI and upper River Exe in Exmoor National Park as productive spawning habitats providing the only reliable Atlantic salmon (*Salmo salar*) recruitment in the River Exe (Figure 1). It is therefore highly important to provide maximum opportunity for successful migration to and from this key habitat for long term survival of culturally iconic and socioeconomically important migratory fish species.



**Figure 1:** WRT FIS results 2019 for salmon in the Exe catchment, indicating Exmoor rivers as highly important for recruitment.

## 1.2 River Exe Weirs

The River Exe catchment contains multiple low-head weirs originally built to supply water to mills. Some weirs still supply active abstraction licences, while others no longer serve a purpose. All are acting to cumulatively reduce migratory fish travelling to and from viable recruitment habitat (Figure 2).

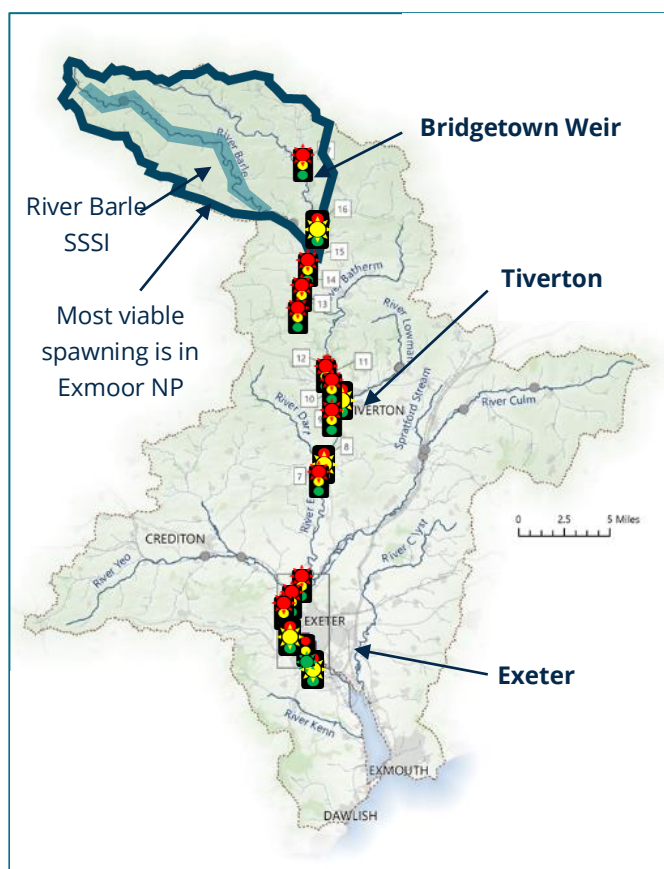
The effects of weirs on migratory fish can be complex<sup>5</sup>. Naturally the River Exe is an open water course that would permit migration in almost all flow conditions. The presence of multiple weirs notably reduces the flow window for successful migration, forcing the river to operate as a spate river for migratory fish.

This effect is particularly notable for the iconic Atlantic salmon, a capital breeder relying on reserves for the return migration from the sea to freshwater spawning grounds. The effect of weirs acting to delay migration has been specifically proven for the River Exe<sup>6</sup>.

When populations were healthy and abundant, sufficient numbers of fish successfully migrated to fully utilise available spawning habitat. Now that migratory fish populations are severely declining it is essential all viable spawning stock has open access to the highest quality habitat to maximise successful recruitment. Research has shown quantity and quality of juvenile fish is important for sustainable marine survival<sup>7,8</sup>. Therefore, alongside enabling free access to spawning areas we must also ensure every opportunity for successful migration to marine habitats.

However, climate change affected rainfall patterns, water abstraction, and land management are producing ever more extreme high and low flow events, further reducing the flow window for successful migration over weirs. This is particularly notable when multiple weirs act together for a cumulative impact. Only by addressing each weir can the flow window be suitably increased to restore natural movement of migratory fish, and work towards a sustainable future for the river.

Furthermore, restoring the natural movement of migratory fish will act to protect populations from other negative impacts, such as isolated pollution events, increasing water temperatures in lower reaches, poaching at known hotspots, and unnaturally high predation pressure. By allowing natural and wider dispersion in the catchment the impacts of such risks are much reduced on a population scale with resulting increased ecological integrity of the River Exe. For more information, please see the Strategic Exe Weirs website: <https://wrt.org.uk/strategic-exe-weirs/>



**Figure 2:** River Exe catchment highlighting barriers on the main stem of the river - Exeter to Exmoor. Strategic Exe Weirs uses a traffic light system to illustrate the severity of each weir as a migration barrier



