A1 in Northumberland: Morpeth to Ellingham

Scheme Number: TR010059

Appendix A Response to RR-04 Environment Agency

AFPF Regulation Rule 8(1)(c)

Planning Act 2008

Infrastructure Planning (Prescribed Forms and Procedure) Regulations 2009

January 2021

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

The A1 in Northumberland: Morpeth to Ellingham

Development Consent Order 20[xx]

Appendix A Response to RR-04 Environment Agency

Regulation Reference:	APFP Regulation Rule 8(1)(c)
Planning Inspectorate Scheme Reference	TR010059
Application Document Reference	TR010059/7.9.1
Author:	A1 in Northumberland: Morpeth to Ellingham Project Team, Highways England

Version	Date	Status of Version
Rev 0	January 2021	Deadline 1

Appendix A - Response to Environment Agency – RR-004

Reference	Comment from Relevant Representation	Applicant's Response
A.1 Environment Agency – RR-004	We have reviewed the Development Consent Order (DCO) application, Environmental Statement (ES) and supporting documents and have a number of concerns regarding the proposed development and matters within our remit. We therefore make representations in relation to the following areas: 1) Net loss of biodiversity 2) Habitats of Principle Importance 3) Otter and water voles 4) Detailed Construction Environmental Management Plan (CEMP) 5) Fish 6) Geomorphology Assessment 7) Discharge of Treated Water and Outfall Construction 8) Water Framework Directive Assessment 9) Surface Water Drainage 10) Drainage Network Water Quality Assessment (DNWQA) 11) Flood Risk Assessment 12) Groundwater 13) Historic Landfill Sites	A response to the specific comments provided by the Environment Agency (EA) in regard to the documents listed is provided in the sections below.
A.2 Biodiversity No Net Loss: Issue and Impact	The net loss of 57.69% of watercourses in Part B of the scheme is an unacceptable loss considering no mitigation or compensation has been suggested. Therefore, we object to the proposed development as submitted.	In the context of this Scheme, loss of watercourse is interpreted to mean the loss of natural channel caused by the construction of culverts/bridges as opposed to the loss of watercourses absolutely. For Part B, it is important to note that the figures represent a worst-case and precautionary assessment of the loss of natural channel, as does the Biodiversity No Net Loss Assessment as a whole, as noted in paragraph 9.5.5 of Chapter 9: Biodiversity Part B [APP-049]. The Applicant is currently preparing a Biodiversity No Net Loss Assessment in line with Defra Metric 2.0 for the Scheme. This will be submitted at Deadline 2. The assessment will verify the extent of watercourse habitat lost to the Scheme. The extension of existing culverts and the addition of new culverts within the Scheme design is considered necessary and the most practical approach when compared to the alternative of providing bridges to span all watercourses. Where new culverts and culvert extensions are proposed, bridges have been considered to be disproportionate when acknowledging the size and characteristics of the watercourses in question and the extensive earthworks that would be required to accommodate any bridge structure, increasing the footprint of the Scheme and construction works. This would impact a wider area, and potentially increased number, of habitats as a result. The Applicant does not consider it viable to create new lengths of open watercourse to mitigate for the loss of watercourse, as this would rely on a water source to create the habitat. Therefore, in the absence of a natural source, a watercourse cannot be readily created. In addition, the diversion of water from an existing watercourse or the modification of an existing watercourse to increase its length (for example, by meandering the channel) is also not considered a viable option for mitigation or compensation, as this would increase the impacts of the Scheme. Because it is not viable to create new watercourses or lengthen existing watercourses, consideration has been given to improving the biodiversity of existing watercourses by, for example; maintaining the hydraulic connectivity of these watercourses and providing mitigation and improvements including enhanced planting as part of the proposed landscape strategy, with the introduction of c.38ha of wet woodland and c.12ha of wetland marginal planting. This is considered to be appropriate mitigation to maintain downstream hydromorphological conditions and

Reference	Comment from Relevant Representation	Applicant's Response
		to provide wetland habitats, along with other measures to provide natural beds and fish passage measures within new structures where possible and appropriate. In order to assist the Examining Authority a Culvert Mitigation Summary (Annex A) is submitted at Deadline 1 that summarises the mitigation that is proposed for each watercourse crossing and Water Framework Directive (WFD) water body catchment. This does not change the previous assessments submitted but consolidates the findings of these assessments
A.3a Biodiversity No Net Loss: Issue and Impact	In addition, considering this loss of watercourse is due to the extension of non-wildlife friendly culverts that will create an even greater barrier to the movement of wildlife and increase fragmentation of habitats, the impact upon biodiversity is expected to be much higher.	A summary of proposed mammal passage provision has been included within the Culvert Mitigation Summary (Annex A), which is submitted at Deadline 1. This does not change the previous assessments submitted and consolidates the findings of these assessments. Culvert provision, permeability, feasibility and proportionality of the Scheme design are addressed in responses A.2, A.3c, A.3d, and A.23. Of the 19 culverts for Part B, 10 are unchanged by the Scheme both in length and diameter (including four culverts with an existing diameter less than 0.6m, which are generally unsuitable for wildlife (particularly mammal) passage) and a single culvert is replaced like-for-like in terms of diameter and length (Tributaries of Kittycarter Burn, circular culvert (southern tributary)). As such, the Scheme would not change the level of impact associated with these culverts in comparison to impacts from the existing road. The remaining culverts involve extension of existing culverts, maintaining the existing diameter, and the construction of a single new culvert. Two culvert extensions (Tributaries of Denwick Burn circular culvert, Tributaries of Kittycarter Burn, circular culvert (southern tributary)) have a diameter of 0.6m and the remaining six culverts have a minimum diameter of 1.2m. Following extension, these culverts retain the ability to offer free passage to wildlife (particularly mammals) except in times of flood. As Part B represents the widening of an existing carriageway, where existing culverts are used by wildlife for safe passage, the Scheme would maintain these features. The existing road already presents a barrier to dispersal and fragmentation of habitats. The Applicant disagrees that the impact upon biodiversity as a result of culvert extension for Part B will be "much higher". The current arrangement of culverts beneath the A1 means that the existing environment contains culverts, which provide a means of traversing the road for mammal species. For species other than otters, these will remain available when water levels allow, although in times of higher water they will not be available, which reflects the current situation. These culverts do not currently benefit from mammal shelves. The exceptions are White House Burn and a Tributary of the Kittycarter Burn, where cattle creeps exist, which provide ample space for mammal passage. It is accepted that culverts will be lengthened. However, it is not accepted that this will render them unsuitable for otter passage in particular. In England there is no definitive guidance regarding the maximum length of a culvert that would be used by otter and also the relationship between length and diameter of a culvert.
A.3b Biodiversity No Net Loss: Issue and Impact	This contradicts the objectives of the National Policy Planning Framework (NPPF) and the Water Framework Directive (WFD), which seek to enhance and protect biodiversity and provide net gains for biodiversity.	As detailed within A3.a above and A3.d below, the Scheme has considered and sought to protect biodiversity (including in relation to wildlife passage). This has included implementation of mitigation where possible to reduce the significance of effects. As a Nationally Significant Infrastructure Project (NSIP), the Scheme is

