Environment Agency Relevant Representation on Sizewell C Development Consent Order

Our Reference: AE/2020/125515/01

September 2020

Executive Summary

Please find enclosed our Relevant Representation for this application for a Development Consent Order on behalf of the Environment Agency.

The Environment Agency's Role
The Environment Agency works to create better places for people and wildlife.

We were established to bring together responsibilities for protecting and improving the environment and to contribute to sustainable development. We take an integrated approach in which we consider all elements of the environment when we plan and carry out our work. This allows us to advise on the best environmental options and solutions, taking into account the different impacts on water, land, air, resources and energy.

We help prevent hundreds of millions of pounds worth of damage from flooding.
Our work helps to support a greener economy through protecting and improving the natural environment for beneficial uses, working with businesses to reduce waste and save money, and helping to ensure that the UK economy is ready to cope with climate change. We will facilitate, as appropriate, the development of low carbon sources of energy ensuring people and the environment are properly protected.

We have three main roles:

We are an **environmental regulator** – we take a risk-based approach and target our effort to maintain and improve environmental standards and to minimise unnecessary burdens on businesses. We issue a range of permits and consents.

We are an **environmental operator** – we are a national organisation that operates locally. We work with people and communities across England to protect and improve the environment in an integrated way. We provide a vital incident response capability.

We are an **environmental adviser** – we compile and assess the best available evidence and use this to report on the state of the environment. We use our own monitoring information and that of others to inform this activity. We provide technical information and advice to national and local governments to support their roles in policy and decision-making.

The Environment Agency's position on Sizewell C
We will support the Examining Authority by advising them if the application is in line with these objectives so that they can be satisfied that their recommendation in relation to the application for the DCO can be made taking full account of environmental impacts.

Pre-application consultation
We have worked with NNBGenCo (SzC) Ltd and their consultants throughout the Pre-Application stage of the DCO to advise them as they have developed the proposals for Sizewell C.

We have made comprehensive comments in response to each of NNBGenCo (SzC) Ltd's pre-application consultations. Throughout that process, and in the subsequent lead up to their DCO application, we have had extensive discussions to address issues and provide advice raised in response to their proposals. We have also been engaging with NNBGenCo (SzC) Ltd to seek common ground and will continue to progress do so throughout the pre-Examination process.

NNBGenCo (SzC) Ltd has responded positively in some areas. We have agreed some measures, including alterations to design or construction, use of best practice and adequate environmental monitoring and response, which have been included in their application to help secure protection of the environment, local habitats and protected species. However, there remain outstanding issues that could cause environmental harm and there is still a substantial amount of further information to be submitted.

Outstanding issues of concern
We believe that issues remaining could be resolved, subject to further endeavours by NNBGenCo (SzC), in accordance with the suggested solutions provided in this Relevant Representation. That said, there are still a number of important issues that do require further attention at this time, as we have been unable to resolve these with NNBGenCo (SzC) in the pre-application period. We recommend that the Examining Authority considers the following issues as principal matters for the purpose of the examination.

Flood Risk – We have yet to agree that the supporting flood risk modelling is sufficient to consider the extent and consequences of flooding. The current Flood Risk Assessment (FRA) identifies increased flooding to properties without identifying appropriate mitigation and compensation measures. In terms of the objectives of an FRA, this is an unacceptable conclusion.

Water Supply - The water supply options described do not provide evidence to demonstrate that a suitable and ecologically sustainable source of water can be provided to the Sizewell C Project.

Terrestrial Ecology – The proposed use of culverts will have significant impacts to watercourses, designated habitats and protected species. Current assessments do not sufficiently identify likely impacts or provide appropriate mitigation and/or compensation measures.

Marine Ecology – We have outstanding concerns over methods being used to assess impacts to marine ecology and cannot yet agree to the appropriateness of proposed mitigation measures.

Water Framework Directive - We have concerns that the assessments have not identified all the potential impacts under the Water Framework Directive (WFD) or adequately assessed the potential for deterioration in the status of WFD waterbodies affected by the development. If a deterioration in waterbody status cannot be ruled out an exemption will be required in accordance with Article 4.7 of the WFD and the applicant has not made a case to support this.

Alignment between submission of Environmental Permits and DCO – At this time we must highlight that we are currently unable to advise the Examining Authority of our position on the environmental permits required for operation, or provide representations on any matters covered by those permits as the permit applications were not submitted sufficiently in advance of the DCO application.

Structure of the Environment Agency response
In the body of the detail comments we identify those issues we would like the Examining Authority to take into account when considering this DCO application. We have outlined the issue, what the impact is, and suggested a solution to resolve it. In many cases we need more information to advise the Examining Authority and we request it be provided up front to be considered in the examination.

We may add to or amend the matters set out in this Relevant Representation. We will keep the matters set out under review and update the Examining Authority on progress with the resolution of these issues at appropriate points as the examination progresses. Where we have suggested the need for possible requirements, this is suggested to facilitate discussion with the applicant and other parties. We may wish to amend this in the course of the examination.

We note that other bodies are involved in the project, such as the Marine Management Organisation and Natural England, with overlapping interests to ourselves. We have had discussions with these bodies throughout the pre-examination period already and will continue to discuss further and collaborate with these organisations where appropriate.

The Environment Agency intends to attend the Preliminary Meeting and make further written representations if necessary. We may also make oral representations at any relevant hearings, where this is sought. We are concerned that there is a substantial amount of information still to be submitted and as a result of this we genuinely fear that we may not be able to review this new, and amended, information to timescales that will enable us to properly advise the Examining Authority within the deadlines sought. Much will depend upon the extent to which the applicant can provide information to resolve outstanding issues, ahead of the examination period.

Many of the proposed watercourse crossings will require Flood Risk Activity Permits from the Environment Agency under the Environmental Permitting (England and Wales) Regulations 2016. We do not currently have the information necessary to establish know if the proposed watercourse crossings can meet our requirements to prevent flood risk, ecological and geomorphological impacts. If this cannot be demonstrated, it is very unlikely that we will be able to grant environmental permits for the proposals, especially where it may lead to WFD compliance failures. Our views below are provided without prejudice to our decisions on any applications made for environmental permits. Our final view will take account of information included in the application and relevant guidance available at that time.

For further discussions, please contact Cameron Sked – Nuclear New Build Senior Planning Adviser, on 0208 474 6422.

Yours sincerely

Mr. Simon J Hawkins
East Anglia Deputy Director

Flood Risk

1.0 Much of the Sizewell C Main Development Site and Associated Development Sites are in Flood Zone 3 (high probability of flooding), and there are also numerous proposed watercourse crossings. It is therefore essential for the DCO application to be supported by an adequate Flood Risk Assessment (FRA), based on information from appropriate flood risk modelling that demonstrates that there will be no increased risk of flooding on-site or elsewhere.

1.1 During the Pre-Application stage of the DCO, the Environment Agency repeatedly gave NNBGenCo (SzC) Ltd comprehensive specialist guidance to help them ensure that an adequate FRA would be submitted so that the Examining Authority would have a sound evidence base upon which to make their decisions. It is therefore a great disappointment to the Environment Agency that NNBGenCo (SzC) Ltd has knowingly chosen to submit an FRA which is neither supported by adequate modelling, nor demonstrates that the site, its users, and neighbouring areas will be safe in the event of a flood. Certain fundamental elements of any FRA have been omitted entirely, such as baseline and 'with-development' comparisons of flood extents at some of the Sizewell Link Road watercourse crossings.

1.2 Whilst we understand that an FRA Addendum will be submitted later in the DCO process which may rectify the many faults that currently remain, it is imperative that the Examining Authority is aware that reviewing such a large and complex submission of additional information will be time-consuming, and the Environment Agency may not be able to perform this task sufficiently quickly to advise the Examining Authority at the appropriate point in the Examination. Any such delays will be a direct result of NNBGenCo (SzC) Ltd's choice to proceed with the submission of the application for the DCO without fulfilling our guidance on the production of an adequate FRA.

Main Development Site Flood Modelling

1.4 The main area of concern is over the main development site fluvial hydrology. Some aspects of the analysis are rigorous but others are not. There are a number of shortcomings, particularly in the choice of an outdated method for flow estimation and limited use of available local data. Whilst it is possible that the overall conclusion of the FRA is unaffected by these shortcomings, it seems reasonable to expect to see a hydrological assessment that is above reproach in the case of a new nuclear development. Where shortcomings have been identified these need to be properly checked and tested using more recent hydrological methods and datasets to ensure that the conclusions of the FRA are not affected.

Sizewell Link Road Flood Modelling

1.5 There are missing elements from the hydraulic model which mean the evidence to support the FRA is lacking in the detail we would expect. It appears as though some aspects of the FRA are based on outline design rather than final designs and some aspects have not been properly considered at all. In particular crossing SW7 has not been represented in the model and therefore third party flood risk impacts cannot be properly understood. There are also some discrepancies between what is reported in the modelling report and what is represented in the hydraulic model. These should be corrected. Flood risk in the baseline and 'with crossing' scenarios has not been mapped so it's very difficult to properly understand third party impacts, particularly where there are out of bank flows such as at SW1 and SW3.

Flood Risk Main Development Site

1.6 The Main Development Site Flood Risk Assessment demonstrates that 4 residential and 6 non-residential properties will be put at an increased risk of flooding as a result of the development, with no compensatory storage or property-level mitigation provided. This increase in flood risk off-site is contrary to paragraph 5.7.16 of National Policy Statement EN-1. This is an unacceptable conclusion to draw, without at least providing assurances that these increases in flood risk can be managed / or mitigated to an appropriate level.

1.7 During the early construction phase, the existing defences will need to be removed prior to the construction of a new haul road / site flood and coastal defence structure. Coastal inundation during this phase has not been adequately assessed. The overtopping assessment, for the period when the existing defences are removed, has indicated a flood flow rate of 140.36l/s, which dangerously exceeds the recommended safety limits for people. The FRA does not address how the safety of the site, and its users, will be ensured during this period of the construction phase.

1.8 The FRA states that a Flood Risk Emergency Plan (FREP) will be in place, although no FREP has been submitted. It is therefore unknown whether the Environment Agency's Flood Warning Service will be used, or how site users will know what to do in the event of a flood, or whether safe dry access, egress and refuge is even available to help people escape from the effects of flooding. This information is required to demonstrate that site users will be safe, during both the construction and operational phases, and throughout the lifetime of the development.

Flood Risk Two Village Bypass

1.9 The FRA has assessed fluvial flood risk and demonstrated some localised areas of increased depths as a result of the proposals. Confirmation of written consent from the landowner must be included in the FRA that they accept the increased flood depth, hazard and velocity on their land in order for this to be acceptable without further mitigation as required by EN-6 3.6.16.

Flood Risk Sizewell Link Road

1.10 The final design of many aspects of the Sizewell Link Road has not yet been provided, which prevents an informed interpretation of the flood risk impacts that may be caused by this development. The Sizewell Link Road crosses water bodies at 7 locations, all of which have the potential to cause flood risk and ecological impacts. The crossings at SW7 and SW4 in particular have not been assessed due to "a lack of information collected", which is not an adequate justification. The current and post-development flood risk at these locations is therefore unknown.

1.11 As well as a lack of information about the river crossings, the FRA also lacks certain information that is fundamental in order to assess flood risk. At crossing SW1 the main river will be diverted, but flood mapping has not been provided to show the change in flood extent and channel location or design. The FRA states and concludes that the Sizewell Link Road is in Flood Zone 1, which has not been proven in the FRA. There is clear indication of flood risk near to crossings, but a map showing the extents of Flood Zones 3a, 3b and 2 based upon the hydraulic model outputs has not been provided. As the FRA does not show the road will be safe for its lifetime without increasing flood risk elsewhere, it is contrary to paragraph 5.7.3 and 5.7.16 of National Policy Statement EN1.

Water Supply

2.0 At its peak, the construction of Sizewell C will require 3.5 megalitres of water per day. East Anglia is an area of serious water stress, and it is therefore crucial that NNBGenCo (SzC) Ltd demonstrates that this quantity of water can be sustainably provided without causing a deterioration to any water body status under the Water Framework Directive (WFD). Essex and Suffolk Water (ESW) have been named in the DCO application as supplying the bulk of the required water supply to the site in the form of mains water from the Blyth Resource Zone. The availability of this water and the approach proposed is yet to be confirmed by ESW.

2.1 It is our view that currently the supply options described do not provide the detail that is necessary to provide the Examining Authority with the assurance that a sustainable source of water, that will not cause ecological harm, can be provided to the Sizewell C Project.

2.2 The Environment Agency is unable to comment at all on the likelihood of a successful water supply option being made available until ESW confirm that they have a viable means of supplying the water required to NNBGenCo (SzC) Ltd for the Sizewell C project. ESW will need to carry out an options appraisal to assess how the Sizewell C demand for water will be met, without causing deterioration to WFD status. We will expect to be consulted on any detailed options that confirm, or propose, how the water demand for this project is able to be met and any non-potable sources of water that can be used to meet supply whilst remaining ecologically sustainable.

Groundwater Modelling

3.0 Modelling has been undertaken to inform the understanding of the groundwater and surface water conditions at the site. During the pre-application stage of the Development Consent Order, the Environment Agency has undertaken a series of reviews of the model and provided advice to NNBGenCo (SZC) Ltd with the aim of ensuring that the model is a sound evidence base to inform the Environmental Impact Assessment.

3.1 The modelling work which has been submitted is broadly acceptable in its current form. However, we note that it has been updated since the DCO application was submitted and is therefore not the most up to date source of information. Through our positive, ongoing engagement with NNBGenCo (SZC) Ltd our understanding is that our recommendations have been incorporated in the final version. We therefore await the provision of the final modelling report before we can give confirmation that we have no outstanding issues or concerns.

Conventional Waste Management Strategy

4.0 Targets/KPI for waste and resource management have not been included. The Environment Agency needs to see clearly defined targets as set out in both UK and European legislation. There are generic statements on how recycling and re-use will be achieved but not target figures. Without these defined targets it is hard to see how the company /contractors will be able to measure their performance and improve upon it. Compared to the highly detailed information provided on storage, external waste management facilities, and bin sizes, it is very disappointing that the above information has not been included

Geomorphology and Coastal Processes

5.0 Environment Agency specialists have been involved in consultation with NNBGENCO (SZC) Ltd and their consultants since 2012 to guide the process of developing the Coastal Geomorphology & Hydrodynamics workstream which fed into the DCO submission. Our focus has been on ensuring that this work reflects the latest understanding of flood and erosion risk both now and throughout the lifespan of the project, as well as ensuring that the proposal takes all appropriate steps to avoid, minimise or mitigate detrimental environmental impacts.