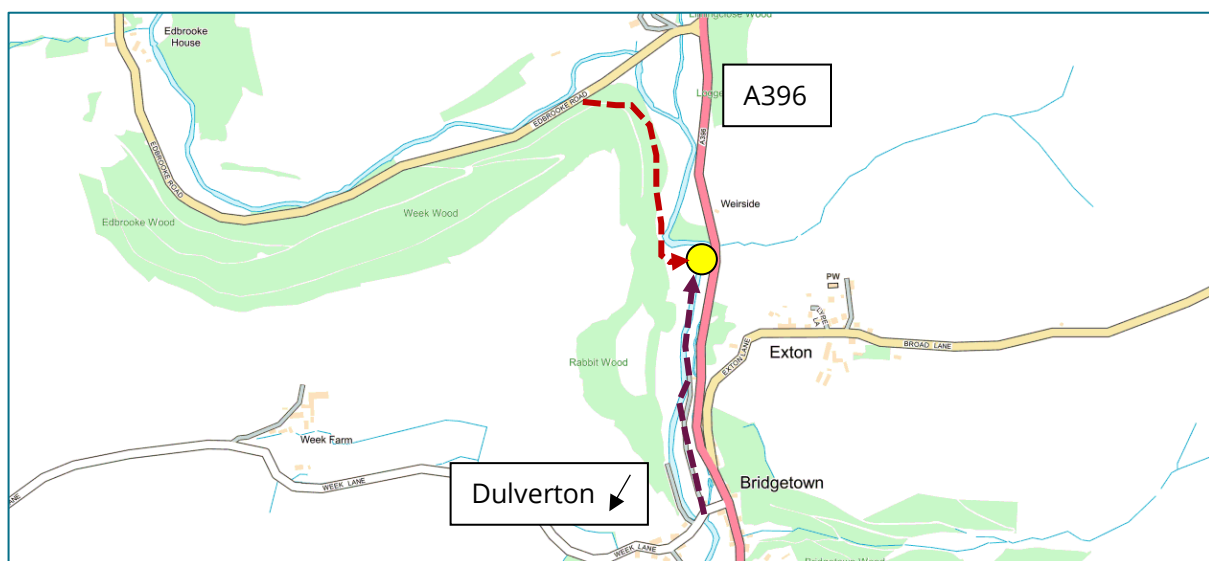
## 2. Bridgetown Weir

### 2.1 Site Details

<b>Location (OS NGR):</b>	SS 92320 33770
<b>Location Description:</b>	Adjacent to A396 north of Bridgetown and west of Exton, Somerset.
<b>Watercourse:</b>	River Exe (WFD WBID: GB108045020890 Exe Quarme to Haddeo)
<b>Current Site Use:</b>	Permanent pasture (RHB), Caravan Park (LHB)
<b>Site Area:</b>	<1ha
<b>Topography:</b>	<p>Right hand bank: Flat floodplain access with mixture of vertical and steeply sloped riverbanks.</p> <p>Left hand bank: Flat land with caravan park, thin peninsula. Vertical stone wall behind weir.</p>
<b>Structure Type:</b>	Single stage sloping weir plus vertical drop weir section, block stone with concrete repairs and fish pass.
<b>Current Fish Passage:</b>	Pool and traverse fish pass on right hand side, with pre-barrage to reduce initial step height installed in 2012.

### 2.2 Site Access

The site can be accessed by foot from the north via a forestry track and riparian field, or from the south via the Exe Valley Caravan Park. Machinery access is via the same routes (Figure 3), although access from the south is width limited by a small bridge. Preliminary access arrangements have been made through WRT, and will be fully agreed between WRT, the appointed Contractor, and the riparian owners following production of the finalised Contractor's method statement. Safe access for required machinery will be the responsibility of the appointed Contractor.



**Figure 3:** Location of Bridgetown Weir. Yellow circle indicates NGR SS 92320 33770. Red dashed arrow indicates machinery access to left hand bank. Purple dashed arrow indicates machinery access to right hand bank. Contains OS data © Crown copyright and database rights 2021. Licence Number 100034184

## 2.3 Fish Passage Assessment

### 2.3.1 Upstream Migration

Successful upstream migration over Bridgetown Weir by adult salmon is currently limited to unnaturally small flow windows. Limiting factors at this site include height and slope of the weir, lack of sufficient downstream pool for traversal over the weir, and a currently overcharged and undersized pool in the existing fish pass. A pre-barrage was constructed in 2012 to improve the efficacy of the fish pass as a temporary measure (Plate 1). Technical assessment indicated Bridgetown Weir continues to impede the upstream migration of protected fish species Atlantic salmon (*Salmo salar*) and lamprey (*Lampetra fluviatilis*, *Lampetra planeri*, and *Petromyzon marinus*), species listed under annex II of the Habitats Directive 1992 and noted Priority Species of Principal Importance under S41 of NERC 2006, and brown/sea trout (*Salmo trutta*) noted Priority Species of Principal Importance under S41 of NERC 2006. Climbing substrate is considered available and adequate for European eels (*Anguilla anguilla*).



**Plate 1:** The combination of the existing fish pass (left) and pre-barrage installed in 2012 as a temporary measure (right) is still restricting access for protected native migratory fish species.

### 2.3.2 Downstream Migration

The influence of Bridgetown Weir on river flows acts to direct downstream migrating fish towards the mill leat. The downstream end of the mill leat includes infrastructure that would be damaging for migrating fish (Plate 2). It is strongly advised the leat entrance be screened with effective by-wash facilities to safely encourage migrating fish back to the main river.