Reference	Comment from Relevant Representation	Applicant's Response
		governed by the National Policy Statement for National Networks (NPS NN) rather than the NPPF. As an NSIP, the overall goal is to achieve no net loss, in line with the NPS NN. Biodiversity No Net Loss Assessments have been undertaken for the Scheme [APP-246] [APP-309], to assess the loss of habitats and inform landscape mitigation proposals with the aim of achieving no net loss. Opportunities for enhancement are detailed within Section 9.9 of Chapter 9: Biodiversity Part A [APP-048] and Chapter 9: Biodiversity Part B [APP-049]. In relation to the WFD, the focus of the legislative scheme is to protect waterbodies and their ability to maintain or achieve good status. A summary of proposed measures to protect biodiversity are detailed within the Culvert Mitigation Summary (Annex A). Where enhancements are being proposed, these will contribute to the maintenance or achievement of good status.
A.3c Biodiversity No Net Loss: Issue and Impact	Furthermore, it fails to comply with Highways England's (HE) Biodiversity Plan which states that 'Roads can be designed to minimise their severance effect, for example using underpasses or green bridges to link habitats under and over our road network'	The Scheme complies with the Highways England's Biodiversity Plan. Mammal passage has been considered for both Parts A and B of the Scheme. Part A includes a new offline section, which introduces a new barrier to dispersal. As such, the offline section of Part A was considered a high priority for the consideration and inclusion of mammal passage mitigation. The mitigation design includes the installation of mammal ledges within culverts (where possible). For Part A, installation of mammal ledges is detailed in Table 10-11 of Chapter 10 Part A [APP-050] of the ES. In addition, provision of wildlife culverts has also been included in the design of Part A (see EM032 of Table 9-23 of Chapter 9: Part A [APP-048]. Culverts represent a form of underpass. The Applicant has considered green bridges. However, the engineering requirements and land take for such a structure are not proportionate considering connectivity beneath Part A can be achieved by the culvert design proposed. Part B involves the widening of the existing carriageway and would comprise the replacement of a single culvert and the construction of a single new culvert; the remainder are extensions of existing culverts. As such, mammals will already be acclimatised to the pressures exhibited by the existing road and the provision of existing safe-passage features. With the exception of two cattle creeps, all culverts along Part B are not suitable to accommodate a mammal ledge (due to their dimensions). The cattle creeps provide free opportunities for wildlife passage beneath the carriageway at these locations without the need for a mammal ledge. The Applicant has considered green bridges and tunnels and these would be disproportionate in the design of Part B of the Scheme as permeability is already addressed within the extant Scheme design. At present permeability of the A1 is provided via existing culverts. As these will be extended as part of the Scheme construction, permeability either side of the carriageway will be maintained.
A.3d Biodiversity No Net Loss: Issue and Impact	We believe that, as a minimum for the impact the scheme is likely to have, culverts should be upgraded to be mammal friendly to improve the current conditions, offsetting for the impact of the extensions and current blockage to wildlife movement.	It has not been possible to include ledges/shelves within all existing (extended) culverts due to size restrictions and acknowledging the constraints associated with Construction (Design and Management) (CDM) Regulations for retrofitting such features (health and safety for working in confined spaces). It is additionally considered disproportionate to remove and replace all existing culverts owing to the impacts this would have on surrounding habitats and the water channel itself (see responses to A.2, A.3d and A.23). An upgrade of existing culverts would be

