Application for fish pass approval

Introduction

Please read through the guidance notes and this application form carefully before you fill this form in.

It should take you about 40 minutes to fill in this form.

If you are not sure about anything, phone us on **08708 506 506 between 8am and 6pm, Monday to Friday**.

This form is designed to help you provide the information we need to understand and approve the design and dimensions of your proposed fish pass. However, designing fish passes is very specialised and technical, so you should read the Environment Agency Fish Pass Manual (or other similar publications) which is on our website at http://publications.environment-agency.gov.uk/pdf/GEHO0910BTBP-E-E.pdf. Because of the specialised nature of the information we need, we recommend that you use specialist consultants to make sure the design is appropriate and you provide enough details.

Contents

1 Site details

1.1 What is the name of the site?

Bolham

1.2 National Grid Reference of the site (10 figures)

SS 94854 15309

1.3 Name of watercourse

River Exe

1.4 Watercourse order

Please give the watercourse name, and then each successive river until the primary watercourse reaches the sea, as watercourse/tributary of 1/tributary of 2/...../tributary of n/Sea.

River Exe/English Channel

2 Details of the obstruction

2.1 What type of obstruction is the pass designed to overcome?

Weir

2.2 What is the purpose of the obstruction?

SWW Abstraction

2.3 Describe the obstruction, including any relevant control structures and associated channels

The barrier is a broad crested weir with a sloping concrete glacis.

2 Details of the obstruction, continued

2.4 What is the overall length (in metres) of the crest of the obstruction?

67.00 metres

2.5 What is the maximum difference between upstream and downstream water levels at the structure?

1.00 metres

2.6 Who owns the obstruction and the riverbanks at the obstruction?

Title (Mr, Mrs, Miss and so on) Mr

First name South West Water

Last name

Position

Address

Postcode

Country UK

Contact numbers, including the area code

Phone

Fax

Mobile

Email

3 Fish pass design and ownership details

3.1 Who has designed the fish pass?

Title (Mr, Mrs, Miss and so on) Mr

First name Stuart

Last name Pudwell

Position
Fisheries Scientist

Company name
Fishtek Consulting

Address
Unit 1A Webbers Way

Dartington

Totnes

Devon

Postcode TQ9 6JY

Country
UK

Contact numbers, including the area code

Phone 01803866680

Fax

Mobile

Email stuart@fishtek.co.uk

3 Fish pass design and ownership details, continued

3.2 Who will own and operate the fish pass?

The person named in 2.6 ☑

Another person ☐
Give their details below.

Title (Mr, Mrs, Miss and so on)

First name

Last name

Position

Address

Postcode

Country

Contact numbers, including the area code

Phone

Fax

Mobile

Email

3.3 Name of the lead Environment Agency officer (if any) involved with this pass

Mike Holland

4 Fish species and period of migration

4.1 Provide details of the species the pass is designed for and identify other species at this site which the pass would benefit. Put ticks in the table below and indicate a size range for each species.

Species	Pass designed for	Species also present	Length range of fish species (cms)
Salmon	✔	✔	From 52.00 to 110.00
Sea trout	✔	✔	From 28.00 to 60.00
Brown trout		✔	From to
Eels	✔	✔	From to
Shad			From to
Lamprey		✔	From to
Sea lamprey			From to
River lamprey			From to
Brook lamprey			From to
Grayling			From to
Fast water coarse fish, for example barbel, chub and dace			From to
Slow water coarse fish, for example roach, bream, pike			From to
Minor species, for example bullhead, minnows, stone loach		✔	From to

4.2 Will the pass operate all year, or is it intended to operate during shorter periods that coincide with the relevant species' movement patterns?

All year ☑

Shorter periods ☐

If a shorter period, name the species groups (as named above) and state the periods when the pass will operate for them.

Species	Months of year

5 River discharge and water levels

5.1 Annual river discharge

Fill in the table below to provide a summary of the annual discharge, in cubic metres per second (m^3/s) to two decimal places, for the percentile exceedance values shown (see the guidance notes).

Percentile exceedance value	Annual discharge (m^3/s)
5	41.16
10	30.39
50	7.75
90	2.28
95	1.78
ADF (Annual Daily Mean Flow)	12.94

5 River discharge and water levels, continued

5.2 Range of river discharge the pass is expected to operate over

	Percentile exceedance	m^3/s
Lowest flow	Q 95	1.78
Highest flow	Q 10	30.39

5.3 River water levels, above ordnance datum (mAOD), corresponding with the flows identified in 5.2

	Upstream level	Downstream level	Estimated or measured?	How were they estimated or measured?
Lowest flow	69.30	68.45	Measured	Site survey + level log
Highest flow	69.65	68.95	Estimated	Calculated + level log

5.4 Is the fish pass for eel only?

Yes ☐ Go to section 7.