**Plate 2:** The weir actively directs downstream migrating fish to the leat (left) where mill infrastructure has high potential of causing damage (example: right)

### 3. Assessment Summaries

A list of supporting documents is provided in Appendix A.

#### 3.1 Abstraction Licence

**Table 1:** Details of active abstraction licences related to Bridgetown Weir infrastructure.

Licence	Type	Water per day (m <sup>3</sup> )	Max rate (m <sup>3</sup> sec <sup>-1</sup> )	Conditions
14/45/02/2354	Surface	34,560	0.400	Not entitled to abstract entire River Exe

#### 3.2 Preliminary Ecological Appraisal

This subsection provides a summary of the report produced by Colmer Ecology in April 2020 commissioned by WRT. For the full report please refer to document '2020-24\_R\_River Exe Weirs DRAFT.pdf'.

There are no statutory conservation designations affected by the proposed site. There are several non-statutory conservation designated Local Wildlife Sites (LWS) in the local area but not within the desk study area, and will not be affected by the proposed site. Recommended actions have been summarised in section 3.2.1. All rivers are Priority Habitats. The proposals will produce overall positive environmental enhancement in line with all environmental conservation measures. As a precaution to work taking place, the construction staff will undergo a site induction highlighting any environmental concerns.

Overall the ecological impact of the proposed works is considered to be highly positive, and likely to contribute to achieving/retention of Water Framework Directive (WFD) Good Ecological Status for Fish and thus WFD elemental improvement.

##### 3.2.1 Recommended Actions

1. No further phase 2 surveys required for proposed works within the site Bridgetown Weir.
2. Use of a suitably qualified and experience contractor to assure continued assessment of risk to local wildlife.
3. Cover dug trenches or provide mammal ladders, and cover piping to protect badgers.
4. External lighting kept to minimum (LED <2,700 Kelvin), upward light ratio 0%, security lighting on short timers.
5. Should removal of breeding bird habitat be required between 1<sup>st</sup> March - 31<sup>st</sup> August inclusive, suitably qualified inspection is a must. If breeding birds are identified, an exclusion zone would be required and no clearance to take place until breeding has ceased.
6. Pre-construction otter and water vole presence/absence by suitably qualified ecologist. If found, construction must cease and suitable mitigation be employed before continuation.
7. Work in accordance with EA pollution prevention guidance (PPG5). No fuel or potential pollutants to be stored near to water, with spill kits on site. Sediment control should be



employed where appropriate, and contractors made aware of potential for pollution incidents incl. toolbox talks.

8. Contractors to be informed of invasive species risks and supplied with identification and prevention guidance. This may include 'no go' areas.
9. Tree root protection zones where appropriate must be adhered to, with appropriate signage and monitoring. Pruning/reductions to facilitate works to adhere to good silviculture practice.

### 3.3 Water Framework Directive Assessment

This subsection is a summary of a WFD assessment performed as part of the Environmental Permit application. The proposed works on the River Exe (Quarme to Haddeo) are considered to be compliant with WFD objectives for the water body.

#### 3.3.1 Ecology

The River Exe (Quarme to Haddeo) is currently at Moderate ecological status with a status objective of Good by 2015. This was achieved, but has subsequently been degraded to Moderate due to presence of PBDEs and Mercury and Its Compounds. The River Basin Management Plan (RBMP) for the South West region has identified river restoration as a measure for achieving good ecological status.

Though ecological category Fish is not contributing to the WFD failure for this waterbody, the waterbody acts as highly important spawning and recruitment habitat for protected migratory fish species and Priority Species of Principal Importance. Therefore, the proposed fish passage improvement project aims to help retain the Good Ecological Status for Fish, and work towards attaining Good Ecological Status for the Exe catchment holistically.

There is no expected change to overall ecological function of the immediate local river channel. The benefits of improving access to high quality spawning and recruitment habitat for migratory fish will give a NET improvement to ecological function of the WFD waterbody.

#### 3.3.2 Geology & Hydrology

Consultation with the EA geomorphological advisor confirmed that the proposals will not have negative impact on the geological function of the River Exe. The Flood Risk Assessment (see section 3.7) has confirmed that the hydrology of the site will not be significantly affected by the proposals.

#### 3.3.1 Short term impacts

There are short-term implications from a delivery aspect for this project. The construction of a fish pass requires work to take place in the river and for the use of concrete.

Potential and control methods for short term impacts have been assessed as part of the Environmental Risk Assessment (ERA) produced for the Environmental Permit application.

The appointed Contractor will adhere to the ERA and supply a Methods Statement to avoid pollution of the watercourse during works. The river will be bunded and construction to take place in the dry to ensure no direct pollution pathway to the water, including fish rescue if required. All works will take place in accordance with the EA Pollution Prevention Guidelines 5 (PPG5).

### 3.4 Tree Protection Orders & Conservation Areas

The works proposed at Bridgetown weir are not within a conservation area, or subject to restrictions caused by TPOs.