Reference	Comment from Relevant Representation	Applicant's Response
		categorised as an enhancement and not mitigation, however, the implications of removal and replacement of culverts would require a 'blocking up' or diversion of watercourse channels for a prolonged period to facilitate the removal and replacement of existing culverts. This is considered drastically more detrimental to existing habitats, both terrestrial and aquatic, than the alternative and selected approach of the extension of existing culverts, in the knowledge that existing culverts provide permeability. Broader benefits for biodiversity would be achieved through the creation and extension of a range of habitats either side of the carriageway to mitigate construction of the Scheme with emphasis placed on achieving connectivity with habitats unaffected by the Scheme (see items S-L2, S-L13, A-L2, B-B2, B-B4, B-L1 in Outline Construction Environmental Management Plan [APP-346].
A.4 Biodiversity No Net Loss: Issue and Impact	In addition, we do not understand the justification for using BREEAM in terms of Biodiversity Net Gain and No Net Loss assessments. Using BREEAM definitions for No Net Loss in a non BREEAM scheme does not seem suitable for a Nationally Significant Infrastructure Project and is not common practice, as such we do not recognise the definition that no net loss has a range of 95-104%.	The use of Building Research Establishment Environmental Assessment Method (BREEAM) Guidance Note 36 (GN36) is in relation to determining distinctiveness of habitats. GN36 has been referenced within the Biodiversity No Net Loss (BNNL) assessment [APP-246 and APP-309] as a recognised best practice methodology to supplement standard BNG guidance (Defra guidance[1]). Habitats can be subject to multiple distinctiveness bands (e.g. woodland habitat types) depending on the quality of habitat. Assigning distinctiveness banding using Defra guidance alone is not currently possible. The Defra metric technical paper is very high-level and only describes the broad habitat type which would be covered under each distinctiveness band. Appendix C of GN36 provides distinctiveness bands for individual habitat types and has therefore been used to assign distinctiveness for all habitat types. The definition that no net loss has a range of 95-104% has been used on the basis that GN36 is currently the only published standard available.
A.5 Biodiversity No Net Loss: Issue and Impact	Without a suitable definition for No Net Loss that is in line with current best practice we have to make the assumption that anything that results in a habitat loss, is a loss. As such, Part A also results in a net loss due to the loss of watercourses. Watercourses provide important links between designated sites, such as Site of Special Scientifics Interests (SSSIs). Any reduction in connectivity between habitats, especially those that are designated and protected possess a severe threat to species ability to survive and adapt to changing climatic conditions. Again, no mitigation efforts have been suggested.	A response regarding the definition of No Net Loss is detailed in A.4 above. Applying this definition, it follows that the assessments are appropriate. In the context of this Scheme, loss of watercourse is interpreted to mean the loss of natural channel caused by the construction of culverts/bridges as opposed to the loss of watercourses absolutely. A response regarding the unviable nature of creating new watercourses or lengthening existing watercourses is addressed in A.2 above. As such, mitigation measures have been designed to address the net loss of approximately 200m of watercourse associated with Part A. Mitigation includes improvements to approximately 850m of Longdike Burn (see EM047 of Chapter 9: Biodiversity Part A [APP-048]) of the ES and the design of new channels to increase their biodiversity value (see EM041 of Chapter 9: Biodiversity Part A [APP-048] of the ES). This would include the design of channels that are of greater biodiversity value than those lost to Part A.

[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69531/pb13745-bio-technical-paper.pdf

Reference	Comment from Relevant Representation	Applicant's Response
		In respect of Part B specifically, measures to improve watercourses impacted by Scheme construction include the provision of gravel beds and the removal of a step-weir from Shipperton Burn for the benefit of fish movement/passage. These items are further discussed in response A.15 below. The Applicant considers, on the basis of professional judgement, this to be appropriate mitigation and is summarised in the Culvert Mitigation Summary (Annex A). Habitat fragmentation and connectivity has been considered within the design of Part A and Part B. Both Part A and Part B has incorporated linear and connective habitat throughout to maintain and, where possible, improve connectivity of habitats and green infrastructure (see Figure 7.9: Landscape Mitigation Masterplan Part A [APP-095] and Figure 7.10: Landscape Mitigation Masterplan Part B [APP-144]) and captured within the Outline CEMP [APP-346], as detailed in A.3d above. Connectivity along watercourses has also been considered within Figure 9.2: Ecological Mitigation Plan Part A [APP-107], including maintaining passage for fish and mammals through culverts along watercourses and the provision of additional wildlife culverts beneath Part A of the Scheme.
A.6 Biodiversity No Net Loss: Issue and Impact	Given the loss of habitat as a result of the scheme, in particular the loss of 57.69% of watercourses in Part B, we currently have significant concerns regarding the proposals and consider that further mitigation measures are required to mitigate and/or compensate for this loss.	The Applicant notes that the stated 57.69% is for Part B only and a loss of 5% is estimated for Part A. This represents a worst-case and precautionary conservative assessment of the loss of natural channel as noted in paragraph 9.5.5 of Chapter 9: Biodiversity – Part B [APP-049]. The Applicant is currently preparing a Biodiversity No Net Loss Assessment in line with Defra Metric 2.0 for the Scheme. This will be submitted at Deadline 2. The assessment will verify the extent of watercourse habitat lost to the Scheme. A summary of proposed mitigation is provided in the Culvert Mitigation Summary (Annex 2)..
A.7 Biodiversity No Net Loss: Solution	To overcome our objection, the applicant will need to carry out and submit documentation on how this loss of habitat and conflict with the WFD and the NPPF will address the concerns highlighted above. The following information should also be submitted as part of the DCO application:	In order to assist the Examining Authority a Culvert Mitigation Summary (Annex A) is submitted at Deadline 1 that summarises the estimated loss of open channel and the mitigation proposed for each watercourse crossing and WFD water body catchment. This does not change the previous assessments submitted for the Application but consolidates the findings of these assessments. The WFD assessment is contained in Appendix 10.2: Water Framework Directive Assessment - Part A [APP-255] and Appendix 10.2: Water Framework Directive Assessment - Part B [APP-312] and assesses the effect of the Scheme on all relevant waterbodies. It is considered that the result of culvert lengthening would not result in a WFD deterioration at the waterbody scale (as agreed by the EA in comment A.80). It is also considered that with the inclusion of the proposed mitigation as summarised in the Culvert Mitigation Summary (Annex A) and taking into account the size of the affected watercourses, general low ecological value and existing baseline constraints that the Scheme would not cause deterioration to the current status of ecological, physiochemical or chemical quality elements. As discussed in A.3, the Scheme is governed by the NPS NN rather than the NPPF. The Culvert Mitigation Summary (Annex A) sets out the approach to mitigate for the required watercourse crossings and diversions. This is discussed further below.
A.8	Information demonstrating how mitigation and/or compensation will be applied to the unacceptable loss of 57.69% of watercourses in Part B, as	As discussed, in A.2, c.38ha of wet woodland and c.12ha of wetland marginal planting has been included within the Scheme to mitigate for this loss along with