5.1 We have reviewed the DCO and are comfortable that its conclusions are based on suitably robust data, and consider an appropriate range of plausible future scenarios with regards to the impacts of climate change. We are satisfied that any residual uncertainty associated with predicting future changes to the geomorphology of the greater Sizewell bay, as well as to key driving processes such as sea level rise and wave climate, is mitigated by NNBGENCO (SZC)'s commitment to continued engagement with the Marine Technical Forum of regulators as part of the Monitoring and Mitigation Plan. This commitment will enable collaborative working between specialists in order to closely monitor the evolution of the coastline and determine the most appropriate measures to manage any unforeseen impacts. Notwithstanding this, the following points require further clarification:

5.2 We have yet to see any detailed designs for the Hard Coastal Defence Feature. It is possible that the detailed design process may modify aspects of the Hard Coastal Defence Feature that were appraised as a high level design in the documents reviewed to date. It is not possible to undertake appraise of any potential issues until designs are complete and available for review. There remains no proposal for the removal of the Hard Coastal Defence Feature at end of life although it is acknowledged that this could only be assessed at the highest level at this stage.

Terrestrial Ecology

Main Development Site

SSSI Crossing

6.0 The proposed design of the SSSI crossing across the Leiston Beck is unacceptable because of the significant permanent direct land take from the SSSI, the impacts to ecology caused by construction of the culvert along the length of the watercourse, and the permanent habitat fragmentation that it would cause. We do not consider that a suitable alternative has been considered adequately, and we reject certain statements within the submitted reports that suggest the Environment Agency would find culverting to be acceptable without further evidence of environmental suitability or compensation.

6.1 The culvert and embankment design has high direct land take - at 0.40ha - and is more than double the land take of a three span bridge option at 0.19ha. We cannot conclude that the culvert design proposed (70m in length with a cross sectional area of 22m^2) will allow for the movement of otter, water vole, aquatic and terrestrial invertebrates, and fish. This culvert could prevent the upstream and downstream migration of numerous species either side of this significant structure approximately halfway along the river, and its associated SSSI designated habitat.

6.2 This will lead to fragmentation of sensitive habitats and the isolation of species populations, some of which are not resilient to this kind of impact and will be significantly less resilient to future impacts. Choosing this approach to site access may well lead to a detrimental population decline in this area for several important species.

6.3 The choice of a culvert is contrary to Environment Agency expectations that watercourses should be crossed by means other than culverts wherever a practical and viable alternative may exist, due to the flood risk implications that culverts present and the overwhelming evidence that they cause harm to the delicate balance of ecosystems that reside within, and along, the watercourse into which the culvert may be placed.

Compensation Areas

6.4 The existing newly constructed habitat area created at Aldhurst Farm is not functionally linked to the Sizewell Marshes SSSI for water vole and otter because the existing and sub-standard culvert crossing underneath Lovers Lane has not been upgraded to facilitate the movement of these, or any, species between the existing SSSI and this newly created habitat. Nor does the DCO application contain any proposal to do so.

6.5 It is our view that the habitat area originally created at Aldhurst Farm was only ever intended as a means of compensation for SSSI habitat lost due to the proposed footprint of the Sizewell C power station. The habitat originally created does not adequately compensate for the loss of the Leiston Beck watercourse along the length of a 70m culvert, the SSSI destroyed due to the associated causeway crossing, nor does it provide the appropriate connection to wet woodland habitat for invertebrate species.

6.6 The DCO application maintains that the Aldhurst Farm habitat creation scheme provides adequate compensation for this site access causeway crossing proposal. It is our view that this was never assessed as part of the original proposal for the habitat creation scheme and that the only SSSI loss that the Aldhurst Farm project was aiming to compensate for was that lost due to the SSSI destroyed through the land take associated with the platform construction in the north-east corner of the SSSI land (north-west corner of the Sizewell C site). At the time of the planning application for Aldhurst Farm the proposals for the method by which access to the site would be gained were not sufficiently advanced to know that the eventual proposal would be the culvert and causeway. Options were still being presented, some of which would have been far less harmful, necessitating far less compensation. Our discussions at the time of the Aldhurst Farm planning application never referred to the SSSI crossing, only the footprint losses. If there is adequate compensation provided at Aldhurst Farm to offset the SSSI crossing proposal, it has never been demonstrated to us.

Summary of Impacts on Protected Species and Habitats

6.7 **Otter:** no evidence has been provided that demonstrates a culvert of the dimensions proposed to cross the Leiston Beck would facilitate the passage of otters (protected species, Wildlife and Countryside Act 1981). Some reports

indicate that otters will be reluctant to use culverts over 50m in length (Otter Report, Jacobs 2007).

6.8 **Water vole:** No evidence has been provided that demonstrates a culvert of the dimensions proposed to cross the Leiston Beck would facilitate the passage of water voles (protected species W&C act 1981).

6.9 The Aldhurst Farm habitat creation area will remain isolated from the Sizewell Belts and Sizewell Marshes SSSI, significantly reducing the function as compensatory habitat unless the Lovers Lane culvert crossing is improved to facilitate mammal passage into that area. This area will also be impacted by noise impacts during the construction phase.

6.10 **Invertebrates:** The Sizewell Marshes SSSI is designated for its invertebrate fauna. The location of the proposed culvert crossing across the Leiston Beck in compartment 1 includes protected, rare and threatened species. Upstream dispersal of aquatic invertebrates will not be possible through an un-vegetated, dark culvert 70m in length. Most insects whose larvae develop in freshwater use polarization of light reflected from water for navigation (positive polarotaxis). These species will not go through a culvert of these dimensions for this reason, they will either turn back, or if they attempt to travel over the top of the culvert and road, may travel along the course of the road instead of the watercourse and attempt to lay their eggs upon the road surface, this is because they are deceived by artificial surfaces particularly roads which omit polarized light pollution. Published evidence of these issues is available (Blakely et al 2006, Kriska et al 2009, Malik et al 2010, Malnas 2011).

6.11 Wet woodland compensation needs to be of an appropriate size to replace the loss of this habitat from the development, and it needs to be functionally linked to fen and ditch habitats if it is to be successful at compensating for the loss of this habitat for the associated invertebrate species which use it. This has not been demonstrated within the submitted reports.

6.12 **Fish:** No evidence has been provided that demonstrates a culvert of the dimensions proposed to cross the Leiston Beck would facilitate the passage of fish along this watercourse. Culverts can inhibit fish movement as the abrupt change in light and extended length of dark, un-vegetated and featureless watercourse is known to prevent fish movement. This can lead to large scale fish mortality when fish are prevented from moving along a watercourse during events when water quality is reduced to a critical level, such as algal blooms, or pollution events.

Sizewell Link Road

6.13 The Sizewell Link Road crosses seven watercourses, two of which are main rivers. None have been identified or taken forward as important ecological features. No assessment of the impact to or loss of watercourses has been provided. Mitigation and compensation has not been proposed for the impact to these features. Potential impacts to the water quality of watercourses from construction and operation have not been discussed. These are basic components of an Environmental Statement that the applicant has neglected to

undertake, despite the Environment Agency having provided comprehensive pre-application guidance on this matter.

Watercourses in the development:

6.14 Watercourses are important linear features of the landscape and important migratory routes for wildlife, including protected species such as the otter, they should be maintained as continuous corridors to maximise their benefits to biodiversity. We require an assessment of the impact to watercourses including the total loss of watercourses as a result of the development. No mitigation or compensation has been proposed for the impact to these features. We require as a minimum no net loss of watercourses through development and safe mammal passage to be provided.

6.15 **Otters:** Otters are likely to forage along the watercourses impacted by this development at certain times of the year, particularly juveniles and females with cubs who use smaller watercourses as dispersal routes. Detailed mitigation is required.

Biodiversity net gain:

6.16 Opportunities exist to provide clearer net gain and greater enhancements for the biodiversity affected by this development, this includes effective mitigation/compensation for the loss of all habitats such as watercourses, and the design of features like infiltration basins to maximise the benefit to amphibians, invertebrates and reptiles.

Two Village Bypass

6.17 We are unable to conclude potential impact to floodplain grazing marsh (NERC Section 41 Priority Habitat). Mitigation or compensation for the permanent loss of 2.91ha of floodplain grazing marsh and the temporary loss of 3.91ha of this habitat has not been proposed. We require confirmation that inundation of this floodplain marsh cannot be improved by widening of the bridge crossing or by including additional flood relief culverts.

6.18 Loss of watercourses including 130m of ditch to be culverted and 343m of ditch affected by development has not been mitigated/compensated for. Confirmation is needed that the proposed mammal ledges and culvert passes through the embankment will function as intended during all elevated flow events. Commitment to biodiversity net gain does not appear clearly demonstrated, opportunities to provide greater net gain have not been incorporated in some aspects of this development.

Floodplain grazing meadow:

6.19 No mitigation or compensation has been proposed for the permanent loss of 2.91ha of floodplain grazing marsh and the temporary loss of 3.91ha of grazing marsh. Insufficient National Vegetation Classification surveys have been undertaken to determine potential impacts from, no floodplain grazing marsh surveys have been undertaken downstream of the proposed crossing, upstream grazing marsh surveys and upstream/downstream watercourse surveys are limited to one survey undertaken in June 2019. We require

confirmation that inundation of this floodplain marsh cannot be improved by widening of the bridge crossing or by including additional flood relief culverts.

Loss of watercourses:

6.20 Loss of watercourses including 130m of ditch to be culverted and 343m of ditch affected by development has not been mitigated/compensated for. We require that at a minimum there should be no net loss of ditches. There is potential for sections of re-routed ditch to be designed to be of maximum benefit to biodiversity. There is also potential for improving the quality of some of the existing ditch network, for example by making it more suitable for water vole.

Mammal passage:

6.21 We require full design details and confirmation that the proposed mammal ledges and passes included as mitigation in the design to cross the River Alde and its floodplain, and other watercourses are sufficient to allow mammal migration during all periods of elevated flow. Monitoring the effectiveness of mammal mitigation is required.

Invertebrates:

6.22 Assessment of the potential impact to invertebrates that use positive polarotaxis to navigate watercourses has not been provided. Culverts and embankments have been proposed to cross the minor watercourses and this could impact invertebrate migration.

Floodplain compensation areas:

6.23 If these areas are needed then they may result in additional adverse impacts on habitats of nature conservation importance, including the ditches and grazing marsh. However, if appropriately designed there may also be opportunities for their design to include habitats which are of biodiversity value. Any required flood compensation areas must be designed to minimise impacts to ditches and watercourses to avoid interfering with suitable otter and water vole habitat. The banks of the River Alde and the associated ditches must be protected during construction of any flood compensation areas.

Biodiversity net gain:

6.24 Opportunities exist to provide clearer net gain and greater enhancements for the biodiversity affected by this development, this includes effective mitigation or compensation for the loss of all habitats such as functional floodplain and watercourses, the creation of additional ponds for amphibians, invertebrates and reptiles and enhanced habitat for water voles on the remaining ditch network.

Marine Ecology

7.0 A number of scientific papers that are referenced within, and which underpin the marine ecology chapters have not been provided with the DCO application

or made available to the Environment Agency outside of the consultation. We have received other papers and reports that have been partially revised and submitted to the Environment Agency as drafts. We consider it essential that these reports are submitted as part of the DCO application to enable validation of the conclusions made in the Environmental Statement.

7.1 At present, the Environment Agency still has concerns over some methods being used to assess impacts to marine ecology at Sizewell C. We cannot currently agree the estimated numbers of fish and other biota predicted to be impinged at Sizewell C, or the degree of mitigation offered by the proposed SZC intake design, or agree the significance of those losses – as set out in the marine ecology chapter, its appendices and the WFD assessment.

Fish and other marine biota impingement estimates

7.2 The Environment Agency has received further updated reports from the applicant which changes the methods that have been used to predict numbers of fish that will be impinged at Sizewell C. Given the inconsistencies resulting from methodological changes that have been made after submission, and concerns over some of the methods being used, we cannot agree with the estimated numbers of fish and other biota to be impinged at Sizewell C.

7.3 The estimated numbers of fish impinged at Sizewell B is one component used to help calculate the likely impingement at Sizewell C. TR339 (v2) reports that the statistical method now being used to predict the average annual impingement of fish (with confidence limits) at Sizewell B (bootstrapping) differs from that used in the DCO submission (zero inflated negative binomial).

7.4 Further to this, when scaling up from Sizewell B to Sizewell C a correction factor is used to account for the differing design of the intake heads (the LVSE factor). SPP099 uses a revised method to calculate an LVSE factor of 0.357 which differs from that used in the DCO submission (0.383). The result of both of these methodological changes is that the predicted numbers for annual impingement contained within the DCO are no longer current and have been superseded. This means that Appendix 22i and Chapter 22 of the Environmental Statement (Marine Ecology), WFD Assessment and the shadow HRA must now be updated to include the latest modelling. Once this is undertaken we will further be able to offer advice on impacts of impingement of fish and other biota.

Potential Impacts on fish populations

7.5 Potential impacts on fish populations have been assessed by expressing entrapment losses in terms of numbers of adult equivalents and then comparing these to population measures, such as Spawning Stock Biomass, numbers of fish, or fishery catch data.

7.6 The method used to calculate an equivalent adult value (EAV) for fish species calculates how many fish would have been expected to survive to the age of maturity. However, for many species spawning can take place for multiple years after the age of maturity. The applicant's method does not take into account the repeat spawning potential of fish. Without robustly considering the potential for repeat spawning, the impact of fish entrapment mortality may be

underestimated. This could lead to ecological harm and potentially adverse impacts to marine ecology, Water Framework Directive water bodies and integrity of designated sites.

7.7 The Environment Agency has developed and shared with NNB GenCo (SzC) an extension to their method which takes repeat spawning into account. We consider that further assessment needs to be undertaken within the DCO to consider the potential for repeat spawning.

7.8 In addition, we also have concerns over the appropriateness of the scale of assessment used for some species. Using too large a scale of assessment may underestimate the potential impacts.

7.9 Many species have been assessed against ICES (International Council for the Exploration of the Sea) population estimates of Spawning Stock Biomass (SSB), which are designed to help in the management of commercial fisheries. Fisheries stocks however can be made up of smaller, biological sub-populations showing site fidelity to particular spawning grounds and adults that do not necessarily range over the entire ICES fishery stock area. We consider in some cases smaller scales of assessment would be more appropriate for use in EIA, the HRA and WFD assessment.

Degree of Mitigation Offered

7.10 We consider that further robust consideration of repulsive technologies should be included in the ES to ensure mitigation for fish impingement in line with environmental best practice and to provide greater assurance on the efficacy of the Low Velocity Side Entry (LVSE) intake as a mitigation solution in itself.

7.11 Fish deterrent devices such as Acoustic Fish Deterrents (AFD) are insufficiently evaluated and suitable detailed evidence is not provided as to why the logistical and safety considerations preclude the deployment of AFDs at Sizewell C.

7.12 Fish deterrent devices such as AFD are considered one of those mitigation methods that could be implemented as best practice in line with Environment Agency guidance. The application states that fish population impacts and the subsequent assessments of biota discharged are precautionary because the LVSE will reduce impingement number further. There is insufficient evidence however that LVSE would be effective without the addition of fish repulsion devices. In addition, we have further concerns that if no deterrent is in place then the LVSE may actually operate as a reef feature attracting fish.