Root Protection Areas (RPA) have been identified as appropriate to the planned operations. The right hand bank (western) does not present any complications in regard to RPAs. The left hand bank (southern) presents with multiple small RPAs related to a small orchard arrangement. A route is possible for the appropriate machinery and vehicles for the proposed construction.

Low pressure machinery with wide tracks is to be used where practicable. Details of RPAs are in the supplied in Appendix B.

### 3.5 Archaeology: Heritage Impact Assessment

This subsection provides a summary of the report produced by South West Archaeology in May 2021 commissioned by WRT. For the full report please refer to document 'EBW21\_FINAL\_Heritage\_Statement.pdf'.

Bridgetown Weir is constructed of linear arrangements of slate boulders forming the profile of a shallow crump weir. The south end of the weir (LHB) adjacent to the leat inlet presents as a more formal vertical drop-weir structure, constructed of large and roughly dressed blocks. Concrete repairs are evidence with previous capping to the centre section, and a concrete fish pass was inserted in 1950s. The narrative of Bridgetown Weir is complex with evidence of different functions. The site is considered more flexible for modification than others, with the burden of ecological benefit overriding any minor heritage concerns in this regard.

Noted features on site include:

- MEM24926: Shetter's Pool and post-medieval weir north of Bridgetown (monument).
- MEM24627: Post-medieval mill leat at Bridgetown. This leat is fed by Bridgetown Weir.
- MEM15204: Bridgetown Mill, Exton (monument). The mill is fed by the leat. The mill is operated for demonstration purposes only by the mill owner.

#### 3.5.1 Recommended Actions

1. Capping of the drop-weir carefully with concrete is not thought inappropriate.
2. It is important to consider visuals from both the road above and the surrounding fields.
3. The changes need to reflect the different structural and aesthetic character of the drop-weir. The two distinct elements of the weir must be retained.
4. Maintain the overall aesthetic where possible.
5. A Written Scheme of Investigation is required with a Watching Brief to record further details during crest alteration and excavation of the right hand bank. Details to be agreed with the ENPA by South West Archaeology.

## 3.6 Services/Utilities Enquiries

Preliminary service and utilities plant enquiries were performed by WRT in December 2019 to feed into feasibility studies and constraints assessment. Secondary services and utilities plant enquiries were performed by the awarded design contractor during the detailed design phase for this project. Notable findings include:

1. BT has services following the main A396, east of the weir.
2. Western Power Distribution have overhead high voltage (11kV) powerlines running north to south to the west of the weir.

### 3.6.1 Recommended Actions

1. Access to site is via the western bank, and therefore any plant/machinery will require passage under the overhead 11kV powerlines. Use of access 'goal posts' will be required.
2. It is the responsibility of the appointed contractor to ensure safe access, egress and construction according to results of the services and utilities plant enquiries.
3. Dynamic site assessment, for example with the use of CAT scanning equipment, before and during ground works is recommended for all construction activities.

## 3.7 Flood Risk Assessment

This subsection provides a summary of the flood risk assessment (FRA) produced by FishTek Consulting in May 2021 commissioned by WRT. For full details, please refer to the full FRA report. In conclusion, the FRA considers the impact on flood risk as negligible.

The project proposes minor alterations to the existing flow situation at Bridgetown Weir. The fish pass and chute will be installed within existing flow channels. A small reduction of water flowing through the fish pass is expected due to the more efficient design of super-active baffle fishways compared to the existing pool-traverse fish pass. A small section of weir crest will be raised to match the majority of the existing crest to reduce risk of competing attraction flows for migratory fish. Neither of the proposed elements will have notable impact on upstream water levels.

All designs have been produced according to the existing Abstraction Licence, and therefore there will be no significant change to upstream water levels across the flow range. The abstraction licence is legally protected and therefore all works will allow continued performance of the abstraction licence. Downstream water levels will also not change as there will be no notable change to existing flow quantities or rates.

The spate nature of the upper River Exe highlights the need for a suitably robust revetment on the right hand bank to protect the planned excavation from erosion post-construction. This has been suitably designed according to the expected flows, and will become more robust over time as vegetation colonises to increase surface roughness and reduce water entry.

It is possible for organic debris to obstruct the fish pass channel or leat entrance. This situation already exists presently where clearance of debris falls within the remit of riparian owners. On completion of the proposed construction this remit will remain with the riparian owners. The proposed angled screen and maintenance walkway at the leat will reduce risk of blockage of the leat, and will make the clearing task easier and safer in the future.

## 3.8 Permissions, Permits & Licences

### 3.8.1 Stakeholder Permissions

WRT is an environmental charity working primarily in partnership with governing bodies, local authorities, other NGOs, and private landowners to deliver beneficial pr. As a charity WRT requires relevant permissions from all local stakeholders, including but not limited to riparian owners, tenants and land managers, fishing rights owners, and other vested interests, to deliver projects on land and in rivers not owned by the Trust.