Reference	Comment from Relevant Representation	Applicant's Response
Biodiversity No Net Loss: Solution	well as 5% watercourses in Part A. This mitigation will need to link to the WFD waterbody catchments these watercourses belong to, and provide mitigation measures within those catchments;	additional improvements made to existing culverts as discussed below. Mitigation to address the net loss of watercourse associated with Part A also includes improvements to approximately 850m of Longdike Burn (see EM047 of Chapter 9: Biodiversity Part A [APP-048] of the ES) and the design of new channels to increase their biodiversity value (see EM041 of Chapter 9: Biodiversity Part A [APP-048] of the ES). This would include the design of channels that are of greater biodiversity value than those lost to Part A. Further information regarding additional measures to improve watercourses along Part B, including the provision of gravel beds and removal of a step-weir from the Shipperton Burn as discussed further in response to A.15 below. The Culvert Mitigation Summary (Annex A) submitted at Deadline 1 summarises the mitigation proposed for each watercourse crossing and WFD water body catchment.
A.9 Biodiversity No Net Loss: Solution	- Detailed design information of the reinstatement and enhancement of the watercourse crossings where natural bed features and mammal passage has not been currently included in the design; and	Information regarding the Scheme design is provided in TR010041/APP/6.5 ES Figure 7.8 Landscape Mitigation Plan Part A, TR010041/APP/6.6 ES Figure 7.10 Landscape Mitigation Plan Part B and TR010041/APP/2.8 Structures Engineering Drawings and Sections. The Culvert Mitigation Summary (Annex A) submitted at Deadline 1 summarises the mitigation proposed for each watercourse crossing and WFD water body catchment.
A.10 Biodiversity No Net Loss: Solution	- Revised estimate of biodiversity loss, no net loss or gain after the review of an appropriate definition of No Net Loss.	The Applicant is currently preparing a Biodiversity No Net Loss Assessment in line with Defra Metric 2.0 for the Scheme. This will be submitted at Deadline 2. The assessment will verify the extent of watercourse habitat lost to the Scheme.
A.11 Habitats of Principle Importance: Issue and impact	Part A summarises a loss of approximately 200m of River Habitat of Principle Importance (HPI). This is not compliant with NPPF, which seeks to protect and enhance the environment. Stating that a 5% loss is not classed as a biodiversity net loss is not compliant with current best practice, as stated in our subsection; Biodiversity No Net Loss.	A response regarding the definition of No Net Loss is detailed in A.4 above. Applying this definition, it follows that the assessment is appropriate. It is not considered viable to create new lengths of watercourse as this would rely on a water source to create the habitat. A water source cannot be created and therefore, in the absence of a natural source or diversion of water from an existing watercourse (which could have adverse effects on the existing water course and/or flood management), a watercourse cannot be readily created. As such, mitigation measures have been designed to address the net loss of approximately 200m of watercourse associated with Part A. These include improvements to approximately 850m of Longdike Burn (see EM047 of Chapter 9 Part A [APP-048] of the ES) and the design of new channels to increase their biodiversity value (see EM041 of Chapter 9 Part A [APP-048] of the ES). This would include the design of channels that are of greater biodiversity value that those lost to Part A of the Scheme. The BNNL assessment should be considered separately from the assessment detailed within Chapter 9: Biodiversity Part A [APP-048] and Part B [APP-049] of the ES. The Scheme is a NSIP and is therefore governed by the NPS NN rather than the NPPF. Therefore, there is currently no legal requirement to achieve no net loss or net gains in biodiversity. The BNNL calculations have been completed to inform the Applicant's internal requirement to achieve no net loss across all its schemes cumulatively (at a national scale). This is not linked to the Development Consent Order (DCO) process and is an internal requirement. The assessment has been undertaken as a best practice measure but does not represent a commitment to achieve no net loss for the Scheme. The Applicant is currently preparing a