No ☑ Go to section 6.

6 Description of fish pass, operating flows, and intended operating periods

Please include plans and sectional elevations of all relevant parts of the pass and adjacent structures (see the guidance under 'Documents you need to provide' in the guidance notes).

6.1 Type of fish pass

Larinier

6.2 Description of the fish pass

1.8 m internal width comprising 2 x 900 mm wide baffle units (150 mm high) fixed in a reinforced concrete channel. Single flight with no resting pool. Entrance located at the weir toe on the true right hand bank. A 1:2 downslope is present at upstream end, extending into the lead in channel. A notch will be cut into the stilling basin to provide an attraction flow and route to the fish pass entrance in low flows. Stop log slots up and downstream of the fish pass.

6.3 Explain why you plan to have the pass at the location you propose, and any factors that restrict where the pass can be located

The pass is situated on the right hand side as this is the most upstream point and therefore where fish are most likely to attempt to ascend the barrier. The pass has been designed in-bank, as this will make construction and maintenance of the pass easier. Furthermore, if the pass were to be built through the weir, the upstream end of the fishpass would extend a significant way into the river channel upstream of the weir and become a snagging risk.

6.4 How is the pass location and operation designed to make sure that fish are attracted to the fish pass across the intended river discharge operating range?

Percentile exceedance value	River discharge (m^3/s)	Pass discharge (m^3/s)	Augmentation flow, if any (m^3/s)	Total attraction flow as % of river discharge
5	41.16	3.37		8.19
10	30.39	2.85		9.38
50	7.75	7.64		22.12
90	2.28	1.33		58.30
95	1.78	1.28		71.73

6.5 Describe how the operation of any nearby water-control structures may affect the performance of the pass

The design has taken upstream abstraction into consideration. The fish pass is designed to take a minimum of 1.28 m3/s, when flow in the river is at Q95 (1.78 m3/s). The abstraction licence states that SWW can abstract up to 2,700 m3 per day unrestricted. This is equal to an instantaneous rate of discharge/abstraction of 0.031 m3/s. As such, there will be more than sufficient water in the river even at Q95 for SWW to continue to abstract their licenced flow, once the fish pass has been constructed.

6 Description of fish pass, operating flows, and intended operating periods, continued

6.6 Does the fish pass include a pool pass?

Yes ☐

No ☑ Go to 6.9.

6.7 Describe how the pool pass will operate to allow fish to pass upstream, including the changing hydraulic conditions within it over the range of river discharge when the pass is expected to operate

6.8 Summarise the operating conditions at the limits of operation in the following table

	Length and width (metres)	Average minimum depth at lowest river discharge (metres)	Average maximum depth at highest river discharge (metres)	Maximum head difference at lowest river discharge (metres)	Minimum head difference at highest river discharge (metres)	Minimum power density (watts per cubic metre)	Maximum power density (watts per cubic metre)
1st pool (upstream)							
2nd pool							
nn							
Tailwater							

6.9 Does the fish pass include a baffle pass?

Yes ☑

No ☐ Go to 6.13.

6.10 Describe how the baffle pass will operate to allow fish to pass upstream, including the changing hydraulic conditions within it over the range of river discharge when the pass is expected to operate

The fish pass has been designed to ensure the ha is within guideline levels and it discharges adequate flow. At Q95 the fish pass will discharge 9.89% of Qmean with ha of 0.54 m. At Q20 and Q10 ha will rise to 0.8 and 0.89 m respectively, which is within the preferred operational range for large migratory salmonids.

6.11 Give details of the operating conditions at the river discharge limits the baffle pass will operate at

	Flight 1	Flight 2	Flight 3	Flight 4
Upstream pass slope invert elevation (metres above ordnance datum)	68.67			
Upstream pass hydraulic invert elevation (metres above ordnance datum)	68.76			
Downstream pass slope invert elevation (metres above ordnance datum)	67.60			
Downstream pass hydraulic invert elevation (metres above ordnance datum)	67.75			
Head difference of slope (metres)	1.00			
Length of slope (metres)	7.22			
Slope (as a percentage gradient)	15.00			
Minimum hydraulic head (Ha) on top baffle (metres)	0.54			
Minimum hydraulic head (Ha) on tail baffle (metres)	0.55			
Maximum hydraulic head (Ha) on top baffle (metres)	0.89			
Maximum hydraulic head (Ha) on tail baffle (metres)	1.20			
Mean velocity (metres per second) at minimum pass flow	1.58			
Mean velocity (metres per second) at maximum pass flow	2.12			

6 Description of fish pass, operating flows, and intended operating periods, continued

6.12 Are resting pools needed?

Yes ☐ Give details of the operating conditions in the table below.

No ☑ Go to 7.1.