Construction projects developed and managed by WRT are delivered on the basis that ownership will revert back to the original pre-construction ownership and maintenance liability arrangements post-construction.

Stakeholders involved in the current project are detailed in Table 2. It is required for all relevant stakeholders to be fully briefed from project site conception and feasibility stage, and involved throughout the project development. All appropriate stakeholders have been guided through the following process:

1. Project introduction and verbal consent gained to perform feasibility investigations, including all necessary preliminary surveys to produce a detailed options and constraints document.
2. A signed pre-design agreement to enable access for production of detailed designs, and performance of all necessary investigations to bring project to 'construction ready' status.
3. Regular consultation to produce acceptable designs for fish passage improvements.
4. A signed pre-construction agreement to permit WRT to deliver and project manage the construction phase. This includes signed acceptance of the return to pre-construction ownership and maintenance liabilities.

**Table 2:** *Relevant stakeholders for the Bridgetown Weir fish passage improvement project being delivered under Strategic Exe Weirs programme.*

Details	Agreements
Riparian owner, RHB	Signed pre-construction agreement gained
Riparian owner, LHB	Signed pre-construction agreement gained
Riparian owner, LHB (retaining wall)	Not required. Designs will not affect the asset (retaining wall).

### 3.8.2 Planning Permission

Bridgetown Weir is within the Exmoor National Park boundary and is therefore subject to the local planning authority Exmoor National Park Authority (ENPA). Correspondence with the ENPA planning department confirmed that the proposed project is subject to a Full Planning Permission application (Pers. Comms. Kieran Reeves, Planning Officer, ENPA, 10<sup>th</sup> March 2021).

This document has been produced as supporting information for the planning application in May 2021 to ENPA for the proposed fish passage improvement project.



### **3.8.3 National Fish Pass Panel**

Members of the National Fish Pass Panel (NFPP) have been involved in the concept design for this project. A site visit was held between NFPP members, the local EA Fisheries Technical Specialist, and the project officer on 10<sup>th</sup> October 2019. Improving the existing fish pass with a pre-fabricated Larinier fishway retrofitted into the existing channel was suggested as the most pragmatic solution against the site constraints.

Outline designs were developed with consultation from the NFPP. Subsequent designs have received NFPP approval for local area officer assessment. The EA Fisheries Technical Specialist has been involved with the project since conception to ensure best practice.

### **3.8.4 Environmental Permit**

Bridgetown Weir is located within a watercourse designated as a Main River, and therefore under the jurisdiction of the Environment Agency Environmental Permit system.

A bespoke environmental permit has been submitted and is currently under review by the local Environment Agency office.

### **3.8.5 Impoundment Licence**

A pre-application advice process was sought for the Environmental Permit with local EA officers. It was advised by the local Fisheries Technical Specialist to gain advice regarding Impoundment Licence requirements for installation of the proposed fish pass.

This project is regarded by WRT as applicable for a Low Risk Impounding Regulatory Position Statement (RPS), as not requiring an impoundment licence. The proposed fish pass will not significantly alter the flows in the local area or significantly impact the water level upstream of the structure.

The existing abstraction licence limits any change to upstream water levels. The designs for this proposal have been produced according to the abstraction licence and will not notably affect upstream or downstream water levels. See results from the Flood Risk Assessment.

WRT have recorded justifications against the low risk impoundment checklist following consultation with the local EA Flood and Coastal Risk Management team, which will be available upon request if required during the Environmental Permit application process.

## **3.9 ENPA Pre-Planning Advice**

### **3.9.1 Archaeology**

A site meeting was held between Phillip Turnbull (WRT), Shirley Blaylock (ENPA) and Alex Farris (ENPA) on 1st April 2021.

A Heritage Impact Assessment was advised by ENPA to assess the proposal against historic value and characteristics of the site. This has been performed and recommendations adhered to. Please refer to section 3.5 of this report.

### **3.9.2 Landscape**

A site meeting was held between Phillip Turnbull (WRT), Shirley Blaylock (ENPA) and Alex Farris (ENPA) on 1st April 2021.

It was suggested that local stone of appropriate size be used for construction of revetments and 'riprap' extension of the weir toe at the northern end. Local stone is available from local quarries that will enable effective blending of the new construction to existing landscape, which will be specified to prospective contractors during the competitive construction tender process.

Subsequent correspondence raised concerns regarding the aesthetic suitability of concrete for raising a section of weir crest. Potential alternative options have been explored, including setting local stone into a concrete cap to blend with surrounding masonry, the potential for rapid biofouling to blend materials with surrounding aesthetic, and use of a lime-based mortar and river grit mix instead of concrete. All alternative options were discussed with the appointed design engineer, whereby significant concerns were raised regarding alternative options explored, including long-term structural stability issues and responsibilities under Construction (Design and Management) Regulations 2015, and build feasibility linked to cure-times and working in time-limited de-watered work areas.

The Heritage Statement following the commissioned heritage impact assessment concluded that use of concrete would not be considered unfavourable in the local context for the weir crest raising works. The resulting discussions with ENPA concluded that the proposals to use concrete are acceptable with respect to landscape. Further details of the respective correspondence are available on request in form of a project note and recorded emails in the project folders.