Reference	Comment from Relevant Representation	Applicant's Response
		Biodiversity No Net Loss Assessment in line with Defra Metric 2.0 for the Scheme. This will be submitted at Deadline 2. The 5% loss of watercourse for Part A is assigned as biodiversity no net loss in accordance with the response provided to question A.4. Within the assessment, no net loss has a range of 95-104% of the baseline in accordance with GN36. GN36 is currently the only published standard available.
A.12 Habitats of Principle Importance: Issue and impact	Considering Part A includes a new offline alignment with several new culverts and the extension of others within the online widening section and given this level of impact upon watercourses, the loss of only 200m (5%) of is not ecologically sound. No mitigation or compensation is offered for this loss.	As discussed in A.11 above, it is not considered viable to create new lengths of watercourse. As such, mitigation measures have been designed to address the net loss of approximately 200m of watercourse associated with Part A. These include improvements to approximately 850m of Longdike Burn (see EM047 of Chapter 9: Biodiversity Part A [APP-048] of the ES) and the design of new channels to increase their biodiversity value (see EM041 of Chapter 9: Biodiversity Part A [APP-048] of the ES). This would include the design of channels that are of greater biodiversity value that those lost to Part A of the Scheme.
A.13 Habitats of Principle Importance: Issue and impact	Culverting of watercourses drastically decreases their function, productivity and ecological value. This loss has been recognised in Chapter 10, section 10.10.31 where it states 'Overall, there is an increase in the total length of culverts and as a result there would be a permanent loss of natural channel associated with Part A along each of the watercourses in the Study Area'.	The Culvert Mitigation Summary (Annex A) submitted at Deadline 1 summarises the mitigation proposed for each watercourse crossing. Specific mitigation measures to maintain the function of the watercourse are discussed further below. The Scheme also maintains the hydraulic connectivity of all watercourses crossed by the Scheme to maintain downstream hydromorphological conditions.
A.14 Habitats of Principle Importance: Issue and impact	Any overall loss and impact will also require considerations in terms of the WFD. Furthermore, Chapter 9 section 9.8.9 states 'With regards to potential impacts to watercourses (running water – G2), excluding ditches, Part A would result in the direct, permanent loss of approximately 750 m of watercourse. Loss would occur to facilitate the construction/extension of culverts. This includes the loss of approximately 715 m of watercourses considered of Local importance and approximately 35 m of watercourse considered of National importance, Longdike Burn.' This is much greater than the 200m the ES summarises. It is assumed that the applicant has come to this conclusion due to the 540m of new channel due to be created as stated in section 9.9.6. However not only this is a net loss, but this is not a like for like replacement and channel realignments are unlikely to carry the same biodiversity value as previous channels. No designs for new channels have been submitted, and plans appear to show straightened channels, which provide a very low biodiversity value.	The reinstatement of new channel has been taken into account meaning that there is a net loss in Part A of c.200m. The assessment considered that the existing channels that are to be realigned are small watercourses that are already very straight and trapezoidal in shape, and with low ecological value and not identified to be suitable for fish. The proposed design of these sections of realigned channel would introduce features within the channel to provide greater variation to flow and habitat form. It is not considered appropriate to provide a meandering channel for these small features, particularly as this would be a significant change to the current channel form and not in proportion to the small nature of the watercourse. However whilst the realigned channel is straight, the proposals to include in-channel features will provide variation within the channel beyond that which is currently present which is considered more appropriate for the size of these features. The proposed in-channel features will be developed further during the detailed design in consultation with the EA and Local Authority, secured through requirement 8 of the DCO [App-014]. The design for the crossing of the Longdike Burn comprises an extension to the existing bridge structure that will maintain the natural riverbed. A mammal ledge will also be added.
A.15 Habitats of Principle Importance: Issue and impact	Part B will also result in the loss of a further 285m of watercourse through a combination of new or extensions to existing culverts. The descriptions of the existing culverts indicate that none of them have been designed to allow the development of a natural bed within the structures, with the A1 culvert on the Shipperton Burn clearly showing a step and channel incision at the downstream end.	As summarised in the Culvert Mitigation Summary (Annex A) all proposed culvert extensions maintain the same baseline conditions as the existing culverts, at minimum, with improvements provided where practicable through inclusion of gravel beds. All culverts extensions are on watercourses that were identified not to be suitable to support fish, with the exception of Shipperton Burn. The culvert extension for Shipperton Burn has maintained similar conditions to existing but with

Reference	Comment from Relevant Representation	Applicant's Response
		the addition of a gravel bed in the new culvert section and removal of an existing step-weir to assist with fish passage through the culvert. This has been updated in B-W1 in the Outline CEMP [APP-346] and submitted at Deadline 1. Due to engineering constraints on the existing and proposed culvert it is not considered viable to introduce fish baffles or a low flow channel. This is summarised within the Culvert Mitigation Summary (Annex A), which is submitted at Deadline 1. Proposed replacement culverts have included a gravel bed as standard where this is feasible in line with engineering constraints, noting that this is an addition not currently provided within many of the existing culverts. New culverts have been informed by the aquatic surveys, with inclusion of a gravel bed and low flow channel for the River Lyne as the only watercourse that was identified to have value for fish species and where a new culvert is proposed. Baffles have been retrofitted in the existing River Lyne culvert to aid fish passage, and the existing baffles in the Longdike Burn culvert would also be replaced with a more robust arrangement. A gravel bed has also been included within most new culverts unless there is insufficient baseflow to have the potential to support aquatic species. This is detailed in Appendix 10.2: Water Framework Directive Assessment - Part A [APP-255] and Appendix 10.2: Water Framework Directive Assessment - Part B [APP-312].
A.16 Habitats of Principle Importance: Issue and impact	All the culvert extensions propose to replicate the existing culverts, with no acknowledgement of the impacts these may have on WFD status, stream morphology or wildlife. Mitigation through design, or compensation for the loss of channel is not considered. This is particularly highlighted on the:	As discussed above, the culvert extensions have aimed to provide betterment where the Applicant considers it to be viable in terms of buildability and culvert size and taking into account the aquatic value of the watercourse. This is detailed in Appendix 10.2: Water Framework Directive Assessment - Part A [APP-255] and Appendix 10.2: Water Framework Directive Assessment - Part B [APP-312]. This is also summarised in the Culvert Mitigation Summary (Annex A), which is submitted at Deadline 1.
A.17 Habitats of Principle Importance: Issue and impact	- Shipperton Burn where the step at the outlet to the culvert is a clear issue for fish migration and yet not mentioned nor addressed; and	The Shipperton Burn culvert extension would be tied into the existing downstream bed and the step weir currently present would be removed to aid fish migration. This is shown in Structures Engineering Drawings and Sections [APP-012] Drawing reference HE551459-WSP-SBR-A2E-DR-CB-2165. No amendments to existing Shipperton Bridge are required and therefore no amendments are proposed. Removing the step weir downstream of Shipperton Bridge would extend the scheme works outside of the Order limits.
A.18 Habitats of Principle Importance: Issue and impact	- Kittycarter Burn Southern crossing and White House Burn crossing are obvious pathways for nutrients and fine sediment to enter the watercourse. Despite listing these as WFD pressures for the relevant waterbodies, yet not considered and addressed.	The Applicant assumes this is related to the presence of the existing cattle creeps. The cattle creeps would be maintained and used as per existing. The Scheme would not change their function or increase risk associated with their use. There would therefore be no change to the baseline condition.
A.19 Habitats of Principle Importance: Issue and impact	In Part A and B, it is proposed to realign several watercourses. The design criteria "the design of the new channel would maintain a similar channel profile and dimensions to the existing watercourse to mimic existing conditions. Boulders would be placed within the new channel to provide varied substrate features and flow dynamics within the watercourse channel" is not acceptable. There is a clear opportunity for betterment, and	The assessment considered that the existing channels that are to be realigned are small watercourses that are already very straight and trapezoidal in shape, and with low ecological value and not identified to be suitable for fish. The proposed design of these sections of realigned channel would introduce features within the channel to provide greater variation to flow and habitat form that is currently present within these watercourses. It is not considered appropriate to provide a meandering