Water Framework Directive Assessment

8.0 The Environment Agency are concerned that a number of the proposals may lead to a deterioration under the Water Framework Directive (WFD). If a deterioration in waterbody status cannot be ruled out an exemption will be required in accordance with Article 4.7 of the WFD and the applicant has not made a case to support this. Further information is required to assess the following issues:

Water Supply

8.1 As highlighted in our water supply comments, the supply options described do not provide sufficient detail to give assurance that a source of water can be provided to the Sizewell C Project.

8.2 Some options could place a large additional demand on the groundwater levels in this area and could lead to detrimental WFD impacts that needs to be assessed. We require submission of detailed options confirming how the water demand is going to be met and assessed within the WFD assessment.

Invertebrates in the Leiston Beck water body:

8.4 The Sizewell Marshes SSSI is designated for its invertebrate fauna and the Leiston Beck is currently classified at good ecological potential for invertebrates. The Leiston Beck is 4.3km in length and the proposed SSSI crossing is approximately 2km upstream of its confluence with the Minsmere River. The location of the proposed culvert crossing across the Leiston Beck in compartment 1 includes protected, rare and threatened invertebrate species.

8.5 Upstream dispersal of aquatic invertebrates will not be possible through an un-vegetated, dark culvert 70m in length. Most insects whose larvae develop in freshwater use polarization of light reflected from water for navigation (positive polarotaxis). Published evidence indicates these species will not go through a culvert of these dimensions for this reason, they will either turn back, or if they attempt to travel over the top of the culvert and road, may travel along the course of the road instead of the watercourse and attempt to oviposition upon the road surface, this is because they are deceived by artificial surfaces particularly roads which omit polarized light pollution. Numerous publications evidence these issues (Blakely et al 2006, Kriska et al 2009, Malik et al 2010, Manas et al 2011). We are unable to conclude that a potential for deterioration for invertebrates does not exist in this water body as a result of the proposed design. We believe a widespan bridge crossing could instead significantly reduce this impact.

Fish in the Ore/Alde waterbody

8.6 The Environment Agency is concerned that the impacts of entrapment during cooling water abstraction may cause a deterioration to the fish element in the transitional and coastal Ore & Alde waterbody and possibly also the Blyth waterbody. The species of greatest concern is the smelt *Osmerus eperlanus* - a key indicator species under the WFD (and also a biodiversity action plan (BAP) species). A reduction in other fish species which feature in the Ore & Alde waterbody could also contribute to a deterioration in this waterbody.

8.7 To assess a potential impact to a WFD waterbody the scale of assessment may need to be done at a smaller scale. Fish in transitional waters are assessed under the WFD at an estuary size scale. So, as with HRA, the scale at ICES fisheries stock level is not readily applicable to understanding impacts to some species at a waterbody level.

8.8 Further evidence is required that demonstrates that the migration of key fish species (including smelt) from a wider stock outside of the Ore/Alde population would prevent the deterioration of those species within this waterbody. If this is not the case we are concerned that there would be a population decline in this waterbody caused by the exploitation of those species, including from Sizewell C in combination with Sizewell B for the period when both stations are operational. In the absence of this evidence we the use of require a smaller stock comparator against which to assess the likely impact.

8.9 In addition, we also have concerns that key fish species, migrations (including smelt) past the Sizewell location may be impacted by the thermal plume. It is unclear if avoidance of some areas experiencing elevated temperatures as a result of the plume may reduce migration success. Increased energy expenditure as a result of avoiding the plume prior to a migration run may also negatively affect reproduction success in the adjoining waterbodies. The effects of the thermal plume will be determined by the Water Discharge Activity permitting process.

Fish entrapment and LVSE Design

8.10 As described in our marine ecology comments, the Environment Agency has concerns over some methods being used to calculate the numbers of fish and biota being entrapped and discharged from the fish return and recovery system (FRR). The LVSE intake design and the reduction factor used to calculate fish impingement are being reviewed. On this basis we cannot agree the impacts described in the WFD assessment at Sizewell C.

Appropriateness of the stock areas being used for some fish species.

8.11 We disagree with the appropriateness of the stock areas being used to assess potential impacts to certain species at a WFD water body level. In addition to smelt we also have concerns over the stock areas being applied for some marine migrant species which feature in the Ore/Alde. We are currently unable to accept that the stock areas proposed by the applicant are acceptable in terms of detecting a potential for deterioration under the WFD.

Cumulative effect assessment:

8.12 We are not able to reach a conclusion on the cumulative effect within the Sizewell C project or with other projects as some of the information described or expected to have been submitted has not been provided. Further detail is provided in Appendix A.

Habitats Regulations Assessment

9.0 As highlighted the Environment Agency have received Environmental Permit applications for the operational cooling Water Discharge Activity (WDA), Radioactive Substances Regulation (RSR) discharges and Combustion Cctivity (CA) permits. These permit determinations will also require an assessment under the Habitats Regulations, which will consider proposed activities within

the project, and in-combination with other projects, and possible cumulative impacts on designated species – or features – as a result of potential pollutions.

9.1 For the purposes of the DCO HRA, our main remit is with regard to diadromous fish, species that migrate between freshwater and marine habitats. We consider that indirect effects have not been addressed for all appropriate bird species. While effects on seabirds via their prey have been considered, there may be routes by which non-seabird species may be impacted. For example, breeding bittern [redacted] as well as breeding and non-breeding avocet [redacted]. These features have specific objectives for 'supporting habitat: food availability' which requires the maintenance of the distribution, abundance and availability of key food and prey items. For avocet, prey items include marine invertebrates as well as gobies whilst for bittern, prey items include eel. Gobies and eel are both predicted to be entrapped at Sizewell C and so there is a pathway by which these features could be impacted.

9.2 We consider that insufficient Natura 2000 sites have been selected with regard to potential losses of allis shad. Allis shad appear to have been screened out of consideration due to low predicted impingement at Sizewell C although this is not explicitly stated. Potential losses of allis shad are compared to the distant Garonne population. However, the Plymouth Sound and Estuaries SAC is closer to the site and has a spawning population of allis shad present, with monitoring data available for spawning runs. In addition to this population, allis shad are also known from northern France. We have received further explanation regarding the scale of assessment for allis shad in and additional document from the applicant which did not form part of the DCO application, SPP103 'Consideration of potential effects on selected features at Sizewell' and although impingement predictions are low, we still are of the view that further designated sites may need to be considered.

9.3 We consider that insufficient Natura 2000 sites have been selected with regard to potential losses of twaite shad. The applicant intends to share further information on twaite shad populations in report SPP100 'Estimates of European populations of twaite shad and cucumber smelt of relevance to Sizewell', but this document has not yet been received and is not included in documents submitted as part of the DCO application. Twaite shad losses are compared to a 'southern North Sea population' however, telemetry data from the Unlocking the Severn project has shown a high degree of site fidelity in returning fish. As such, it may be more appropriate to treat rivers as individual populations, rather than there being a wider North Sea population. In order for assessments to be sufficiently precautionary, there may be a need for entrapment losses to be assessed in turn against individual river populations rather than pooling all river populations into a single southern North Sea stock. There appear to be European sites which may be functionally linked to Greater Sizewell Bay that have not been considered in the assessment, for example, the Seine Estuary.

9.4 We consider that insufficient Natura 2000 sites have been selected with regard to potential losses of river lampreys. Losses have been assessed against estimated spawning migration run sizes for the Humber SAC. However, there

also appear to be mainland European Natura 2000 sites for which river lamprey are features, such as the Scheldt estuary, but potential losses to these SACs do not seem to be assessed in the same way.

Eel Regulations Assessment

10.0 Eels are a critically endangered species and the decline in eel stocks is an international concern. In 2007, the European Union adopted a Council Regulation which charged the UK and other member states to take specific actions. Defra brought in our own domestic legislation “the Eels (England and Wales) Regulations 2009”, for which the Environment Agency is the competent authority. The Eel Regulations 2009 gave us new powers to protect eels from exploitation and entrainment and require improvements in passage to assist their migration over barriers and weirs.

10.1 We have be unable to conclude the significance of impacts to eels or confirm compliance with the Eel Regulations 2009for some aspects of the proposed development for the reasons listed below.

10.2 We are pleased to see commitment from the company to ongoing monitoring of the impact to eels if Sizewell C becomes operational and for the commitment to additional mitigation or compensation if deemed necessary.

LVSE intake head design

10.3 A review of the proposed LVSE design and its ability to reduce the number of impinged fish is currently being undertaken by the Environment Agency. We are currently not able to conclude that the impact has been reduced as described by the applicant.

Glass eel entrainment predictions

10.4 Glass eel specific surveys were only conducted for 1 year, additional data indicates they took place too early in the year for this location and they did not include all of the variables that could influence glass eel movements at this location, such as monitoring in dark conditions (at night) and monitoring at different stages of the lunar cycle. Data from nearby glass eel monitoring stations also demonstrate that glass eel migrations numbers are highly variable in this area and that double the number of glass eels were recorded in the previous year for this location.

Worst case predicted glass eel entrainment

10.5 BEEMS SPP104 uses data that is not a population estimate and extrapolates this information to provide a worst case eel entrainment figure. Night time migration calculation is not used in the worst case calculation, some figures

appear to be incorrectly titled or incorrect, and other figures are used without sufficient explanation, the assessment does not include numbers of glass eels for all months that migration occurs, mean impingement numbers have been used rather than upper limits for total entrapment calculation. Whilst this provides a useful scenario to consider, this assessment is not considered a worst case and does not provide full clarification on the potential number of glass eels present or their vulnerability to entrainment at the location of the Sizewell C intakes.

Entrainment Mimic Unit (EMU) experiments

10.6 BEEMS TR395 did not include pressure change or condition chemicals such as hydrazine. Temperature should represent the expected temperatures at Sizewell C during June-July when peak migration can occur. A more precautionary mortality rate is required in the absence of a comprehensive experiment.

10.7 It is not possible to conclude what effect a passage through the SZC cooling water loop will have on glass eel survival. Experiments should include replication of passage through a 3km pipe, pressure change, trauma associated with passage through a pump, temperature uplift representative of SZC peak migration period, exposure to the full range of chemicals to be used at SZC, second passage through a 3km pipe and second pressure change prior to discharge at the outfall. It will not be possible to assess the cumulative impact of these traumas on glass eels if they are not all incorporated. The worst case survival prediction must be provided.

Eel Stocks on the east coast

10.8 The importance of eel stocks on the east coast and in the waterbodies around Sizewell has generally been dismissed, eels are an important species on the east coast and provide a valuable source of food for several important features in the area, such as bittern and otter. Another notable fact of the east coast eel stock is that female eels make up a significantly higher proportion of the stock.

Safe passage for eels as required under part 4 of the regulations

10.9 No details of water level control structures and incorporated eel passes have been provided. Any structure and associated eel pass will need to be approved by the Environment Agency prior to the commencement of any work. Ongoing monitoring will be required to assess the effectiveness of any eel pass. Dewatering operations and the use of pumps needs to ensure that eels cannot be entrained, screening will be required to prevent the entrainment of eels if a risk exists.

Alignment between Environmental Permits and Development Consent Order Process

11.1 NNB GenCo (SzC) has submitted the operational water discharge activity (WDA), RSR activity and combustion activity permit applications to the Environment Agency at the same time as submitting the application for the DCO to the Examining Authority. We had advised NNB GenCo (SzC) that Planning Inspectorate advice note 7[1], recommends that applications for permits for development with novel technology, or with expected complex Habitats Regulations Assessments (HRA) should be submitted 6 months before the DCO, to ensure any examination can be informed by permitting assessments.

11.2 The WDA permit application determination will consider the potential for pollution as a result of heated water, process chemicals and dead fish and biota. It's therefore relevant to both the WDA permit and DCO applications that an assessment of biota entrapment and mortality is presented in both applications. The permit application determination will also require an in-combination assessment for Habitats Regulations, which will consider proposed activities within the project, and in-combination with other plans and projects, and possible cumulative impacts on designated species – or features – as a result of potential pollutions. In addition, as the competent authority for Water Framework Directive (WFD) when considering the permit application we will consider if the proposals would result in a deterioration in transitional (estuarine) and river water bodies.

11.3 Due to the submission of permit applications and DCO at the same time and because of the complexity of RSR permit application determination process and the direct cooling discharge assessment, associated HRA and WFD assessments, it is possible that we will not be able to publish our draft decisions on the environmental permits before the Sizewell C DCO examination closes. We therefore wouldn't be able to advise the Examining Authority of our position on the permits, or provide representations on any matters covered by that permit, at a time that would allow these decisions (and any recommendations that we may make from them) to be taken into account in the Examining Authority recommendation to the Secretary of State for BEIS.

11.4 If during the permit determination we disagree with assessment methods that have been used, we may decide that we would calculate our own predictions, and this may be especially the case for biota entrapment and mortality. Our comments relating to marine ecology and WFD above highlight the concerns with the methods currently presented within the DCO application. Our methods therefore may differ from those submitted by NNB GenCo (SzC) in the DCO application. During Appropriate Assessment and WFD assessment this may

[1] [redacted]

lead to differences in conclusions as to whether ecological and/or environmental impacts are likely, and what could be done to mitigate for these.

11.5 As the competent authority for WFD we may also require the incorporation of measures to reduce, or mitigate for potential environmental impacts, or potential loss of fish that could otherwise result in a deterioration in the fish element of transitional (estuarine) and river water bodies. We wish to highlight at this time that it may be unlikely that the scope of our powers would allow such protective measures to be written into a permit. Therefore we may have reliance upon the DCO to secure such measures.

Appendix A: Response to DCO

To help you, where possible, we have laid out our comments in the following format:
Issue – indicating a particular area of concern;
Comment – which discusses that issue in greater detail and the potential impact;
Suggested solution – which presents a potential solution to the issue in the form of information, or evidence that - if provided - might ensure that no adverse impact will arise, or identifies a potential mitigation measure for you to consider.

Document Title	Paragraph number	Issue	Comment	Suggested solution
Flood Risk – Main Development Site				
Sizewell C Main Development Site FRA	General comment	The FRA must show that site users will have safe dry access to and from the site in fluvial & tidal flood events, but access/egress, refuge and flood warning and evacuation are not discussed in detail. This is contrary to paragraph 5.7.5 of National Policy Statement EN-1. Appendix D of the EA & ONR Joint Advice Note (July 2017) states that Safe assess /egress must be provided in the 0.5% tidal flood and 1% fluvial flood with an allowance for climate change. A safe means of escape (or sufficient time available) must be provided up to the 0.1% fluvial and tidal event.	NNBGenCo (SzC) Ltd has stated an intention is to develop a Flood Risk Emergency Plan (FREP) post-DCO stage, which will be informed by emerging information regarding construction phasing and operations. However, this information is required in order to demonstrate that workers and users of the site will be safe during the construction and operation phases. It is unknown whether the site will use the Environment Agency's Flood Warning Service, how site users will know what to do in the event of a flood, when evacuation should occur, whether there is safe dry access, egress and refuge available, or what the flood hazard presented to site users would be.	Provide further information on the flood warning and evacuation procedures to demonstrate that the proposed development can be made safe for people both during construction and operation. This Flood Response Plan should be informed by the hazards posed to people using the site and the phasing of construction activities, as well as ongoing operational activities throughout the lifetime of development. Please refer to guidance on Flood Risk Emergency Plans for New Development Also refer to the standards set out in Appendix D of the EA & ONR Joint Advice Note (July 2017) to ensure people on site are safe in the event of a flood. We will object where these are not met.