### **3.9.3 Trees**

A site meeting was held between Phillip Turnbull (WRT) and Graeme McVittie (ENPA) on 8th April 2021 to discuss the impact on any local trees.

The supporting information from the awarded design contractor mentioned significant removal of trees. This was clarified as removal of a small number of young trees to provide safe access and excavation of the riverbank and riverbed. This was agreed as acceptable within the local landscape context by ENPA.

It was also agreed that WRT would explore the option of planting whips of native species to replace removed trees, as part of fence reinstallation during site demobilisation activity post construction. On request by ENPA it was discussed with the riparian owner to move the fence line into the field to create a wooded area in the corner. However, this was rejected by the riparian owner.

### **3.9.4 Application process**

Kieran Reeves, ENPA Planning Officer, has co-ordinated the Pre-Application advice for this project, opened 2<sup>nd</sup> March 2021.

It was explained that the project includes two riparian owners who are involved in the pre and post-construction ownership of the affected site at Bridgetown Weir. It was advised that one planning application be completed with WRT as the single applicant, with a Notice 1 (Certificate B) served on each of the riparian owners. It was clarified by ENPA that the appropriate notice was to be served to the persons evidenced as riparian owners at the time of 21 days prior to the application.

It was advised that further development of the Outline Designs submitted for ENPA review be considered before submitting the planning application. ENPA also provided assistance with filling in of various forms on the Planning Portal website, including stating forms Non-residential Floorspace and Hazardous Substances as not applicable for this application.

### 3.10 Non-applicable Assessments

The assessments detailed in Table 3, as specified in the Mandatory Documents list on the Planning Portal Supporting Documents section, are deemed non-applicable to the current proposals.

**Table 3:** Assessments listed as Mandatory Documents on the Planning Portal not applicable to the current proposal.

Document	Reasons for not including
Foul Sewage Assessment	The proposals do not contain any element of Foul Sewage, and therefore no such assessments have been performed.
Lighting Assessment	The proposals do not contain any element of external lighting installation, or any lighting post-construction.
SuDS Supporting Information	The proposal does not include drainage elements, including surface or ground water, and therefore creation or connection to SuDS do not require consideration.
Sustainability Appraisal	A detailed sustainability appraisal has not been performed over and above the ecological assessments under WFD assessment, preliminary ecological appraisal. The proposals will have NET benefit for Priority Species and Priority Habitats. It is not believed by WRT that further consideration is applicable for the proposed project.

## 4. Project Proposal

The phased project delivery adopted by SEW is detailed in Appendix C. The fish passage assessment concluded that improvements are required to maximise successful migration for native fish species both upstream and downstream over Bridgetown Weir.

To achieve the desired goals of the Strategic Exe Weirs programme at the site Bridgetown Weir in accordance with the results of the Options and Constraints Assessment, it was decided by the project team to commission the design of a technical super-active baffle fish pass of the Larinier fishway design to improve upstream migration, with accompanying screening of the leat entrance and smolt chute to improve downstream migration, for native migratory fish.

For further details on the proposed project, please refer to accompanying drawing '02900-Bridgetown-GA Design-210519 .pdf' in the supporting documents.

### 4.1 Larinier Fishway

The proposals include locating a single flight 600mm wide aluminium Larinier fishway (single unit) of approximately 9500mm in length with 100mm baffles within the existing fish pass channel at the true right hand extent (upstream end). To minimise to the weir the new fish pass channel will be retrofitted into the existing channel. This will be achieved with the use of suitably graded concrete, and will blend with the existing concrete channel over time through biofouling of the surface. Positioning of the new fish pass in the existing channel will necessitate excavation of the downstream pool and a section of the true right hand bank adjacent to the downstream pool, to ensure effective dissipation of flow energies to remove risk of erosion and to maximise the efficacy of attraction to the fish pass entrance (Plate 3).

The pool and riverbank will be reinforced by a stone revetment constructed with locally sourced stone to ensure blending with the local landscape. Local stone will also be used to effectively extend the toe of the weir adjacent to the fish pass to meet the entrance of the fish pass to maximise positive attraction. Stone will be chosen to effectively blend into the existing landscape.

Some minor tree removal will be necessary for safe site access and to enable the bank excavation. These trees will be replaced with native tree whips in accordance with ENPA pre-planning advice.

#### 4.1.1 Weir crest raising

A section of weir crest will be raised towards the true left hand side to meet the average height of the existing crest. The purpose of this work element is to reduce the competing attraction flows and thereby maximise attraction efficacy towards the fish pass. This will be achieved with a suitably graded concrete and dowls into the existing structure, in accordance with recommendations from the heritage statement. The shape of the new crest will blend with the existing weir design, and ensure continued distinction between the sloped weir and drop weir as identified by the heritage statement.