Reference	Comment from Relevant Representation	Applicant's Response
	we welcome the commitment to "further develop the design during the detailed design stage alongside further consultation with the Environment Agency and Northumberland County Council as Lead Local Flood Authority".	channel for these small features, particularly as this would be a significant change to the current channel form, and instead providing variation within the channel was considered more appropriate whilst still providing more varied conditions than is currently present.
A.20 Habitats of Principle Importance: Issue and impact	Opportunities to create more natural, sinuous watercourses and water dependant habitats have not been considered, such as realignment of Fenrother Burn. As such, we believe there are many missed opportunities to compensate for the impact of the scheme, thus further increasing the biodiversity net loss.	The section of Fenrother Burn to be realigned was already a straightened trapezoidal channel that flowed parallel to the east of the A1. The Fenrother Burn also currently passes through a c.120m long 0.5m diameter culvert and the total culverted length would be c.30m less than the existing culverted length and with a larger structure provided. This is also a small watercourse with a small c.3km2 catchment that was not considered suitable to support fish. The Applicant believes that the proposed provision of features within the channel and the appropriate selection of aquatic vegetation would provide enhancement of the open sections of this realigned channel. Our approach to the other realigned watercourses is as discussed in A.14 and A.19 above.
A.21 Habitats of Principle Importance: Solution	To overcome our concerns, the applicant will need to carry out and submit a design of the mitigation and compensation of channel creation as part of the DCO. The design should be developed with a specialist geomorphologist support in order to maximise the biodiversity and hydromorphology benefits of the new channel alignments	As per above response (A.20) it is not considered appropriate or necessary to meander the Fenrother Burn and other realigned watercourses as discussed above, however the proposed approach to the design as discussed above is considered appropriate to provide an enhanced design compared to baseline conditions. The proposed in-channel features will be developed further during the detailed design in consultation with the EA and Local Authority, secured through requirement 8 of the DCO [App-014].
A.22 Otter and Water Vole: Issue and impact	The ES addresses the highly mobile nature of otters within the assessment for Part A. Pre-commencement surveys as outlined with DM008 are essential due to their large range and as the surveys are outdated, this form of survey should be completed within a timescale allowing a European Protected Species Mitigation Licence to be applied for if new resting places are found.	The Applicant agrees that the pre-commencement survey is essential, and the requirement for the survey has been captured within the Outline CEMP [APP-346], see measure A-B17. The Applicant can confirm that the pre-commencement survey would be undertaken within a timescale to allow a licence to be applied for if necessary.
A.23 Otter and Water Vole: Issue and impact	The lack of consideration for otter in Part B is unacceptable, given that they are a highly mobile species and are slowly naturally expanding their ranges. Therefore, we object to the proposed development due to inadequate assessment of otters. Our records show 24 records of otter within 5km of Part B. Given they have ranges of up to 32km, there is a high potential for otter to be as a minimum, transient in the local area. The scheme will become a permanent feature in the landscape and become a new major barrier to movement should otter colonise the area or expand current ranges. Therefore, the operational phase of the scheme is likely to cause mortalities of otters due to the lack of wildlife friendly culverts or crossings. The potential for otter to be present in a forward looking manner is required, giving further consideration to risk of mortality in the operational phase.	Impacts to otter have been considered within the assessment for Part B. The otter surveys for Part B were completed in line with relevant standard guidelines (refer to Appendix 9.3 Part B [APP-300]) and did not identify any field signs of otter within the surveyed area. The survey also concluded that, generally, habitats were of low suitability or unsuitable to support resident otter. The desk study presented within the otter report for Part B [APP-300] included records of otter within 2km of Part B. The assessment considered those records within the last 10 years, as earlier records may not be relevant to the current ecological baseline. The desk study recorded 13 records of otter within the 2km search area. As detailed in paragraph 9.8.2(c) of Chapter 9: Biodiversity Part B [APP-049], otter are assessed as likely absent from the Order limits of Part B. The Applicant recognises that otter are a highly mobile species. However, Part B involves the widening of the existing A1 and not the creation of a new road. As such, Part B is already a permanent feature (existing A1) and already represents a major barrier to otter movement. The existing otter population is therefore acclimatised to the presence of a road. Mortality as a result of traffic collision is an existing pressure, not one introduced by Part B.

