

Dear Tom,

Many thanks for outlining this in such detail, this is an excellent reference point for us to work from.

Kindest regards,
Emma

Emma Goddard

Head of Environment

South East Water

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 *Please consider the environment before printing this e-mail*

From: Reid, Tom [<mailto:Tom.Reid@environment-agency.gov.uk>]

Sent: 23 June 2016 15:26

To: Goddard, Emma; Murrell, Iain; Dance, Lee

Cc: Howarth, David; Fowler, Viv; Vincent, Ros (Ros.Vincent@jacobs.com); Smith, Alastair; Halliday, Andrew J

Subject: RE: SEW 36.0m Broad Oak Reservoir Option - WFD Compatibility

***** External Mail *****

Dear Emma

Thanks for the email. I will try to respond to your questions in turn.

1. What are the key biodiversity drivers are that you are requiring for both the fish pass and the Sarre Penn diversion?

In the South East River Basin Management Plan, produced as a requirement of the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (the WFD), the Sarre Penn is a heavily modified watercourse that, in its lower reaches, mainly serves a drainage and water resources (agricultural abstraction) function. However, in its upper reaches, above Calcott, much of the channel has re-naturalised and shows many features of an un-modified (natural) waterbody. In addition, our fish monitoring programme has shown that there are brown trout in the stream and some of them undergo metamorphosis as they become sea trout, a form of brown trout that migrates out to sea for a year or more before returning to spawn in freshwater. Our monitoring has also shown that there are eels in the stream.

Delivery of the WFD requires us to protect waterbodies from adverse impacts or, if those impacts are unavoidable, to require mitigation from developers (in the broadest sense) so that the potential (ecological, chemical and morphological status of a modified waterbody) of the waterbody is not affected and any plans that we have or might develop in the future to improve the potential of the waterbody can still be implemented.

With respect to migratory fish, the Salmon and Freshwater Fisheries Act (SAFFA) 1975 requires developers "to make and maintain fish passes . . . where in any waters frequented by . . . migratory trout . . . a new dam is constructed . . . so as to create . . . any other obstruction to the passage of . . . migratory trout". In addition, the fish pass for migratory trout must be of such form and dimensions as the Environment Agency "may approve as part of the structure of, or in connection with, the dam or obstruction, and shall thereafter maintain it in an efficient state".

The Eels (England and Wales) Regulations 2009 also require the free passage of eels in inland waters. Where new dams block watercourses, it is an offence not to install an eel pass, if we have required one, and to fail to operate it in accordance with any directions that the Environment Agency might make.

On the basis, therefore, of the WFD Regulations, SAFFA and the Eels Regulations, South East Water is required to construct a fish pass on the Sarre Penn at the proposed Broad Oak Reservoir and operate it as we might direct.

2. Could you please clarify why this is so important from the Environment Agency's perspective?

The Environment Agency is the competent authority in England for the three pieces of legislation, above. Failure to require the fish pass and other mitigation in the river channel and riparian corridor would be a dereliction of our legal duties to fish and to rivers in this country.

3. Could you confirm requirements for the composition of tree species in the tree canopy and how you would expect this tree canopy to function within the fish pass and river diversion area.

In my email, I made reference to in-channel planting. I was referring here to aquatic plants that might be needed to stabilise the constructed river channel.

However, the riparian corridor – a hydromorphological quality element, as described in the WFD – needs trees for a number of reasons, some of which include:

- i. Trees and other riparian vegetation help to shade rivers. This is of great benefit, particularly given current climate change scenarios, as shading helps to keep rivers cool. Although some species of fish are relatively tolerant of wide temperature variations, salmonids (brown and sea trout, and other species) are especially sensitive to increases (diurnal or longer term) in water temperature. Among other things, this is because warmer water cannot contain as much dissolved oxygen (DO) as cold water, and salmonids require high levels of DO.
We are concerned about the impact of any lack of shade over and around the fish pass. This relatively long (compared to other fish passes in the country) structure needs to benefit from shade otherwise it will heat up and, effectively, become a thermal (and deoxygenated) barrier to the passage of fish in the Sarre Penn.
 - ii. Trees are an important source of fine, coarse and large woody material (WM) for rivers. There are numerous biodiversity, flood risk and climate change mitigation reasons why rivers need to contain WM. I attach a document listing some of the benefits of WM in rivers.
 - iii. And, "trees" must not be taken to mean a monoculture of a single species. A range of species including alder, willow, oak and possibly others are all important to ensure that the riparian corridor is suitably bio-diverse and provides as wide a range of habitats for other species as possible.
4. Why is mitigation for the effects of the reservoir on the Sarre Penn so important and what are the key parameters/objectives that we need to achieve?

The Environment Agency is of the opinion that unmitigated construction of the Broad Oak Reservoir is going to have adverse impacts on the Sarre Penn. These impacts include on the WFD potential of the waterbody which would constitute hydromorphological harm, defined in Section 161ZA of the Water Resources Act 1991 amended by the Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009, and on the passage of salmonids (sea trout) and eels in the river.