## 4.2 Smolt Chute, Leat Screen and Walkway

The proposals include locating a smolt chute at the true left hand extent (downstream end) of Bridgetown Weir, at an existing overspill. The chute will be aluminium and of cross-braced open-topped design, approximately 5000mm in length and 340mm wide, smooth bottomed and at a 1:3 slope. For safe exit of downstream migrating fish, a small pool will be excavated and reinforced with locally sourced stone (Plate 4).

To guide downstream migrating fish away from the leat entrance and towards the chute, infrastructure will be installed to allow the safe installation of a seasonal mesh screen of 100mm aperture across the abstraction leat entrance. This is to avoid protected species from entering the leat where high risk of damage exists at the mill workings and associated spillways. The screen will be placed at an angle to reduce debris accumulation. Behind the screen will be an aluminium walkway, with safety rail and gated entrance, to enable safe installation, maintenance and removal of the seasonal screen. The screen is expected to be in situ during mid-April to mid-June, the peak time for the Atlantic salmon smolt migration.



**Plate 3:** Left: Existing channel to house new technical fish pass, area to be excavated to produce a larger pool, section of wall to be removed to accommodate new fish pass, and area of extended weir toe with stone. Right: Area of crest to be raised to reduce competing attraction flow.



**Plate 4:** Left: Location for the seasonal smolt screen and maintenance walkway. Right: Area for smolt chute and exit pool.

## References

- [1] *Exmoor National Park Local Plan 2011-2031; Chapter 4. Conserving and Enhancing Exmoor Objectives 3 and 4 pp 49-59.* Exmoor National Park Authority.
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## Appendix A: Supporting Documents

Supporting documents for this application include:

Nº	Document	Produced By:
1	Summary & Supporting Information	Westcountry Rivers Trust
2	Design Drawings	FishTek Consulting
3	Flood Risk Assessment	FishTek Consulting
4	Fish Passability Assessment 2017	FishTek Consulting (Summarised by WRT)
5	Preliminary Ecological Appraisal (combined report for Bridgetown Weir and Bickleigh Bridge Weir)	Colmer Ecology
6	Heritage Impact Assessment / Heritage Statement	South West Archaeology
7a 7b	Notice 1 (Certificate B)	Westcountry Rivers Trust