Reference	Comment from Relevant Representation	Applicant's Response
		Existing culverts located along Part B would be extended as part of road widening. Owing to the size of the existing culverts and the single proposed new culvert (tributary of Embleton Burn), based on CDM regulations it is not possible to include or retrofit mammal ledges/shelves. Cattle creep box culverts are located along White House Burn and a tributary of Kittycarter Burn, which provide free opportunities for wildlife passage beneath the carriageway at these locations without the need for a mammal ledge. As discussed in response A.3d, whilst considered, it is not feasible or proportionate to remove and replace existing culverts in their entirety. The increased construction footprint requirement and damage to existing habitats, both terrestrial and aquatic, that would be required to facilitate this, outweigh the benefits of this approach. This is particularly when acknowledging that the assessment has concluded a likely absence of otter from the Order Limits and Survey Area of Part B. It is accepted that culverts will be lengthened. However, it is not accepted that this will render them unsuitable for otter passage in particular. Following extension, these culverts retain the ability to offer free passage to wildlife (particularly mammals) except in times of flood. In England, there is no definitive guidance regarding the maximum length of a culvert that would be used by otter and also the relationship between length and diameter of a culvert. See also response A.3a above.
A.24 Otter and Water Vole: Issue and impact	We accept the assessment that water vole are likely absent from Part A and B, and that precautionary pre-commencement surveys should be undertaken alongside otter surveys.	The Applicant notes the acceptance of the water vole assessment for the Scheme.
A.25 Otter and Water Vole: Solution	The mitigation designs and the scheme drawings should be updated and take into consideration the impact of the development on otters. Given the known presence of otter in Part A, and potential in Part B, wildlife crossings should also include mammal fencing to ensure otters and other mammals, such as badger are directed towards wildlife friendly crossing points. We note that there is some badger fencing designed into the scheme, this needs serious consideration for other potential mammal crossing points.	The impacts to otter have been considered within the mitigation design, in accordance with the impact assessment presented within Chapter 9: Biodiversity Part [APP-048] and Part B [APP-049]. As such, it is not proposed to update mitigation designs and scheme drawings. The impact assessments detailed in Chapter 9: Biodiversity Part A [APP-048] of the ES and Chapter 9: Biodiversity Part B [APP-049] of the ES are considered accurate and the proposed mitigation proportionate to the potential impacts of the Scheme on the basis of the results of both the desk study and survey results for either Part of the Scheme as discussed in A.23 above. Mammal fencing has been considered and selectively incorporated into the Scheme where there is a risk of severance of mammal pathways or territories, primarily in relation to badger for Part A (as for example, shown on Ecological Mitigation Plan (confidential) [APP-106]). In these instances, the fencing has been used to direct badger (and other mammals) to crossing features designed into the Scheme (culverts with mammal passage).
A.26 White Clawed Crayfish (WCC): Issue and impact	In Part A of the scheme, we have two records of white-clawed crayfish on the River Lyne, c.1km and c.1.2km from the current alignment. This has not been identified within the ES. Therefore, it is considered that the impact of the development on the WCC has not been satisfactorily assessed. We therefore object to the proposed development as submitted.	The field survey of Part A undertaken in 2017 did not record white-clawed crayfish within the surveyed area of the River Lyne, although a population of the invasive North American signal crayfish was recorded (a total of 31 individuals) (see Appendix 9.3, Table 8.1 [APP-229]). Once a mixed population of American signal crayfish and white-clawed crayfish occurs, the white-clawed crayfish population is

Reference	Comment from Relevant Representation	Applicant's Response
	Though reported as unconfirmed, these records are from 2018, 1 year after the surveys were undertaken for the DCO application.	progressively lost due to crayfish plague and/or competition (Peay, 2003). Once this happens, there is no known action that can be taken to allow future recovery of the native crayfish population (Peay, 2003). Therefore, no white-clawed crayfish are considered absent from the River Lyne within the Order Limits and the impact assessment is considered valid. Peay, S. (2003). Monitoring the white-clawed crayfish *Austropotamobius pallipes*. Conserving Natura 2000 Rivers Monitoring Series No. 1, English Nature, Peterborough.
A.27 White Clawed Crayfish (WCC): Issue and impact	Only one survey was undertaken in Part B, this was undertaken using a novel and technique that is in its infancy. Therefore, the validity of the results should be considered when assessing the likelihood of WCC being present within the DCO limits.	e-DNA samples were collected to assess the presence/likely absence of white-clawed and American signal crayfish within the watercourse. The eDNA method has been found to be suitable for detecting several invasive and native crayfish species as well as the crayfish plague pathogen in Central and Western Europe (Rusch et. al., 2020). As such, the survey results are considered valid. Rusch JC, Mojžišová M, Strand DA, Svobodová J, Vrålstad T, Petrusek A (2020) Simultaneous detection of native and invasive crayfish and Aphanomyces astaci from environmental DNA samples in a wide range of habitats in Central Europe. NeoBiota 58: 1-32.
A.28 White Clawed Crayfish (WCC): Solution	The potential for WCC to be present on the River Lyne must be considered and reassessed within the zone of influence of the scheme, along with any mitigation requirements submitted within the ES. Furthermore, the validity of the results for Part B must be considered when assessing the likelihood of WCC being present.	The answer provided above in A.26 demonstrate that the presence of white-clawed crayfish on the River Lyne has been considered and the assessment of absence remains valid. The results for Part B are considered valid as a result of the eDNA sample survey and white-clawed crayfish are considered likely absent. As such, the impact assessment for Part B is valid.
A.29 Great Crested Newt: Issue and impact	We are satisfied with the approach taken in respect to great crested newt, despite the time since the initial surveys. We agree that further surveys are needed in Part A as presence was confirmed from surveys undertaken in 2017 and are aligned with historic records, indicating population in two main areas; near Burgham Golf Course and Tile Kiln Rush, Felton.	No comment required
A.30 Great Crested Newt: Issue and impact	As part of the updated surveys to inform both the licence and mitigation requirements we believe that, given the time since the original surveys, eDNA surveys as a minimum should be undertaken of all ponds within 500m of the known clusters, such as ponds A7 and A14. Despite being segregated by barriers such as the A1, there are still potential routes for migration.	Given the time that has elapsed since the original surveys, the Applicant completed a great crested newt verification survey in 2020, which involved an update Habitat Suitability Index (HSI) assessment and eDNA survey of each previously surveyed waterbody (where accessible). The report was issued at Deadline 1 (document reference 6.20). No changes to baseline conditions were recorded. These surveys are additional to the proposed update surveys to inform the newt licences. Update population size class surveys will be undertaken to inform the great crested newt licences (see A-B18 of the Outline Construction Environmental Management Plan (Outline CEMP) [APP-346]). The Applicant agrees that the update surveys shall include ponds within 500m of the known great crested newts ponds, where these are not separated by barriers to dispersal. The Applicant does not agree that ponds A7 and A14 are necessary for inclusion within the updated surveys. Pond A14 will not be included within this survey as it is separated from the great crested newt ponds (Ponds A11 and A12) by the existing A1, a major barrier to dispersal.