Document Title	Paragraph number	Issue	Comment	Suggested solution
Sizewell C Main Development Site Fluvial Model Update Report & Appendix C, D & E.	MDS FRA 11.3.8, 12.7.19-12.7.22 and Fluvial Model Update Report 8.1.9	The Fluvial Flood Risk Assessment has established that the hazard rating category for 4 residential properties will be increased as a result of the proposed development. Modelling shows the development will increase flood risk elsewhere which is contrary to paragraph 5.7.16 of National Policy Statement EN-1.	The fluvial modelling results confirm that the change in the maximum water levels within the Minsmere catchment area is less than 15mm for all the considered scenarios, including 100-year and 1,000-year events with 65% and 80% climate change allowances. the number of residential properties at risk of fluvial flooding does not increase as a result of the scheme, the hazard rating which 4 of these residential properties could experience will be increased (in 1% with 35%climate change event). There is inconsistency within the FRA as to whether the flood hazard rating increases from 'Danger to Some' to 'Danger to Most' or from 'Danger to Most' to 'Danger to All'.	Investigate whether the provision of compensatory flood storage could mitigate this increased fluvial flood risk. Threshold survey data could inform of specific nature of anticipated flood risk (e.g. internal flooding). Adequate mitigation and compensation should be provided to ensure the development does not increase flood risk to property.
Sizewell C Main Development Site Fluvial Model Update Report & Appendix C, D & E.	Tables 6.2 and 6.3, Plates 6.14-6.20, Table 6.5	The FRA has identified that, as a result of the proposals, an additional 5/6 non-residential properties will be at risk of fluvial flooding, which currently are not. Modelling shows the development will increase flood risk elsewhere which is contrary to paragraph 5.7.16 of National Policy Statement EN-1.	Reference to Tables 6.2 and 6.3 clearly show that the scheme could result in an additional 5 non-residential properties at risk in all return period events, from the 5year to the 1000 year event, with 6 additional non-residential properties at risk in the 1000year with the higher 65% and 80% climate change allowances. The location of the properties at risk is not made clear. The FRA appears to excuse this increased flood risk to non-residential property as being within the Very Low hazard category (as the increase in peak flood level is less than 0.1m). However, the inclusion of these properties within the flood outlines constitutes	Investigate whether the provision of mitigation measures, including compensatory flood storage could mitigate this increased fluvial flood risk. Threshold survey data could inform of specific nature of anticipated flood risk (e.g. internal flooding). Adequate mitigation should be provided to ensure the development does not increase flood risk to property.

Document Title	Paragraph number	Issue	Comment	Suggested solution
			an increased flood risk to people and property.	
Sizewell C Main Development Site FRA	11.3.13, 11.3.6, 11.3.8 & 11.3.9	FRA has demonstrated an increased change in off-site fluvial flood risk to both residential and non-residential properties as a result of the development. Yet, compensatory flood storage has not been provided. There is no clear and justified explanation for this. FRA states that EA confirmed that compensatory storage is not usually required where change in flood depth is less than 30mm, which is inaccurate.	Generally 30mm is a small change but the consequence of this change must still be assessed in the FRA to confirm this. The FRA has identified that the change in fluvial flood risk as a result of the scheme will result in the flood hazard rating increasing for 4 residential properties for the 1% with 35% climate change. This therefore confirms that the scheme is anticipated to increase the fluvial flood risk to 4 residential properties, with at least one of these becoming considered dangerous for most users. It is not acceptable to increase flood risk to people or properties. Paragraph 11.3.9 also states that the scheme will result in an increase in flood risk to 5/6 non-residential properties. Flood depths are assessed to be between 5 and 8mm with low velocities. However, this is still a greater number of properties at risk as a direct result of the scheme.	The evidence submitted demonstrates that the off-site fluvial flood risk will be increased as a result of the scheme. Compensatory flood storage or other means of mitigation should be investigated to determine whether this would mitigate against this increased risk.
Sizewell C Main Development Site FRA	General and 7.1.12 & 7.2.9, Table 7.4 & 7.1.29 7.1.20	There is a lack of clarity over the proposed sequencing of the early construction phases, which has implications for assessing the flood risks posed from overtopping of the defences during the construction phases.	The existing defences will be removed prior to construction of a new haul road/defence. It is not made clear how long this phase will take, or the time of year etc. No detail regarding the proposed design or construction of the temporary haul road has been provided. Throughout this phase, the crest level is anticipated to be as low as 4.36mAOD. The overtopping assessment has indicated rate of 140.36l/s during this stage. This is not within safe threshold limits. The FRA has not fully assessed what this means for the safety of the	Clarify the following issues within the FRA: What are the implications of this rate of overtopping. How might the temporary lowering of the defences impact on flood extents and receptors? What are the risks to the site itself and to the ongoing construction works across the site area? How could these risks be managed?

Document Title	Paragraph number	Issue	Comment	Suggested solution
			site and its users during this early construction phase (depth, extent, duration, velocity, and hazard). NNBGENCO (SZC) Ltd have commented that they will address this post DCO, as a better understanding of sequencing and inundation modelling for construction phase is developed, alongside the FREP. Works to remove existing defences are also likely to require an environmental permit. On the basis of the FRA at the current time, it is therefore not clear how, or whether, this level of risk from overtopping can be managed.	
Sizewell C Main Development Site FRA	8.1.11, Table 8.2 & 8.2.7, 8.3.10	The temporary SSSI crossing during construction will be at risk of fluvial flooding and also coastal flooding in the 0.1% event as the existing defences are inundated, and also during a breach flood event.	The risk of fluvial flooding for the area of the temporary SSSI crossing is unclear. 8.3.10 indicates that the levels of the proposed temporary crossing are unknown, but that these should be set above 2.0mAOD in order that the road would remain dry from fluvial flooding (1 in 100yr +25% level 1.86mAOD). However, there is no assessment of the potential implications of fluvial flood risk on the construction site itself, nor for the safety of the construction workers. Para 8.1.13 states a 0.1% still water level of 4.35mAOD, which is above the shingle crest. This is below the level of the proposed haul road (7.3mAOD). However, there will be a period of risk during the early construction phase BEFORE completion of the haul road. For a period of time where this risk will be real and there will be no defences in place. What impacts would this event have at this time and how will this risk be managed?	Explain the fluvial and coastal flood risk posed to the temporary crossing and people using it, for both the risk of fluvial flooding or coastal inundation during the early construction phase, and also in the event of a breach occurring. Ensure there is a safe access/egress or a safe means of escape. Detail how this would be implemented and how people on site will know when to evacuate or stop work. A breach flood can occur without warning.

Document Title	Paragraph number	Issue	Comment	Suggested solution
Sizewell C Main Development Site FRA	11.2.6	FRA identifies a change in flood risk associated with a breach at Tank Traps, and attempts a description of the impacts of this change, however references a Table (8.2), the data in which does not appear to be consistent with the description.	Any change in flood risk (either increased or reduction) must be clearly identified in the FRA with maps, plates or figures so it is clear to the reader what the impact of the development is. This must then be assessed in detail (depth, hazard, velocity) and the results interpreted for the receptors affected. What is the consequence of this change in flood risk? For example if an area is already at risk of flooding in a breach to significant depths additional flooding which does not increase the hazard to people could be acceptable. If there are new areas flooded that were not flooded before this would be a more significant consequence. The receptors in this area would then need to be identified to determine if this change is significant.	Provide full assessment of change in off-site flood risk in a breach. Clearly show change in depth, hazard and velocity and identify key areas where the impact is felt. Assess the consequence of this change to the receptors present. This also applies to offsite flood risk as result of the development for tidal overtopping and fluvial flood risk.
Sizewell C Main Development Site FRA	7.2.16, Tables 7.5, 7.6 and 7.7	There is detailed assessment of the depth, hazard, velocity and time until inundation on the platform in the event of a breach at: 1).Tank Traps (Table 7.5; during the construction phase, prior to raising of the platform area and construction of the new defences), 2). the main defence (Table 7.6 and 7.7 during the operational epoch and beyond).	7.2.7 and Table 7.5 show the depth, velocity and hazard of a breach at tank traps in 2030 and 2190. There is no information on how this risk (which at some points/locations indicates Danger for Most/All) shall be managed (including main platform 2030 in 0.5%/0.1% events, which would present a risk during the early construction phase, prior to raising of the platform area). Breach in main HCFD in 2140 (worst case credible maximum) results in flooding to MPlatform, 7.2.27 indicates 70mm-170mm of internal flooding for up to 3hours. The FRA (7.2.25-7.2.26) mentions forecasting, warning, suspension of operations and a flood emergency plan, although there is no detail to	The FRA must be updated to show how the risk to people will be managed.

Document Title	Paragraph number	Issue	Comment	Suggested solution
			indicate that this could act as a means of keeping people safe.	
Sizewell C Main Development Site FRA	Fig 33, 9.2.13 and Fig 56 and 9.3.3	Water Management Zone 1 basin is shown to be at fluvial risk in the 1000yr (and to a lesser extent the 200yr) extent in the baseline scenario, however, in the with scheme mapping, the proposed basin acts as the boundary for the flood extent.	The proposals should be made clear. Will proposed raised embankments create the boundaries of the flood extents? If so, the updated flood extents must be demonstrated. Figure 56 indicates that this location would be inundated in the future 100year flood events, based upon upper end and credible maximum scenarios.	Provide plates and figures showing flood risk and the construction site location. Illustrate the flood risk for the areas of the construction site that are at risk (depth, hazard & velocity). Confirm mitigation measures if required.
Sizewell C Main Development Site FRA	General comment	The FRA must show that site users will have safe dry access to and from the site in fluvial & tidal flood events, but access/egress, refuge and flood warning and evacuation are not discussed in detail. This is contrary to paragraph 5.7.5 of National Policy Statement EN-1. Appendix D of the EA & ONR Joint Advice Note (July 2017) states that Safe assess /egress must be provided in the 0.5% tidal flood and 1% fluvial flood with an allowance for climate change. A safe means of escape (or sufficient time available) must be provided up to the 0.1% fluvial and tidal event.	NNBGenCo (SzC) Ltd has stated an intention is to develop a Flood Risk Emergency Plan (FREP) following the examination stage of the DCO, which will be informed by emerging information regarding construction phasing and operations. However, this information is required in order to demonstrate that workers and users of the site will be safe during the construction and operation phases. It is unknown whether the site will use the Environment Agency's Flood Warning Service, how site users will know what to do in the event of a flood, when evacuation should occur, whether there is safe dry access, egress and refuge available, or what the flood hazard presented to site users would be.	Provide further information on the flood warning and evacuation procedures to demonstrate that the proposed development can be made safe for people both during construction and operation. This Flood Response Plan should be informed by the hazards posed to people using the site and the phasing of construction activities, as well as ongoing operational activities throughout the lifetime of development. Please refer to guidance on [redacted] Also refer to the standards set out in Appendix D of the EA & ONR Joint Advice Note (July 2017) to ensure people on site are safe in the event of a flood. We will object where these are not met.

Document Title	Paragraph number	Issue	Comment	Suggested solution
Flood Risk – Two Village Bypass				
Two Village Bypass Flood Risk Assessment	4.3.3, 7.2.5, 7.2.6, 7.2.8, 7.2.9	FRA has assessed fluvial flood risk and demonstrated some localised areas of increased depths as a result of the proposals. Landowner agreements will need to be sought to confirm that the potential impacts on landowners are accepted.	4.3.3 Report is updated to consider flood zone 3b and this is now mapped. The FRA has determined that flood depths (and extents) will be increased in places as a result of the proposals7.2.5 identifies increased peak water levels in design event of 30-32mm and concludes no floodplain compensation or further mitigation (beyond the 'embedded mitigation') is proposed. Paragraph 7.2.6 states that increases in depth are higher upstream of the proposed crossing. Paragraph 7.2.8 states depths increase with scheme by 220mm-320mm near the flood relief culvert on R.B. On L.B., depths increase by up to140mm. 7.2.9 clarifies R.B depths up to 350mm extend 80m u/s of bridge; and L.B depths up to 250mm extend up to 25m u/s.	Discussions are ongoing with the landowner to mitigate for an increased flood risk on the flood plain. Written consent from the landowner must be included in the final FRA for the increased flood depth, hazard & velocity on their land in order for this to be acceptable without further mitigation as required by EN-6 3.6.16.
Flood Risk – Sizewell Link Road				
Sizewell Link Road Flood Risk Assessment	3.6.2	Existing and proposed road levels not provided for SW4. Although proposed not to change culvert, current and future flood risk is still unknown.	The SW4 crossing was not modelled as the existing culvert will remain in place. The existing baseline flood risk is unknown as the watercourse is not currently modelled. The FRA also states that road levels will remain close to existing but not the same. Any increase in road level could create a further barrier to flood water which must be assessed.	Confirm road levels. Modelling may be required to evidence baseline and post development flood risk. This must be determined in consultation with Suffolk County Council as the river is an ordinary watercourse and the existing baseline flood risk is unknown.
Sizewell Link Road Flood Risk Assessment & Model Report	3.6.3 of FRA & 2.1.9 of model report	No flood risk assessment of proposed crossing at SW7. FRA does not show the road will be safe for its lifetime without increasing flood risk elsewhere which is contrary to paragraph	Flood risk at SW7 has not been assessed due to lack of information collected. This is not adequate justification for not assessing flood risk and fails to comply with national planning policy. The flood map for surface water shows a clear flow path is present and the new SLR will	Provide further investigation and assessment of flood risk at SW7. Explain why hydrological calculations have not been used to inform design i.e. crossing size. This must be agreed in discussion with Suffolk County Council as

Document Title	Paragraph number	Issue	Comment	Suggested solution
		5.7.3 & 5.7.16 of National Policy Statement EN1 and paragraph 160 of the National Planning Policy Framework.	create a barrier to this and therefore could increase flood risk elsewhere. It is also possible that the road itself could be at risk of flooding. It has not be proven in principle that the design could work and be sized correctly. It is understood that some hydrology calculations were undertaken for this catchment but this has not be used in the FRA or model report.	this is a surface water flow path/ordinary watercourse.
Sizewell Link Road Flood Risk Assessment	3.6.6 & 3.6.7	The final design for the crossings are unclear	The FRA states portal culvert have been used at the crossings. This is misleading as this has not been possible in all locations and contradicts the modelling report and model build (e.g. SW1 is now a T shaped concrete culvert). Flood relief culverts have been used at some crossings (it is unclear which) and they are not shown on the plans provided or no plans have been provided at all.	Provide final designs for all crossings SW1 to SW7 with arrangement plans and cross sections for each.
Sizewell Link Road Flood Risk Assessment	5.2.5	FRA states & concludes that the SLR site is in Flood Zone 1 which has not been proven in the FRA. Several of the watercourses that will be crossed by the SLR have been modelled, although Flood Zone mapping has not been provided.	There is a clear indication of flood risk near to crossings as this information has been provided with cross sections. However, a map showing the extents of Flood Zones 3a, 3b and 2, based upon the hydraulic model outputs has not been provided. The baseline hydraulic model should be incorporated into the known flood risk areas, in order to provide an up to date map showing the extents of flood zones 3a, 3b and 2. The flood levels on the development site should be determined and compared to a topographic site survey to determine the location, flood depths and extent of flooding across the site.	Update FRA and model report text to state correct flood zones. This should be evidenced by modelled flood extents and levels.
Sizewell Link Road Flood	4.3.3, Table 4.1, 5.1.2	The level of road compared with maximum modelled flood extents demonstrates road surface is	FRA states SLR design at Fordley Road will reduce risks of flooding as the road will be moved outside of the currently mapped Flood	Update FRA and model report text and ensure all crossing assessments are based on detailed modelling flood extents not JFLOW