Appendix B: Root Protection Areas

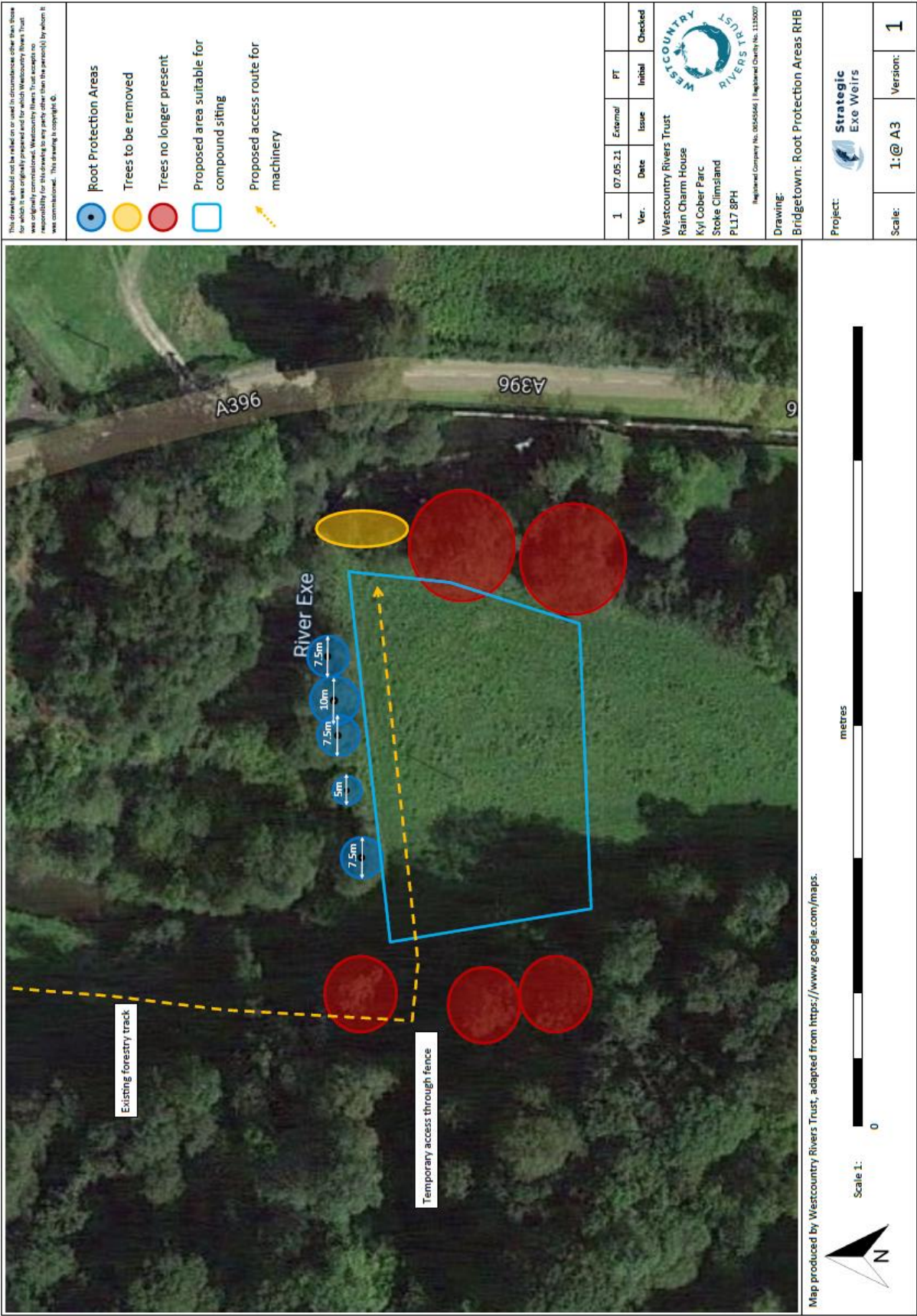
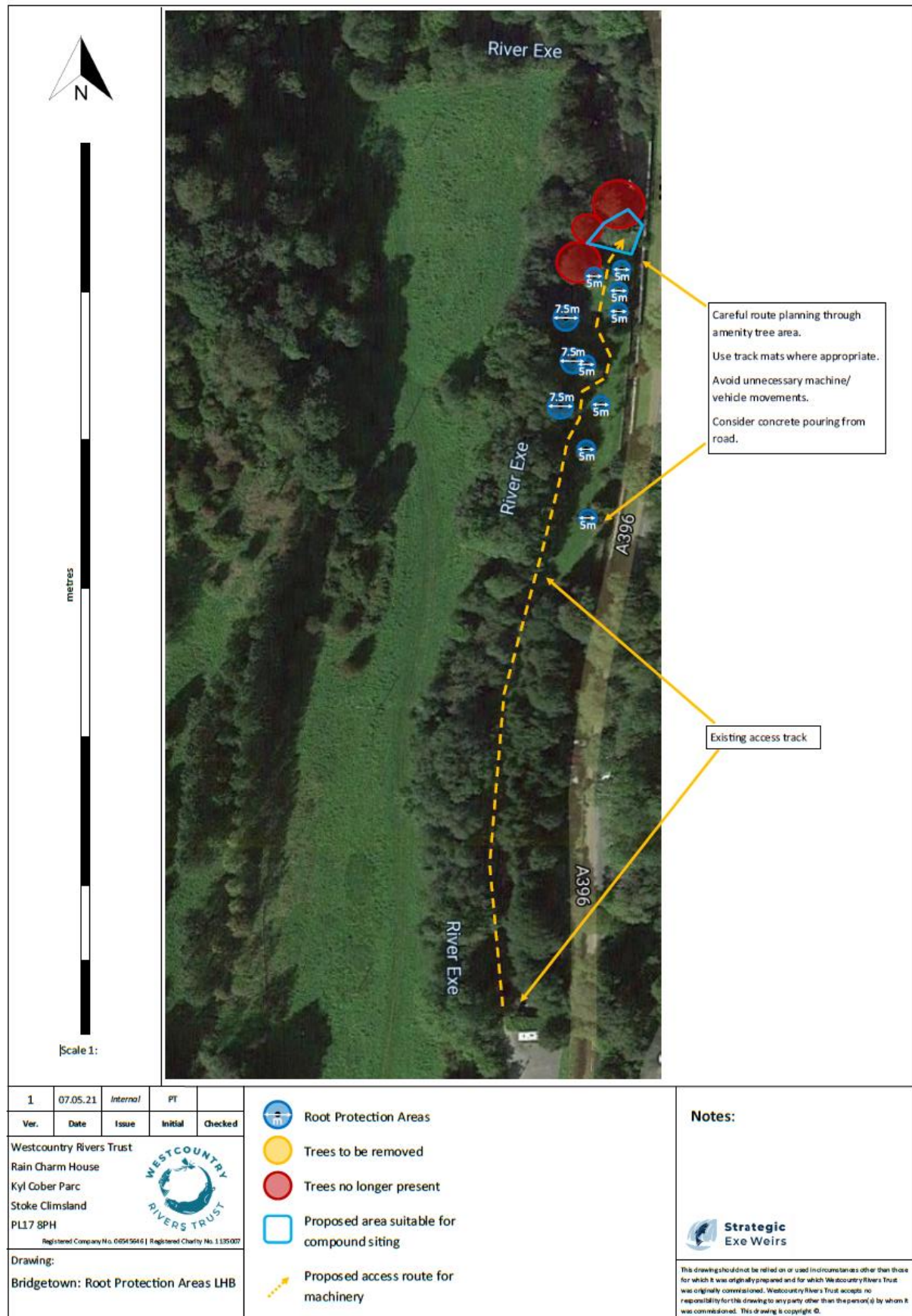


Figure A: Root protection areas for the true right hand bank:





**Figure B:** Root protection areas for the true left hand bank