Mitigation measures for the impacts have, however, been identified. They include the construction of a large fish pass, careful design of the water course – longitudinally and in cross section – and habitat creation in the riparian corridor to minimise the effects of the reservoir. Implementation of these measures will prevent the occurrence of harm and permit the passage of fish.

5. What are the key management requirements of the Sarre Penn and fish ladder?

All rivers require careful management. In the case of the Sarre Penn, as the new course of the river will be an artificial, constructed one, South East Water will have to monitor the river and ensure that it does not lose any of the features that we have specified as mitigation. These features include a low flow channel placed inside a sinuous, meandering channel that is located in a suitably vegetated riparian corridor.

The key feature of the management of the fish pass is, simply, that it must continue to permit the passage of fish upstream and over the dam. To this end, it must be maintained in an operational state and anything, within SEW's control, that prevents it from functioning properly will need to be addressed and rectified.

I hope that these answers have provided the additional information that you require.

As before, if you require further information, please let me know.

Best wishes

Tom

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 *Please consider the environment before printing this email*

From: Goddard, Emma [<mailto:Emma.Goddard@southeastwater.co.uk>]

Sent: 23 June 2016 11:58

To: Reid, Tom; Murrell, Iain; Dance, Lee

Cc: Howarth, David; Fowler, Viv; Vincent, Ros (Ros.Vincent@jacobs.com); Smith, Alastair; Halliday, Andrew J

Subject: RE: SEW 36.0m Broad Oak Reservoir Option - WFD Compatibility

Dear Tom,

I am replying on Lee's behalf as he is on holiday at the moment.

Your response is very helpful and we very much appreciate the clarity that is given within it, it is useful to understand that we need to allow flexibility (i.e. space) within our scheme design so that we can accommodate a range of dam heights up to 36mAoD and the mitigation that is associated with it.

We are in the process of formulating our plans further and it is noteworthy that both the river diversion and fish pass design are unprecedented under WFD and thus there is no reference scheme that we can use. As this is the case, we would appreciate if you could provide further detail in a couple of areas:

Firstly, could you please clarify what the key biodiversity drivers are that you are requiring for both the fish pass, and, the Sarre Penn diversion. Could you please clarify why this is so important from the Environment Agency's perspective.

Secondly, you outline in your email that the composition of tree species within the diverted stream, and fish pass are yet to be agreed. We had understood that we would be looking at a mix of species (reflective of that currently present on the water course). For example our current design has a mix of Alder, Oak, hazel and willow. Could you please confirm requirements from your perspective together with how you would expect this tree canopy to function within the fish pass and river diversion area.

Would it be possible for you to clarify why the mitigation for the Sarre Penn is so important from your perspective and the key parameters/objectives that we need to achieve.

If you could also outline key management requirements of the Sarre Penn and fish ladder that would be very useful at this stage.

We would find this additional level of detail very helpful in setting the scheme requirements going forward for our WRMP19 options development.

Many thanks,
Emma

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From: Reid, Tom [<mailto:Tom.Reid@environment-agency.gov.uk>]

Sent: 22 June 2016 12:35

To: Murrell, Iain; Dance, Lee

Cc: Goddard, Emma; Howarth, David; Fowler, Viv

Subject: RE: SEW 36.0m Broad Oak Reservoir Option - WFD Compatibility

***** External Mail *****

Lee

Given Iain's qualified response below, I write to confirm my opinion of the existing scheme and the proposed 36.0m scheme.

During my discussions with you and with your consultants, particularly Katie Kemble, Geomorphologist, and Jacobs' ecologists and engineers, we have agreed a scheme of work to mitigate for the impacts of the Broad Oak Reservoir scheme on the Sarre Penn that will act to protect its Water Framework Directive (WFD) status, not cause deterioration of the WFD waterbody and will provide fish passage for the migratory fish (smoltified or metamorphosing brown trout) found in the stream.

For clarity, we have considered a number of elements of the scheme including:

- location and length of the offtake of the Sarre Penn to a new course
- enhancement of the new course of the Sarre Penn to the secondary dam wall
- enhancement of the riparian corridor with tree planting of the new course of the Sarre Penn
- overflow from the Sarre Penn to the reservoir to accommodate flood flows
- engineering of the channel over the secondary dam wall
- engineering of the course of the stream to the beginning of the fish pass
- the fish pass
- the overall stream gradient from the offtake
- the connection of the stream from the foot of the fish pass to the existing course of the Sarre Penn
- management of the course of the Sarre Penn to ensure that remains in, at least, good WFD potential and does not become silted up or overgrown.

I must add that there are still a number of minor details e.g. the species that are to be used for in-channel planting, the precise materials that will be used to engineer the channel, the use of large woody material etc. that we need to agree but none of these are material considerations.

I also confirm that all elements of the scheme can be adapted with ease to fit a reservoir dam at a range of heights from those which have been scrutinised and passed through the Water Resources Management Plan approvals process up to 36.0m. This means that, if South East Water wishes to increase the height of the reservoir dam, then, subject to agreeing the minor details, there is no biodiversity or WFD reason why this could not be done.

Please let me know if you need any other information.

Tom

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