Document Title	Paragraph number	Issue	Comment	Suggested solution
Risk Assessment		above flood level. However, the FRA should assess whether the footprint of the SLR is at risk of flooding. This could indicate the site would be at risk of flooding during the construction phase.	Zone 3 which is based on JFLOW modelling. The Flood Zone maps in this area are formed of national generalised modelling, which was used in 2004 to create fluvial floodplain maps on a national scale, known as JFLOW. This modelling is not a detailed local assessment, it is used to give an indication of areas at risk from flooding. JFLOW outputs are not suitable for detailed decision making. In these circumstances an FRA will need to undertake a modelling exercise in order to derive flood levels and extents (flood zones), both with and without allowances for climate change in order to inform the design of the site. The SLR will still cross the watercourse. The claim that flood risk has been reduced must be evidenced.	extents/flood zones. Remove claim that new SLR route will reduce risk of flooding or qualify with detailed modelling.
Water Supply				
8.4 Planning Statement Appendix 8.4K site Water Supply Strategy	1.1.1	The text states that the principle supply for the Sizewell C Project will come from mains water, provided by Essex and Suffolk Water (ESW).	The mains supply of water to Sizewell C continues to remain unconfirmed. Under the Water Industry National Environment Programme (WINEP) Asset Management Plan (AMP) 7 investigations, water companies are required to determine if abstraction licences are impacting on the ability of water bodies to achieve their Water Framework Directive (WFD) status. Recent groundwater modelling for ESW sources in the Blyth Water Resource Zone (WRZ) show that any increase in water demand here is likely to deteriorate WFD status further and is therefore unacceptable to the Environment Agency.	Where use of the regional NEAC groundwater model is required, and where ESW are stated as the water provider, it is the responsibility of ESW to scope out the required runs necessary to help identify their water resource availability. Water may need to be pumped in from a different resource zone or be supplied from a different water company. As yet no viable options have been presented to the Environment Agency. Holistic solutions around water resources in East Suffolk may help towards reaching levels of sustainable abstraction, as there is already a significant pressure on resources from agricultural summer demand for spray irrigation.

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8.4 Planning Statement Appendix 8.4K site Water Supply Strategy	Table 1.1	Summary of all potential water supply options have not been investigated further to check their viability. These are ideas raised predominately by the Environment Agency for NNBGenCo (SzC) Ltd to investigate.	At this stage we would expect options to be fully assessed with quantities of water identified. The Environment Agency would need to be consulted to assess whether they meet abstraction licensing requirements.	All of the non-potable water options have to be assessed in more detail and quantities assigned. It is rightly assumed that due to the shortages of water in this area, there is likely to be groups of supply options. More detail is required.
8.4 Planning Statement Appendix 8.4K site Water Supply Strategy	1.4.5 & 1.5.2	The assumption that the potable water and the main water supply will be provided by ESW from within the Blyth WRZ.	This is incorrect. ESW's WINEP AMP 7 Investigation in to the sustainability of the Blyth groundwater sources is still in progress and early indications show that regardless of WFD planning cycle deadlines, we can currently only assume Recent Actual levels of abstraction are available or, once WINEP has concluded, whatever is proven to be the sustainable level of annual abstraction.	Groundwater modelling is required to confirm a sustainable supply of potable water for Sizewell, it is likely that the supply of water will have to found outside of the Blyth WRZ.
8.4 Planning Statement Appendix 8.4K site Water Supply Strategy	1.4.7 and 1.4.8	Using discharged water from Minsmere sluice as a source of supply.	No numbers have been provided on the resources available, which would indicate SZC has not installed any flow monitoring. No works or pipe line from Minsmere sluice are mentioned or any consultation with the relevant authorities.	Flow monitoring is installed and this option is assessed in more detail.
8.4 Planning Statement Appendix 8.4K site Water Supply Strategy	1.4.18	Ship tankering	There are no quantities on the amount of water tankered and where this water comes from.	Quantities are assigned and it is confirmed where this water could come from. Costs and benefits should also be assessed.
8.4 Planning Statement	1.4.21	The text states that 'The Environment Agency has stated	This is incorrect. In theory abstraction licence trading is an option to explore, but the	NNBGenCo (SzC) Ltd need to negotiate with licence holders to identify licences available to

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Appendix 8.4K site Water Supply Strategy		that licence trading would be a viable water supply option"	Environment Agency have not confirmed that this is a 'viable ' water supply option or have indicated quantities of water available from a water rights trade.	trade and to supply EA with a list of licences and detailed information around a potential trade. EA will need time to assess the application and to confirm the potential quantities of water available. If suitable NNBGenCo (SzC) Ltd need to apply for a pre-application abstraction licences in order to vary licences and to allow a trade to take place.
8.4 Planning Statement Appendix 8.4K site Water Supply Strategy	1.4.26,	NNBGenCo (SzC) Ltd is working with the Environment Agency to understand how the use of compensation discharge may support water supply for the Sizewell C Project.	The Environment Agency strategy is for a presumption against any new groundwater compensation schemes. There can be deterioration of groundwater bodies too with long term use of groundwater compensation schemes.	More strategic solutions would be preferable, which tackle the underlying sustainable abstraction problem.
8.4 Planning Statement Appendix 8.4K site Water Supply Strategy	1.4.28	The text states that "The Environment Agency have carried out an initial scoping exercise to understand how operating the compensation discharges may act as a benefit to support abstraction."	This is incorrect. ESW have tested their existing compensation schemes as part of their AMP 7 WINEP Investigations.	This statement should be removed from the document.
8.4 Planning Statement Appendix 8.4K site Water Supply Strategy	1.4.35	ESW transfer from Northern/Central WRZ)	This has been discussed, but no hydrological modelling has taken place to assess impacts and explore options around this. There are significant time delays on both the development of this option and building of any new pipeline. If the water is to be treated at Barsham Treatment Works, there may be time implications as this ESW treatment works is undergoing a re-building programme. This	The viability of this is explored further. ESW need to provide the Environment Agency with evidence that increasing abstraction from this resource zone does not cause deterioration to WFD. ESW need to discuss further the implications of additional abstraction in this zone on the Waveney. The Waveney is supported by the Waveney Augmentation scheme operated by the Environment Agency Hydrology Team. It is suggested further

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			might have implications for the timescale of the Sizewell C development.	discussions are held with EA Hydrology. In addition, ESW may also require further modelling work using the Regional NEAC model to further investigate the additional impact from use of the WAGS etc.
Waste				
Book 6: Environmental Statement Chapter 8, Conventional Waste Management. Appendix 8A. Waste Management Strategy	Section 12	Whilst the applicant has been very thorough in describing how they will store, manage, reduce, recycle and re-use waste, there are no targets or KPIs in the DCO application at all. We expect to see targets and detailed description of how waste management is monitored and performance is measured against target.	By not having these targets, NNBGenCo (SzC) Ltd will have no idea how they are performing, where to improve, and where the waste is being generated. There should be clearly laid out recycling values and percentages of each waste stream generated, such as (but not limited to) paper and card, metals, plastic, all packaging waste, wood, in accordance with both UK and EU targets, and the aspirations of the circular economy.	Please include UK and European revised waste targets, as laid out in the European Circular Economy Package. Adopting these targets will show the site has a highly effective waste and resource strategy.
Terrestrial Ecology – Main Development Site				
SZC_Bk6_ES_V2_Ch14 Terrestrial Ecology and Ornithology	Table 14.2 (EN-6 C.8.62 & EN-6 C.8.63)	The creation of Aldhurst Farm habitat area has not addressed the issue of habitat fragmentation, particularly as the culvert crossing at Lovers Lane is now not going to be improved to facilitate the passage of mammals.	The decision not to upgrade this crossing means the Aldhurst Farm site and the mammals relocated to it, will remain isolated from the remainder of the Sizewell Belts and SSSI habitat. This is not a coherent ecological network that is more resilient to change and may lead to isolated populations for translocated water voles and increased mortality from vehicle collision for otters.	Upgrade the culvert underneath Lovers Lane to facilitate mammal movement safely between the 2 habitats.
SZC_Bk6_ES_V2_Ch14 Terrestrial Ecology and Ornithology	14.8.27	The Sizewell Marshes SSSI is designated for its invertebrate fauna and the Leiston Beck is currently classified at good ecological potential for	Upstream dispersal of aquatic invertebrates will not be possible through an un-vegetated, dark culvert 70m in length. Most insects whose larvae develop in freshwater use polarization of light reflected from water for navigation (positive	We require the crossing of the SSSI and the Leiston Beck to have the minimal amount of land take as possible and to facilitate the passage of the species identified in in this area, particularly protected species. From the

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		invertebrates under WFD. The location of the proposed culvert crossing across the Leiston Beck in compartment 1 includes protected, rare and threatened species.	polarotaxis). These species will not go through a culvert of these dimensions for this reason, they will either turn back, or if they attempt to travel over the top of the culvert and road, may travel along the course of the road instead of the watercourse and attempt to oviposition upon the road surface, this is because they are deceived by artificial surfaces particularly roads which omit polarized light pollution. Numerous publications evidence these issues (Blakely et al 2006, Kriska et al 2009, Malik et al 2010, Malnas et al 2011). We are unable to conclude that a potential for deterioration for invertebrates does not exist in this water body as a result of the proposed design. Upstream of the Lovers Lane crossing at the top of the Leiston Beck water body a water treatment works discharges untreated effluent to this water body during storm events, impacted sensitive invertebrate taxa are unlikely to recover in this area if upstream migration and dispersal is prevented due to the proposed culvert and embankment.	design options put forward, the design most likely to achieve this is the three span bridge as this will significantly reduce the land take from the SSSI and will significantly reduce the risk of habitat fragmentation for all the species listed.
SZC_Bk6_ES_V2_Ch14 Terrestrial Ecology and Ornithology	14.8.91	Habitat fragmentation caused by the SSSI crossing combined with loss of wet woodland habitat has not been fully considered. We cannot conclude a deterioration for invertebrates would not happen as a result of these impacts and this carries concerns for WFD and protected species.	The loss of habitat combined with the isolation from remaining habitat is not discussed.	Provide a combined assessment of impacts to invertebrates in the Leiston Beck

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SZC_Bk6_ES_V2_Ch14 Terrestrial Ecology and Ornithology	14.9.8-14.9.10	Loss of fish habitat, inadequate connectivity in the water body and compensation area for fish.	Fish are unlikely to enter the habitat creation area at Aldhurst Farm due to the oblique, dark culvert under Lovers Lane, this will act as a barrier to fish and fragments the two areas. Fish migration into this area will likely be further inhibited by excessive macrophytes causing a barrier to fish movement. SSSI crossing; culverts can inhibit fish movement as the abrupt change in light and extended length of dark, un-vegetated and featureless watercourse is known to prevent fish movement. This can lead to large scale fish mortality when fish are prevented from moving along a watercourse during events when water quality is reduced to a critical level, such as algal blooms or pollution events.	SSSI crossing should not prevent the movement of fish, this could be achieved with a widespan bridge that prevented an abrupt change in light at the entrances and reduced the overall length of dark watercourse. Upgrade the culvert underneath Lovers Lane to facilitate fish movement.
SZC_Bk6_ES_V2_Ch14 Terrestrial Ecology and Ornithology	14.14.31-14.14.32	We cannot conclude that the proposed culvert and embankment across the Sizewell Marshes SSSI and the Leiston Beck water body would be of sufficient dimensions to facilitate the passage of otters. And therefore cannot conclude that this will not lead to the fragmentation of habitats between the Minsmere south levels and Sizewell marshes.	No evidence has been provided that demonstrates a culvert of the dimensions put forward would facilitate the passage of otters (protected species W&C act 1981). Some grey literature indicate that otters will be reluctant to use culverts over 50m in length (Otter Report, Jacobs 2007).	A widespan bridge crossing will ensure connectivity of these habitats for otters.
SZC_Bk6_ES_V2_Ch14 Terrestrial Ecology and Ornithology	14.14.47	Habitat creation and translocation site for water voles at Aldhurst farm is not functionally linked to the Sizewell Marshes SSSI as the oblique	If this issue is not addressed it will lead to isolated populations between the two areas and the potential for population declines.	Upgrade the culvert underneath Lovers Lane to facilitate mammal passage.

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		culvert underneath the Lovers Lane crossing has not been upgraded to facilitate the passage of mammals between the two areas.		
SZC_Bk6_ES_V2_Ch14 Terrestrial Ecology and Ornithology	14.14.51	The anecdotal evidence described here is not considered to provide adequate robust evidence that water voles will not be impacted by the proposed SSSI culvert crossing.	Impacts to water vole populations could be underestimated by this crossing. In the absence of more robust evidence relating to water vole use of culverts of this length, a more precautionary assessment is required.	A widespan bridge crossing will ensure connectivity of these habitats for water voles.
SZC_Bk6_ES_V2_Ch14 Terrestrial Ecology and Ornithology	14.14.51	Without supporting evidence we cannot conclude that the water vole population in the Sizewell Marshes could be sustained without genetic interchange from a wider area.	Insufficient evidence provided to confirm this population could be sustained.	Provide evidence that demonstrates a population of this size could be sustained long term without genetic interchange from a larger area.
Terrestrial Ecology – Two Village Bypass				
SZC_Bk6_ES_V5_Ch7_Terrestrial_Ecology	7.4.9-7.4.11	Figure 7.4 in Appendix 7A shows the results of the NVC surveys of the River Alde and Floodplain grassland. Insufficient spatial coverage of the floodplain meadow and insufficient sampling effort has been used to conclude the species present or the potential impact to this habitat.	The spatial coverage of these surveys appears to be very limited with floodplain meadow only being surveyed upstream of the proposed crossing, this is insufficient to assess the species present in the floodplain meadow downstream that require periodic inundation, and that will be impacted by changes in flood water conveyance over the meadow, furthermore surveys were also limited to one survey in June 2019, the lack of coverage and sampling events (they are limited to 1 month in a single year) gives us very poor confidence in this data.	Provide further sampling over a greater spatial area, including downstream of the crossing. Provide data for more than a single year.