	Length and width (metres)	Average minimum depth at lowest river discharge (metres)	Average maximum depth at highest river discharge (metres)	Maximum equivalent head difference at lowest river discharge (metres)	Minimum equivalent head difference at highest river discharge (metres)	Minimum power density (watts per cubic metre)	Maximum power density (watts per cubic metre)
1st pool (upstream)							
2nd pool							
nn							

6.13 For combined passes and passes other than pool passes or baffle passes, provide a description of the proposal, as in 6.7 to 6.12

7 Eel passes

Are the passes specifically designed for eels?

Yes ☑ Fill in the rest of this section 7.

No ☐ Go to section 8.

7.1 Type of eel pass

Gravity fed

7.2 Description of eel pass

Gravity fed bank side channel separated from the Larinier with a concrete dividing wall. Channel contains studded eel and lamprey tiles. The largest eel pegs are towards the bottom of the pass and a GRP predation cover is to cover the pass. The pass follows the slope of the Larinier fish pass and runs to bed. Tiles are on a lateral slope to accommodate for a range in upstream water levels and ensure passage over the required operating range as a minimum.

7.3 Is the eel pass pump fed?

Yes ☐ Give the following details.

No ☐ Go to 7.4.

Pump capacity at the target head level

litres per minute

How will the pump be powered (for example, mains electricity, battery, solar power, wind power, or other)?

How is water fed into the head of the pass and any flow-splitting arrangements?

With this application enclose drawings of the pump installation to show the pump in relation to the channel and the eel pass, any screening or protection from debris, and the facilities for cleaning and maintenance.

7 Eel passes, continued

7.4 Explain why you plan to have the eel pass at the location you propose, and any factors that restrict where the pass can be

Located bankside. This is due to eels generally being bank and bed orientated and for easier operation and maintenance.

7.5 Describe how nearby water-control structures may in any way affect the operation of the eel pass

The design of the eel pass has taken the abstractions into consideration. With no abstraction taking place, Q99 river flows will be 1.18 m3/s, equating to a depth in the eel pass of 60mm. If maximum instantaneous abstraction occurs at Q99 (both leat and pumping station, totalling 0.113 m3/s), available flow reduces to 1.067 m3/s. The depth in the eel pass would be reduced to 26mm (although the likelihood of this ever occurring is minimal).

7.6 In the table below, provide a summary of the operating conditions at the river discharge limits the eel pass will operate at

	Flight 1	Flight 2
Upstream pass invert elevation (metres above ordnance datum)	69.21	
Downstream pass invert elevation (metres above ordnance datum)	68.12	
Head difference (in metres)	1.09	
Length (in metres)	7.22	
Slope (as a percentage gradient)	15.00	

8 Monitoring and maintenance

All applicants must fill in this section.

8.1 Describe any proposals you have for monitoring the hydraulic and biological performance of the fish pass

There are currently no monitoring proposals as a part of this project, however a hydraulic gauge board will be installed both upstream and downstream of the fish pass, so operators can easily see whether the hydraulics are working as expected. Whilst there is no intention to conduct biological monitoring at this location, a sufficiently long flat section has been included upstream of the pass to facilitate the installation of a resistivity counter, including recesses containing white HDPE. Recesses have also been included to facilitate the installation of monitoring equipment (cameras).

8.2 Describe the procedures that you will have in place to maintain the structure and mechanisms of the pass

Provisions for maintenance include stop log slots at the upstream and downstream end of both the fish pass. The pass management regime will be determine by local operational teams.

Stop log slots will be provided upstream of the eel pass for maintenance purposes.

9 Supporting documents

With this application you need to provide the documents listed below. Tick the relevant boxes to confirm that you are enclosing the documents.

A map or plan of the proposed site and relevant structures (1:10,000 or other scale if more appropriate) ☑

An annual river discharge hydrograph ☑

Detailed engineering drawings of the existing obstruction and the proposed design for the fish pass ☑

List the reference numbers of the drawings including any revision numbers and date of revision.

02925_200-Location plan
02925_201-RHB fish pass plan
02925_202-fish pass plans & sections
02925_301-LHB smolt chute plan
02925_302-smolt chute & screen general arrangement

If you are providing any other documents to support this application, list them here.

Bolham_FP002_SupInfo_Rev2
20230329 11 Bolham_Project Note_Design Constraints NFPP

Are you enclosing any separate sheets you used to provide extra information to answer questions?

Yes ☐ How many?

No ☐

We can only grant Fish Pass Approval if you provide all the documents we need. If this is not possible, but the rest of the form is filled in properly, we will decide whether this proposal is compatible with approved status. You can then give us the relevant documents when you have them.

For Environment Agency use only

Date received (DD/MM/YYYY)

Environment Agency region and area

Our reference number

Region

Account Manager

Area