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SZC_Bk6_ES_V5_Ch7_Terrestrial_Ecology	7.5.4	The report states that an otter ledge would be installed on the bridge abutments, if required, to allow passage at times of high flows, and that otter fencing would be incorporated.	We require clarification over the proposed mitigation in order to assess its appropriateness.	We require detailed information on the position and height of the proposed otter ledges (there should be one on each side of the river), the height (in relation to flood flows of the mammal culverts through the embankment across the Alde valley, and details of any fencing that is proposed. These details will also be required as part of any environmental permit application for works within 8m of the River Alde.
SZC_Bk6_ES_V5_Ch7_Terrestrial_Ecology	7.5.4	The provision of up to four ponds is also proposed along the route, which would provide additional pond habitat in the area and contribute to bio-diversity net gain.	The total number of new ponds needs to be confirmed. Further detail is required about the design of these ponds (e.g. size and depth, how they will hold water etc.). Details are also required of the grass/wildflower mix to be planted around the infiltration basins. We would like the infiltration basins to incorporate a small area of permanent standing water to further improve biodiversity. Shape and profiling of the infiltration lagoons needs further consideration. These should have a naturalistic appearance, with an irregular planform and gently shelving margins. Consideration should be given to planting wetland vegetation in the base (in areas of permanent water) to further enhance biodiversity.	Provide further design details of this mitigation and incorporate the suggested measures included
SZC_Bk6_ES_V5_Ch7_Terrestrial_Ecology	7.6.30	The flow regime of the River Alde, functional floodplain and surface drainage network during construction would, however, be altered by the embankment	The increased back flooding upstream of the proposed embankment will also result in reduced inundation of the downstream floodplain grazing meadow, which in-turn has the potential to alter the composition of this	Provide modelling/evidence that inundation downstream of the embankment cannot be improved with the inclusion of additional culverts in to the design.

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		across the floodplain during periods of higher flow, when the river is 'out of bank'. Even though flood relief culverts through the embankment would be present, temporary and localised back-flooding on the floodplain and potentially within the surface drainage network during high flow periods is anticipated.	priority habitat. See comments also in 7.4.9. Can the inclusion of additional flood relief culverts through the embankment help to reduce this impact on both sides of the embankment	
SZC_Bk6_ES_V5_Ch7_Terrestrial_Ecology	7.6.33	The scheme will involve the permanent loss of 2.91ha of floodplain grazing marsh, a NERC Section 41 Priority Habitat. There will also be a temporary loss of 3.91ha of this habitat.	We disagree with the assessment that this loss is not significant. There appears to be no mitigation for the loss of this area of habitat. It will result in a net loss of biodiversity rather than the net gain that we would expect.	Mitigation may be achieved by enhancing some of the remaining areas of this habitat if the provision of replacement habitat is not possible. For example, the reinstatement of the temporarily affected areas could involve re-seeding with an appropriate grassland and wild flower mix which is of greater conservation value than the existing sward.
SZC_Bk6_ES_V5_Ch7_Terrestrial_Ecology	7.6.44	We disagree with the assessment that habitat loss of grazing marsh is not significant. Insufficient information has been provided on how much of the ditch network will be affected.	The report doesn't say how much of the ditch network will be affected and so more clarity/certainty is required on this issue so that we can be confident that any proposed mitigation is acceptable/proportionate.	The loss of these habitats needs to be accurately quantified and appropriate mitigation or compensation needs to be provided, this should include the potential loss of floodplain downstream of the crossing as a result of reduced periodic inundation.
SZC_Bk6_ES_V5_Ch7_Terrestrial_Ecology	7.6.88 7.6.168-7.6.169	Mitigation detail needs to be provided based on operational phase effects on otter and water vole.	We will only be able to accept this once flood modelling demonstrates that the mammal passes and ledges facilitate the passage of these species during elevated flows. We will also require the details of the otter fencing and maintenance programme for that fencing.	Confirm the appropriate mitigation has been put in place.

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			Fencing may be needed to prevent otters (and other wildlife) entering excavations during the construction period. Need to ensure that there is a safe means of egress for any animals that enter excavations, and that a safe passage for otters along the river corridor is maintained.	
Terrestrial Ecology – Sizewell Link Road				
Review_SZC_Bk6_ES_V6_Ch7_Terrestrial_Ecology_and_Ornithology	7.3.34	Appendix 7A contains details of the detailed suite of ecological surveys.	Appendix 7A paragraph 1.4.9 states; no surveys were undertaken for invertebrates, reptiles or terrestrial mammals as the extended Phase 1 habitat and protected species survey identified habitats within the site boundary to be sub-optimal for these species. Paragraph 1.4.45 states that no targeted reptile surveys were conducted despite an incidental sighting of a grass snake during a bird survey.	Surveys need to be undertaken to determine the potential level of impact to these species, suitable habitat is present in the development footprint.
Review_SZC_Bk6_ES_V6_Ch7_Terrestrial_Ecology_and_Ornithology	7.4.14	Ten of these surface water features (Middleton Watercourse, Theberton Watercourse, an unnamed watercourse and seven ditches) were surveyed at the time of the Phase 1 habitat survey, and at the time of survey, were dry and most had recently been cleared of all aquatic and marginal vegetation.	A single survey conducted 2019 is unlikely to give an accurate reflection of the value of these watercourses to the biodiversity of the area. 2019 was a very dry year which followed an exceptionally dry winter. Watercourses are important linear features of the landscape and important migratory routes for wildlife,	Additional surveys are required to assess these watercourses. Provide accurate details of the impact to watercourses as a result of the development. Include the details of the total net loss of watercourse including that lost through culverting
Review_SZC_Bk6_ES_V6_Ch7_Terres	7.4.42	Water vole considered absent from the site and has not been	Due to the limited amount of surveys that took place and the significant length of time between the phase 1 surveys taking place and the	Provide further assessment prior to the commencement of any construction work.

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trial_Ecology_and_Ornithology		considered further within this assessment.	commencement of the project we require further confirmation of the absence of this species prior to construction starting	
Review_SZC_Bk6_ES_V6_Ch7_Terrestrial_Ecology_and_Ornithology	Table 7.11	Watercourses including 2 main rivers have not been identified or taken forward as important ecological features. No mitigation or compensation has been proposed.	Watercourses are important linear features of the landscape and important migratory routes for wildlife, they should be maintained as continuous corridors to maximise their benefits to biodiversity. We also require as a minimum no net loss of watercourses through development.	Provide accurate details of the impact to watercourses as a result of the development. Include the details of the total net loss of watercourse including that lost through culverting. Provide comprehensive mitigation for this impact and appropriate compensation for the loss of any watercourses.
Review_SZC_Bk6_ES_V6_Ch7_Terrestrial_Ecology_and_Ornithology	Table 7.11	Otter scoped out of table of Important Ecological Features to be taken forward for detailed assessment.	Otters are likely to forage along the watercourses impacted by this development at certain times of the year, particularly juveniles and females with cubs who use smaller watercourses as dispersal routes.	Scope in and provide detailed mitigation to avoid impacts to this species. This should include how passage will be maintained along watercourses impacted by the development.
Review_SZC_Bk6_ES_V6_Ch7_Terrestrial_Ecology_and_Ornithology	7.4.52	Watercourses including 2 main rivers have not been identified or taken forward as important ecological features. No mitigation or compensation has been proposed.	Watercourses are important linear features of the landscape and important migratory routes for wildlife, they should be maintained as continuous corridors to maximise their benefits to biodiversity. We also require as a minimum no net loss of watercourses through development.	Provide accurate details of the impact to watercourses as a result of the development. Include the details of the total net loss of watercourse including that lost through culverting. Provide comprehensive mitigation for this impact and appropriate compensation for the loss of any watercourses.
Review_SZC_Bk6_ES_V6_Ch7_Terrestrial_Ecology_and_Ornithology	7.5.4	No primary mitigation for the crossing of watercourse has been identified	The design of the crossings used on the SLR must be influenced by the requirement to ensure safe mammal migration routes along the watercourses during elevated flow events. We also require that efforts are made to ensure watercourses are maintained as continuous	Provide comprehensive details of all watercourse crossings including how they provide safe migration routes for mammals in elevated flows and how they have been designed to minimise impacts to biodiversity.

Document Title	Paragraph number	Issue	Comment	Suggested solution
			corridors to maximise their benefits to biodiversity.	
Review_SZC_Bk6_ES_V6_Ch7_Terrestrial_Ecology_and_Ornithology	7.5.4	Infiltration basins are proposed, but insufficient design details have been included to demonstrate opportunities for biodiversity have been considered.	We would like the infiltration basins to incorporate a small area of permanent standing water to further improve biodiversity. Shape and profiling of the infiltration basins needs further consideration. These should have a naturalistic appearance, with an irregular planform and gently shelving margins. Consideration should be given to planting wetland vegetation in the base (in areas of permanent water) to further enhance biodiversity.	Provide further design details of this mitigation and incorporate the suggested measures included
Marine Ecology				
Sizewell C Project Environmental Statement 6.3 Volume 2, Main Development Site Chapter 6. Revision 1.0. Alternatives and Design Evolution	Throughout this report and rest of ES.	Fish deterrent devices such as AFD are insufficiently assessed in the ES as mitigation methods that could be implemented as best practice in line with Agency guidance Ref 6.5. There is evidence that LVSE would not be effective without fish repulsion devices in tandem with an LVSE. And the design of LVSE is still unproven in the field.	The Applicant also acknowledges that LVSE may not work as stated in saying "the benefits of a LVSE design while seemingly reasonable are only hypothetical at present because there are no operational intake heads of this type" (6.5.19). Ref 6.5 Environment Agency, Cooling Water Options for the New Generation of Nuclear Power Stations in the UK, (2010)	Further robust consideration of repulsive technologies should be provided to ensure mitigation for fish impingement in line with environmental best practice and greater assurance is required on the efficacy of the LVSE as a mitigation solution in itself
Sizewell C Project Environmental Statement	6.2.24	This paragraph states that: The Environment Agency (Ref. 6.5) states that direct cooling can be acceptable in coastal locations if	Ref 6.4 European Commission, Integrated Pollution Prevention and Control (IPPC), Reference Document on the application of Best Available Techniques to Industrial Cooling	Robust consideration of repulsive technologies should be included in the ES to ensure mitigation for fish impingement in line with best practice and to provide greater

Document Title	Paragraph number	Issue	Comment	Suggested solution
6.3 Volume 2, Main Development Site Chapter 6. Revision 1.0. Alternatives and Design Evolution		three conditions are met: • extension of heat plume in the surface water leaves passage for fish migration; • cooling water intake is designed aiming at reduced fish entrainment; and • heat load does not interfere with other users of receiving surface water. And follows this is saying that All three of these criteria have been met by the Sizewell C Project. We disagree that appropriate mitigation has been considered due to the lack of repulsive technologies, so these criteria have not been met.	Systems, (2001). [It should be noted that the BREF statement used here are in relation to rivers and/or estuaries, and does not mention coastal locations as planned for SZC, as does the Agency's own interpretation of BAT.] Ref 6.5 Environment Agency, Cooling Water Options for the New Generation of Nuclear Power Stations in the UK, (2010).	assurance on the efficacy of the LVSE as a mitigation solution in itself.
Sizewell C Project Environmental Statement 6.3 Volume 2, Main Development Site Chapter 6. Revision 1.0. Alternatives and Design Evolution	6.2.24 and generally	Concern that the intake itself could act as an attractant for some species due to the large-scale reef structure it may provide. Without fish repulsive technologies in place, the structure itself may increase fish coming into the intakes particularly when it becomes more visible as suspended sediment decreases in late spring and summer	The applicant has said the area is too turbid to enable the intakes heads to be easily seen by fish. Further assurance is required that the structure will not be visible at all times of the year	Consideration of repulsive technologies should be included in the ES to mitigate for fish impingement and provide greater assurance on the efficacy of the LVSE as a mitigation solution. Consideration needs to be given to understanding if this is going to be an attractant to fish.

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Volume 2, Main Development Site Book 6, chapter 22 Marine Ecology and Fisheries	Table 22.110 and Appendix 22I	We are concerned that the Scale of Assessment at ICES fisheries stock level is not readily applicable to understanding impacts to some species at a EIA, HRA or WFD level.	Potential impacts may be underestimated	Consider at a species levels whether the scale of assessment may need to be undertaken at a smaller scale.
6.3 Volume 2 Main Development Site Chapter 22 Marine Ecology and Fisheries Appendix 22i - Sizewell C impingement Predictions Based Upon Specific Cooling Water System Design.	Overarching Comment	The Environment Agency has received documentation from the applicant which changes the methods they have used to predict numbers of fish that will be impinged at SZC.	TR339 reports that the statistical method now being used to predict the average annual impingement of fish (with confidence limits) at SZB (bootstrapping) differs from that used in the DCO submission (zero inflated negative binomial or ZINB). Further to this, when scaling up from SZB to SZC a correction factor is used to account for the differing design of the intake heads (the LVSE factor). SPP099 uses a revised method to calculate an LVSE factor of 0.357 which differs from that used in the DCO submission (0.383). The result of both of these methodological changes is that the predicted numbers for annual impingement contained within the DCO are no longer current.	Appendix 22i and Chapter 22 of the Environmental Statement (Marine Ecology) and the shadow HRA need to be updated to include descriptions and results of the latest modelling and ensure that conclusions drawn are still consistent with the underlying data. There will also be implications when considering biota as polluting matter which may affect WFD assessments.
6.3 Volume 2 Main Development Site Chapter 22 Marine Ecology and Fisheries Appendix 22i	Section 5.8 to 5.10	Potential impacts on fish populations have been assessed by expressing entrapment losses in terms of numbers of adult equivalents. The method used to calculate an equivalent adult value (EAV) for fish species calculates how many fish would	The Environment Agency has developed an extension to the applicant's method which takes repeat spawning into account, but the applicant did not accept the validity of this extension during pre-application discussions and submitted an unmodified EAV calculation.	The EAV methodology needs be updated to account for the ability of many fish species to spawn in multiple years, not just the single year during which they mature.

Document Title	Paragraph number	Issue	Comment	Suggested solution
- Sizewell C impingement Predictions Based Upon Specific Cooling Water System Design.		have been expected to survive to the age of maturity. However, for many species spawning can take place for multiple years after the age of maturity. The applicant's method does not take into account the repeat spawning potential of fish and so underestimates the potential impacts.		
Water Framework Directive				
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.3.10	Incorrect water bodies identified. Fen Meadow compensation areas stated as being in the Leiston Beck water body.	Sites 10 and 11 are located in the Fromus water body (GB105035045980). Site 28 is located in the Blyth water body (GB105035046030)	Assessment does not consider impacts to the correct water bodies.
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	Table 2.8	Incorrect water body identified for fen meadow compensation areas. Incorrectly screened out.	Hydrological manipulation has the potential to affect WFD elements in the Fromus and Blyth water bodies and should be screened in for further assessment.	Identify correct water bodies and screen in for further assessment.
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.4.21 & Table 2.12	Does not mention potential conflict with proposed measures to: Remove or soften hard bank, Preserve or restore habitats, In-channel morph diversity, Re-opening culverts, Alter culvert channel bed, Set-back embankments.	The channel realignment and proposed SSSI crossing in the Leiston Beck water body have the potential to prevent these mitigation measures being implemented.	Include these in the assessment
SZC_Bk8_8.14_Water_Fr	2.5.156	No mention of the water supply needed for the construction or	This could place a large additional demand on the groundwater levels in this area and could	Include the water demand for both the construction and operation of SZC.

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amework_Directive_Part_2_of_4		operation of SZC. Peak demand for the construction phase has been indicated at 3.5 megalitres a day.	lead to a detrimental impact that needs to be assessed.	
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.160	No mention of the water supply needed for the construction or operation of SZC. Peak demand for the construction phase has been indicated at 3.5 megalitres a day.	This could place a very large additional demand on the surface water levels in this area and could lead to a detrimental impact that needs to be assessed.	Include the water demand for both the construction and operation of SZC.
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.164	The ecological potential of the water body is predicted to remain as moderate throughout all phases of the proposed development. Invertebrates in the Leiston Beck are currently classified at good ecological potential.	Concern exists that impacts from the proposed development could cause a deterioration for invertebrates from good to moderate ecological potential.	Amend this and assess the potential impacts to invertebrates in the Leiston Beck.
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.185	Does not include monitoring of invertebrates in the Leiston Beck	Invertebrate monitoring will need to be undertaken as loss of habitat and habitat fragmentation are likely to cause an impact to this element.	Include invertebrate monitoring
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.187	Temporary interruption to river continuity	No measurement of time given, not possible to understand the impact.	Include the period of time for this impact
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.239-2.5.242	Fen meadow communities present require a groundwater level of 5-20cm below the surface. A change of up to 14cm could take some areas of fen	Changes in fen meadow community could happen as a result of changes to groundwater, this would have a knock on effect to invertebrates within the Leiston Beck water body.	Without detailed assessments of the fen meadow areas and the level of the water table in those areas, it will not be possible to understand the potential impact from the changes predicted.

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		meadow out of their optimal range. This would have a knock on effect to invertebrate communities		
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.252	The fluvial modelling results presented in the Sizewell C Main Development Site Flood Risk Assessment (Doc Ref. 5.2) predict that the loss of functional floodplain would result in a change in the maximum water levels of 15mm for the range of considered scenarios from 1 in 5-year annual probability event up to 100-year event with 65% climate change allowance; this 15mm additional flood depth would have an insignificant impact on the floodplain and any off-site property.	Insufficient design details have been provided. Unable to conclude the potential impact to channel morphology.	Provide detailed design information.
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.256-2.5.278 & 2.5.324	Dredging activities and sediment release needs to be considered in-combination with any discharges to the marine environment that will contain sediment, such as tunnel boring waste water.	Worst case scenarios need to be considered for dredging and discharge activities in relation to seasonal stresses (temp, Do) and ecologically relevant times (migration periods).	Confirm and provide these combined assessments.
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.357-2.5.358	15µgl discharge concentration used for the month long model scenario looking at impacts to Minsmere Sluice. In 2.5.342 it is stated that the predicted	Why has the impact to Minsmere Sluice been modelled using half the predicted discharge concentration?	Explain why this assessment only uses half the predicted discharge concentration? Provide assessment that uses the 30µgl concentration.

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		discharge concentration will be 30µgl.		
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.385	Leiston Beck water body is 4.3km in length. It extends from the confluence with the Minsmere River to the Aldhurst Farm site.	Figure of 5.75km does not reflect actual length of watercourse. Minsmere Sluice is located in the Minsmere River water body.	Amend this statement in order to demonstrate the actual impact
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.413	Details for the loss of these other habitats is not provided.	Unable to understand the impact.	Provide the details for each of the habitats being lost in the Leiston Beck water body.
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.417	Complete loss of vegetation through the culvert combined with sheet piled sides will act as a barrier for the upstream dispersal of aquatic invertebrates.	It will not be possible for aquatic invertebrates to swim against the flow through a dark, un-vegetated and sheet piled culvert 68m in length.	This design will not facilitate the upstream dispersal of aquatic invertebrates.
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.424-2.5.426	Ecological connectivity for invertebrates will be significantly impacted by the proposed culvert crossing design, this could lead to a deterioration from good ecological potential for invertebrates to moderate ecological potential in the Leiston Beck water body. The Leiston Beck water body is approximately 4.3km in length and the location of the proposed crossing is approximately 2km from its confluence with the Minsmere River. A water	Invertebrates: The Leiston Beck water body is currently classified at good ecological potential for invertebrates. The location of the proposed culvert crossing in compartment 1 includes protected, rare and threatened species. Upstream dispersal of aquatic invertebrates will not be possible through an un-vegetated, dark culvert 70m in length. Most insects whose larvae develop in freshwater use polarization of light reflected from water for navigation (positive polarotaxis). These species will not go through a culvert of these dimensions for this reason, they will either turn back, or if they attempt to travel over the top of the culvert and road, may travel along the course of the road instead of the	Provide a detailed assessment of the potential impacts to invertebrates in the Leiston Beck as a result of the proposed culvert crossing across. A wide span bridge would significantly reduce the impact to invertebrates and the resulting habitat fragmentation caused by an embankment and culvert design.

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		treatment works upstream of the Lovers Lane crossing occasionally discharges untreated sewage effluent in to the upper reaches of the Leiston Beck water body during storm events. This has the potential to impact sensitive taxa in the upper part of the Leiston Beck, if upstream migration of invertebrates is prevented then any impacted stretches may not recover.	watercourse and attempt to oviposition upon the road surface, this is because they are deceived by artificial surfaces particularly roads which omit polarized light pollution. Numerous publications evidence these issues (Blakely et al 2006, Kriska et al 2009, Malik et al 2010, Manas et al 2011). We are unable to conclude that a potential for deterioration for invertebrates does not exist in this water body as a result of the proposed design.	
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.424-2.5.426	Fish will be reluctant to move through this culvert in certain conditions.	Culverts can inhibit fish movement, as the abrupt change in light and extended lengths of dark, un-vegetated and featureless watercourse is known to prevent fish movement during daylight. This can lead to large scale fish mortality when fish are prevented from moving along a watercourse during events when water quality is reduced to a critical level, such as algal blooms or pollution events. We acknowledge that a culvert will be unlikely to prevent the movement of some mobile fish species at night.	A design that maximises light penetration through the structure and reduces the abrupt change in light at the entrance and exit to any structure is much more likely to facilitate the movement of fish
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.427	The fragmentation of the Leiston Beck caused by the proposed SSSI crossing could also impact the Minsmere Old River, as this will be isolated from part of the Leiston Beck and the Sizewell Marshes SSSI	Impacts to biological features in the Minsmere Old River may occur as a result of the proposed SSSI crossing.	Provide a detailed assessment of the potential impacts to biological features in the Minsmere old River

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SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	Plate 2.2 and Table 2.50	Smelt migration period described as February-April in table 2.50 which gives a 25% occlusion exceedance of 4.6%.	Plate 2.2 shows a migration period for smelt as February to May. Previously the 25% occlusion threshold for smelt has been stated as 7% for smelt (TR302 Ed 3).	Provide justification as to why the migration period for smelt has been reduced and why the revised exceedance figure of 4.6% is being used?
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.523	Thermal plumes unlikely to act as a complete barrier to smelt migration, but avoidance of the elevated temperatures by some life stages of smelt may negatively impact this species.	BEEMS SPP101 stated that it was not possible to assess uplift avoidance at the location of the SZB intakes at >3°C as those conditions did not coincide with CIMP sampling dates. It was unclear from the data provided in SPP101 if larger smelt avoid the area with an increasing background and absolute temperature. Avoidance of some areas experiencing elevated temperatures by some age classes of smelt may reduce migration success. Increased energy expenditure as a result of avoiding the plume prior to a migration run may also negatively affect reproduction success in the adjoining water bodies.	We are unable to conclude that all age classes of smelt will not exhibit some avoidance of areas impacted by the thermal plume. It is not possible to assess the impact temperature uplift >2.5°c has on this species. Supporting evidence in relation to the 4°c avoidance threshold used for this species (Jacobs 2008 report) has still not been provided to us.
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.522	In addition to the species considered, other marine migrants, including dover sole and grey mullet, have an important role in WFD classification.	No consideration has been given in the WFD assessment to the risk of such marine migrants avoiding the thermal plume and fewer entering the Alde/Ore and Blyth estuaries.	We are unable to conclude that the thermal plume will not lead to avoidance by marine migrant fish species
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.533	Figures showing these overlapped plumes at the sea bed cannot be located.	Has this figure been provided?	If not, then provide this information.
SZC_Bk8_8.14_Water_Framework_Dir	2.5.535	Figures showing these overlapped plumes at the sea bed cannot be located.	Has this figure been provided?	If not. then provide this information.

Document Title	Paragraph number	Issue	Comment	Suggested solution
ective_Part_2_of_4				
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.536	TRO toxicity may increase with the near-field of the thermal plume. However, limited acute (lethal) effects are predicted to be localised and mobile species and life history stages would demonstrate avoidance behaviours reducing exposure.	Avoidance of these combined plumes could negatively impact migratory species leading to reduced reproductive success.	Has this been examined for the period of migration for each of the relevant species present?
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.565-2.5.566	An increase to absolute temperatures caused by the operation of SZB and SZC, combined with an increase in background sea temperatures currently predicted as a result of climate change, could create a significant tipping point for some species in this area.	Some migratory species could be impacted by this combined change to water temperatures in this area. The impact from the proposed thermal plumes on the existing baseline for species like smelt is already of concern.	Provide a comprehensive assessment of how water temperature increases associated with the operation of SZB and SZC will impact species like smelt which have reducing metabolic headroom as a result of climate change.
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.589	As highlighted in Marine Ecology sections we have concerns relating to the methods and the model used to produce the figures	We are unable to conclude our position on fish impingement at this time.	
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.592	The assessment states Smelt caught at Sizewell are considered to be part of a wider North Sea population. Numbers of individuals impinged have been compared with adult abundance estimates from	No evidence has been provided to support the position that smelt in the Ore/Alde water body are from a wider stock covering the North Sea. Smelt are an important species in the Ore/Alde water body and removing the species from the classification would result in an 11% deterioration in the fish classification. Given the	Provide evidence that the immigration rate of smelt into the Ore and Alde (and possibly the Blyth) would exceed the exploitation rate at this location. If we cannot be confident that over time the smelt stock will not be reduced - we will be unable to conclude that a potential for deterioration is not present as a result of

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		monitoring surveys conducted in the River Elbe.	predicted numbers of smelt to be impinged for the period when both SZB and SZC are operational, we are not able to conclude that a potential for deterioration to the Ore/Alde and possibly the Blyth water bodies does not exist.	this project. This will need to be provided for any stock comparator being used.
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.597	Modelling indicates that Sizewell C will abstract 0.383 per cumec of the fish abstracted by Sizewell B, because of the intake head design.	In BEEMS TR316 it was stated that LVSE intake designs are unproven and at present there is no experimental evidence that they would offer any additional impingement mitigation without the inclusion of a behavioural deterrent such as an Acoustic Fish Deterrent (AFD) system.	Further evidence is required to conclude that the LVSE intake design will reduce the number of abstracted fish as described.
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	Table 2.58	Smelt mortality recorded as 9,139 after mitigation and 23,863 before mitigation.	FRR will not reduce mortality to this species so reduction is based on LVSE reduction.	Further evidence is required to conclude that the LVSE intake design will provide the reduction stated.
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.606	We have concerns that the method provided does not account for the fact that some species will live to reproduce more than once and will have an EAV value of more than 1.	We have concerns that the method provided does not account for the fact that some species will live to reproduce more than once and will have an EAV value of more than 1.	We are unable to conclude at this time that the EAV method provided by the applicant is the most appropriate.
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.609	Given that the impingement numbers are extremely small and the number of species present would not be altered, no change in classification status is predicted.	We are unable to conclude that a potential for deterioration in the Ore/Alde and Blyth water bodies does not exist as a result of the proposed project.	Provide evidence that the fish species in the Ore/Alde and the Blyth would not be reduced to a point that would lead to a deterioration in these water bodies. If we cannot be confident that over time species such as the smelt will not be reduced to a point where we do not record them - we will be unable to conclude that a potential for deterioration is not present as a result of this project. This will need to be provided for any stock comparator being used for each of the relevant species.

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SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.610 & table 2.60	1% of the SSB for a given species chosen as screening threshold to assess potential WFD deterioration against.	1% may be an appropriate screening threshold to use provided agreement has been reached that the relevant stock area for a given species is being used. In may not be appropriate to use large commercial fishery stock areas to measure the potential for deterioration of a sensitive species at a WFD water body level, particularly if sub-populations exist for that species.	The selection of a stock area that is relevant to measure impacts against for a given species is essential in order to assess the potential for deterioration at a water body level.
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.614	BEEMS Technical Report TR406 (Ref. 2.25) considers that it is likely that 90% of bass would remain inshore of the Bank therefore the expected bass impingement would be reduced to 0.03% SSB.	Is this for the period when SZB and SZC are both operating? What would happen to bass stocks when SZB stops emitting a thermal plume inshore?	Risk that bass entrapment at the location of the SZC intakes may be underestimated for the period when SZC operates in isolation. Provide this assessment.
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.615	BEEMS Technical Report TR406 (Ref. 2.25) considers it is highly unlikely that the landings represent more than 20% SSB and therefore the predicted impingement is reduced to approximately 0.1% SSB.	Is any evidence available to support this assumption? We would expect the precautionary principle to be applied in the absence of any evidence.	Provide evidence to support this position. If this is not available then apply the precautionary principle.
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.5.623	A precautionary survival rate of 0% was assumed for eggs of all species, except for Dover sole and seabass, which applied 20% and 50% survival rates, respectively based on experimental evidence.	Does the application of this survival rate for sole and bass take in to account the site specific trauma associated with a passage through the SZC cooling water system? Pressure change, temperature uplift and conditioning chemicals such as hydrazine, chlorine?	Trauma associated specifically with the SZC cooling water loop may not be fully considered.
SZC_Bk8_8.14_Water_Framework_Dir	2.6.643	Headwork design not accounted for and results should be should be considered as precautionary.	Without evidence demonstrating the effect of the proposed design it's not possible to determine if the LVSE without the inclusion of	We are currently unable to conclude that the LVSE intake design will reduce the number of abstracted fish as described.

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ective_Part_2_of_4			the AFD would make any reduction to impingement or even increase impingement from the SZB design.	
SZC_Bk8_8.14_Water_Framework_Directive_Part_2_of_4	2.6.2	These tables demonstrate that the Stage 3 assessment did not indicate any parameters at risk of deterioration such that class status for any of the parameters would decrease. As a result, the proposed activities alone, as detailed in section 2.2, are considered compliant with the requirements of the WFD.	We have identified a potential for deterioration to invertebrates in the Leiston Beck as a result of habitat fragmentation caused by the SSSI culvert crossing. We have identified a potential for deterioration to fish in the transitional and coastal water bodies of the Ore & Alde and the Blyth as a result of fish entrapment from the cooling water system.	With the level of information currently provided we are unable to confirm that a potential to these element in these water bodies does not exist as a result of the proposed project
SZC_Bk8_8.14_Water_Framework_Directive_Part_3_of_4	3.6.76	No mechanism for construction (or operation) of the overbridge to affect the hydromorphology and biology of the water body.	Although the proposed overbridge design will reduce the impact to invertebrates when compared to a culvert design, this does not mean that invertebrates in the River Alde will not be impacted by the crossing. The interference of reflected polarised light from the watercourse as a result of the crossing will reduce the upstream migration success of some species.	Provide an assessment of the potential impact to invertebrates as a result of habitat fragmentation caused by the proposed crossing.
SZC_Bk8_8.14_Water_Framework_Directive_Part_3_of_4	3.6.77	The design of the culverts means that they would not present a barrier to the free movement of fish and other aquatic organisms in the two small watercourses.	Upstream dispersal of aquatic invertebrates is not possible through an un-vegetated, dark culvert 70m in length and is highly unlikely even at 45m in length. Most insects whose larvae develop in freshwater including the species of beetles identified during the phase 1 surveys use polarization of light reflected from water for navigation (positive polarotaxis). These species are unlikely to go through a culvert of the proposed dimensions for this reason, they will either turn back, or if they attempt to travel over the top of the culvert and road, may travel along	Provide an assessment of the potential impact to invertebrates as a result of habitat fragmentation caused by the proposed culvert crossings.

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			the course of the road instead of the watercourse and attempt to oviposition upon the road surface, this is because they are deceived by artificial surfaces particularly roads which omit polarized light pollution. Numerous publications evidence these issues (Blakely et al 2006, Kriska et al 2009, Malik et al 2010, Manas et al 2011).	
SZC_Bk8_8.14_Water_Framework_Directive_Part_3_of_4	3.7.66	The design of the culverts means that they would not present a barrier to the free movement of fish and other aquatic organisms in the two small watercourses.	Abundant evidence demonstrates that culverts inhibit the movement of invertebrates in both their aquatic and adult lifestages. Although this unlikely to cause a deterioration to the waterbodies affected by this development it will result in an impact to these species	Provide an assessment of the impact to invertebrates from the proposed crossings.
SZC_Bk8_8.14_Water_Framework_Directive_Part_4_of_4	Table 4.7	C2: Cumulative impacts to the Leiston Beck water body: does not appear to consider the loss of ditch habitat, with the loss of fen meadow habitat, with the loss of wet woodland habitat, with the fragmentation of habitat caused by the SSSI crossing, combined with the temporary loss of habitat from the construction areas needed for each of these activities.	Cannot determine if the In-combination assessment has captured all of the impacts that are happening in the water body. Has this been assessed against each of the WFD elements?	Provide clarification/assessment of these combined impacts to biological elements in the Leiston Beck.
	4.3.9	The cumulative assessment for fish is incomplete. This section of the WFD Assessment needs to assess whether the activities in combination could impact on a water body. It is not sufficient to assess if the same individual fish	A deterioration was not predicted when the thermal discharge and impingement and entrainment activities were assessed individually. However in our view there are still uncertainties (e.g. assumed thermal occlusion thresholds) and gaps (e.g. the impact of the thermal plume on the behaviour of marine	Provide further assessment of activities in combination

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		could be impacted by separate activities. The estuary classification could also be impacted if the physically separated activities impact different fish and in combination result in fewer fish overall from a species entering the estuary. Based on the evidence presented we cannot conclude if the activities in combination present a risk of deterioration to the fish WFD quality element of estuaries or not.	migrant species such as dover sole & grey mullet is not considered) in the evidence presented to assess these activities individually. As we are unable to agree with the conclusions regarding the impact of these activities alone, we also cannot agree at this stage with the conclusion that a risk of deterioration is not predicted from the activities in combination.	
SZC_Bk8_8.14_Water_Framework_Directive_Part_4_of_4	Table 4.24	MLA/2017/00033 Gives a description of an operational maintenance requirement from SZB (desilting the forebays).	This is listed under Sizewell B decommissioning, when this is an operational activity.	SZB operational activities should be a separate section to SZB decommissioning, which is not forecast to commence for some years.
SZC_Bk8_8.14_Water_Framework_Directive_Part_4_of_4	Table 4.24	Sizewell B, some operational activities have not been included.	What are the combined impacts for periods when SZC construction is underway combined with an outage at SZB.	Provide an assessment of all the SZB operations in-combination with SZC construction and operational activities.
SZC_Bk8_8.14_Water_Framework_Directive_Part_4_of_4	Table 4.24	Decommissioning of the SZA station not included	Cannot assess any combined impacts from the decommissioning of SZA	Provide an in-combination assessment of all SZC, SZB and SZA impact pathways
SZC_Bk8_8.14_Water_Framework_Dir	4.5	Some of the combined assessments we require to reach our conclusions are missing.	We are not able to agree with this conclusion with the present level of information	Provide the missing information

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ective_Part_4_of_5				
Habitat Regulations Assessment				
Shadow HRA Report Volume 1	8.3.79	It in this section the use of 1% and 10% thresholds were covered. It states in this paragraph that "Similar thresholds were used and accepted during the assessment for Hinkley Point C", which is not correct.	We consider for some migratory species other measured of sustainability may be more appropriate	Rather than apply generic thresholds each feature needs to be considered on its own merit with quantitative assessment being used alongside a narrative for the feature which considers the conservation status of that feature in the light of the conservation objectives (and which may include quantitative and qualitative description).
5.10 Shadow Habitats Regulations Assessment. Volume 1: Screening and Appropriate Assessment.		The Environment Agency's main remit in DCO is with regard to migratory (diadromous) fish species and to Water Framework Directive compliance. Eel are however, prey for bitterns. We therefore note that indirect effects may not all have been addressed for all appropriate bird species.	While effects on seabirds via their prey have been considered, there may be similar routes by which non-seabird species may be impacted. For example, breeding bittern (Minsmere-Walberswick SPA and Benacre to Easton Bavents SPA). At Minsmere at least, there is a specific objectives for 'supporting habitat: food availability' which requires the maintenance of the distribution, abundance and availability of key food and prey items. As eel are predicted to be entrapped at SZC and thermal/chemical plumes may intersect with the Minsmere sluice, there would seem to be pathways by which breeding bittern could be impacted.	Bittern should be considered in HRA
5.10 Shadow Habitats Regulations Assessment. Volume 1: Screening and		The Environment Agency's main remit in DCO is with regard to migratory (diadromous) fish species and to Water Framework Directive compliance. However, through our review of entrapment predictions we note that marine	While effects on seabirds via their prey have been considered, there may be similar routes by which non-seabird species may be impacted, for example, breeding and non-breeding avocet (Alde-Ore Estuary SPA). These features have specific objectives for 'supporting habitat: food availability' which requires the maintenance of	Breeding and non-breeding avocet should be considered in HRA

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Appropriate Assessment.		invertebrates and gobies are vulnerable to entrapment. We therefore note that indirect effects may not all have been addressed for all appropriate bird species.	the distribution, abundance and availability of key food and prey items*(eg. Gammarus, Corophium, flies, beetles, Nereis, Hydrobia, Cardium, gobies) at preferred sizes (eg. fish or worms between 4-15 mm long)* Gobies are both predicted to be entrapped at Sizewell C and so there would seem to be a pathway by which these features could be impacted.	
5.10 Shadow Habitats Regulations Assessment. Volume 1: Screening and Appropriate Assessment.	6.5.3 to 6.5.6 (and Table 4.5 in Section 4.3.1)	We are unsure how Natura 2000 sites have been selected with regard to potential losses of river lampreys.	Losses have been assessed against estimated spawning migration run sizes for the Humber SAC. However, there also appear to be mainland European Natura 2000 sites for which river lamprey are features, but potential losses to these SACs do not seem to be assessed in the same way. From Table 4.5, river lampreys are features of:' Schelde- en Durmeëstuarium van de Nederlandse grens tot Gent Site of Community Importance', 'Unterweser SCI', 'Weser bei Bremerhaven SCI', 'Nebenarme der Weser mit Strohauser Plate und Juliusplate SCI', 'Schleswig-Holsteinisches Elbästuar und angrenzende Flächen SCI', 'Unterelbe SCI', 'Mühlenberger Loch/Neßsand SCI', 'Hamburger Unterelbe SCI', 'Elbe zwischen Geesthacht und Hamburg SCI'	Include consideration of potential impacts upon all relevant designated sites for river lamprey.
Eels Regulations Assessment				
SZC_Bk6_ES_V2_Ch22_Marine_Ecology_Appx22O_Eels_Compliance_Reg	3.2.16 5.3.25 5.3.29	A review of the proposed LVSE design and its ability to reduce the number of impinged fish is currently being undertaken by the Environment Agency. We are currently not able to conclude that the impact has been	We are currently reviewing BEEMS SP099 V3. The LVSE design proposed for SZC and its fish protection compliance are currently being assessed.	We are currently unable to conclude that the LVSE intake design will reduce the number of abstracted fish as described.

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ulations_Assessment		reduced as described by the applicant.		
SZC_Bk6_ES_V2_Ch22_Marine_Ecology_Appx22O_Eels_Compliance_Regulations_Assessment	3.3.11	It's unclear what lifestages this information relates to. It should be noted that eels move between depths at a rate of their choice which does not result in trauma. This does not mean that experiencing a change in depth and pressure in a short period of time as a result of passage through a cooling water loop will not result in trauma. Silver eels migrating back to the Sargasso have also experienced physiological change including changes to the swim bladder to accommodate this migration.	Eels experiencing this hydrostatic pressure change in a short period of time may result in trauma as the eel has no control over the speed of change. Yellow eels have not undergone any physiological change to their swim bladders and may also be more vulnerable to pressure change. The parasite, Anguillicoloides (Anguillicola) crassus may also alter tolerance to pressure change.	Provide details of what lifestages this assessment of potential barotrauma applies to, highlight any lifestages where impact of hydrostatic pressure are not known. Provide Barotrauma damage threshold details (log ratio pressure LRP). Compare SZC pressure change to natural movement to depth for this species for each lifestage. Provide details of any known change in pressure tolerance as a result of infestation from Anguillicola.
SZC_Bk6_ES_V2_Ch22_Marine_Ecology_Appx22O_Eels_Compliance_Regulations_Assessment	3.3.14 - 3.3.21	There are three key limitations to the surveying: 1) Monitoring at the location of the SZC intakes/outfall was limited to 8.75 hours of sampling conducted over 11 days in April and May 2015. 2) In 2015 data shows that the main glass eel run at Flatford Mill on the Stour estuary in Suffolk, took place in June with 7892 out of the 8554 glass eels recorded that year, running in that month, the next most productive month was July. This is the closest	These limitations impact the conclusions of the survey as follows: 1) This is considered too small an amount of sampling effort to concluded potential impacts from. The survey design, as well as taking place too early in the year for this location, did not include all of the variables that could influence glass eel movements at this location, such as monitoring in dark conditions (at night) and monitoring at different stages of the lunar cycle. 2) This would indicate that the monitoring that was conducted by CEFAS to assess the potential numbers of glass eel present at the	Update this section and include the limitations around the survey design and why it is not possible to draw conclusions on the potential entrainment of glass eels at the location of the SZC intakes. Amend the information to show that peak migration can take place later than suggested at this location and include details around interannual variability being an important consideration at this site. Suggest using 2015 as the reference year. Monitoring commenced on the Stour at the end of April, with the first glass eels being recorded in May (144), June recorded the highest number (7892), followed by July (345).

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		monitoring station the Environment Agency has to SZC, which is located to the south of the proposed intake location (glass eels would be expected to be observed at this location before they arrive at the SZC location). 3) In 2014 16310 glass eels were recorded passing through the Flatford glass eel monitoring station, this is nearly double the number recorded at the same location in 2015.	location of SZC intakes took place too early in the season (April and May). 3) This demonstrates interannual variation is an important consideration at this site and potential impacts cannot be concluded from a small amount of sampling conducted in a single year.	
SZC_Bk6_ES_V2_Ch22_Marine_Ecology_Appx22O_Eels_Compliance_Regulations_Assessment	3.4.2	The predicted survival for glass eels has not been provided.	Cannot assess predicted survival rates for glass eels as no figure has been provided.	Provide predicted survival rate for entrained glass eel at SZC.
SZC_Bk6_ES_V2_Ch22_Marine_Ecology_Appx22O_Eels_Compliance_Regulations_Assessment	3.4.8-3.4.9	BEEMS TR395 did not include pressure change or condition chemicals such as hydrazine. Temperature should represent the expected temperatures at SZC during June-July when peak migration occurs. A more precautionary assessment is required in the absence of a comprehensive experiment. Pressure change for HPC	It is not possible to conclude what effect a passage through the SZC cooling water loop will have on glass eel survival. Experiments should include replication of passage through a 3km pipe, pressure change, trauma from passage through a pump, temperature uplift, exposure to the range of chemicals to be used at SZC, second passage through a 3km pipe and second pressure change prior to discharge at the outfall. It will not be possible to assess the	Use worst case survival predictions. Provide a clear description of the limitations of the glass eel EMU experiments and the eels surveys undertaken at Sizewell.

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		assessed in BEEMS TR273. Is the intake depth and pressure change the same at HPC and SZC? Hydrazine and other condition chemicals appear to have also been excluded from this experiment. Does TR273 include the trauma associated with second pressure change and mechanical trauma from travel through the outfall pipe prior to discharge?	cumulative impact of these traumas on glass eels if they are not all incorporated.	
SZC_Bk6_ES_V2_Ch22_Marine_Ecology_Appx22O_Eels_Compliance_Regulations_Assessment	5.2.49-5.2.51	What discharge concentration is being used for this assessment as both 15µgl and 30µgl concentrations have been proposed? Is this assessment for the commissioning phase or the operational phase? Bioaccumulation is described as medium by Slonim and Gisclard (1976)	Unsure of the discharge concentration being referred to in this assessment. Hydrazine impacts during either the commissioning or operational phase may not be provided. Hydrazine bio-accumulates to a higher degree than stated.	Clarify what discharge concentration this assessment refers to. Clarify if this statement applies to the commissioning or operational phase. Provide reference for the evidence of hydrazine having a low bioaccumulation potential.
SZC_Bk6_ES_V2_Ch22_Marine_Ecology_Appx22O_Eels_Compliance_Regulations_Assessment	5.3.27	Does this include trauma specific to the SZC location such as passage through 3km of pipe and barotrauma x2.	Potential underestimate of mortality as trauma specifically associated with the SZC cooling water loop may not be included.	Add detail of the additional trauma experienced from the SZC cooling water loop.

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SZC_Bk6_ES_V2_Ch22_Marine_Ecology_Appx22O_Eels_Compliance_Regulations_Assessment	5.3.51	Migrating eels can use chemical signals to navigate to freshwater (Cresci 2020).	Has an assessment of the chemicals in the SZC cooling water discharge been undertaken to assess if it could act as an attractant to migrating eels seeking chemical cues.	Assess whether the SZC plume will attract or disrupt migrating eels.