Reference	Comment from Relevant Representation	Applicant's Response
		A7 will also not be included as it is located over 500m from Ponds A11 and A12. Pond A7 was also dry during the 2020 verification survey. The scope of the updates surveys to inform the great crested newt licence shall be agreed with Natural England as the licensing body.
A.31 Great Crested Newt: Issue and impact	Furthermore, there appears to be some disparity between the logic used for survey effort and compensatory habitat for great crested newt. For example, Pond A14 has a 'Good' HSI score, yet is not to be surveyed due to the justification that the A1 is a barrier to movement and change is not expected in the time frames of this assessment, however compensatory habitat for Pond A19 is on the opposite side of the A1. If the A1 it is not deemed a barrier to movement north of the Coquet River, then for robustness, ponds such as A7 and A14 that are segregated from known populations by similar barriers should be resurveyed for robustness, especially given the time elapsed since the eDNA survey in 2016.	As a busy A-road, the A1 represents a significant barrier to great crested newt dispersal. As such, it is not intended to resurvey ponds A7 and A14, as detailed further in the response to item A.30 above. The justification for the inclusion of habitat on the opposite side of the A1 to Pond A19 is detailed in Section C5 of the Great Crested Newt Method Statement [APP-250]. For clarity, this does not apply to the A7 and A14 referenced above. Habitat on the opposite side of the A1 to Pond A19 was included due to connectivity beneath the River Coquet Bridge to the southeast of the pond. The Method Statement, which will be used to inform a future European Protected Species (EPS) licence application, has been reviewed by Natural England. Natural England have confirmed that they would not seek compensation for loss of habitat on the eastern side of the A1 (opposite side to Pond A19). This is confirmed within the Letter of No Impediment provided by Natural England. As such, habitat loss on the opposite side of the A1 to Pond A19 will not be considered further within the future licence application.
A.32 Great Crested Newt: Solution	Further justification for compensatory habitat that is segregated from known populations by the A1 alignment, such as by compensation scheme by pond A19 should be submitted as part of the DCO.	The requested justification is detailed within the above response; A.31.
A.33 Great Crested Newt: Solution	There also appears to be work within 500m of Pond A21, with no compensatory habitat provided. This should be addressed. The results of updated surveys should be submitted as part of the DCO and the reassessed in the ES.	The approach to the assessment and mitigation for works in proximity to Pond A21 is detailed in EM007 of Chapter 9: Biodiversity Part A [APP-048] of the ES. Currently, works would not include the loss of great crested newt habitat and therefore no compensatory habitat is proposed.
A.34 Detailed Construction Environmental Management Plan (CEMP): Issue and impact	Fish species, great crested newt, white clawed crayfish and otter are protected species and receive protection through UK and EU legislation. These species have been found to be present or potentially present at the proposed development site. In addition, Invasive Non-Native Species (INNS) have also been found to be present on site and have been identified as requiring management.	The Applicant can confirm that mitigation for fish, great crested newts, otter and Invasive Non-Native Species (INNS) are detailed within the Outline CEMP [APP-346]. These include the following measures: · Fish – S-G5, S-B14, S-W12, A-B9, A-W2, A-W3, A-W5, A-W6, A-W8, A-W9, A-W12, A-W13, A-B29, A-B30, A-B33, A-W15, B-B5, B-B24 and B-B25; · Great crested newts – A-B22 and A-B23; · Otter – S-L3, A-B2, A-B8, A-B10, A-W4, A-W5, A-W6, A-W9, A-W11, A-W12 and A-B17; and · Invasive non-native species – S-B8, S-B13, A-B7, A-B17 and A-B39. White-clawed crayfish were considered likely absent from the Order Limits and therefore no specific mitigation is proposed. Measure B-B26, which would be applied to the Scheme, acknowledges that if a crayfish of any species is found during works, activities shall cease and a suitable licensed ecologist shall be consulted to confirm actions to take.
A.35 Detailed Construction Environmental Management	The greatest threat to the environment through construction is the release of site water with high suspended sediment into the watercourses. This is detrimental to the water environment and associated ecology and is	S-GS13 and S-W9 in the Outline CEMP [APP-346] have been updated and submitted at Deadline 1 to include appropriate mitigation for sediment control associated with the release of site water that reflects the programme, location and

Reference	Comment from Relevant Representation	Applicant's Response
Plan (CEMP): Issue and impact	predominantly due to the exposure of topsoil's and compaction of subsoils, leading to high rates of soil erosion and surface water runoff with high suspended solids, leading to a risk of sediment pollution to waterbodies. The most effective method for managing this risk is to phase the stripping of topsoil's, as the topsoil provides a highly efficient protective layer that aids in interception of precipitation and infiltration into the ground. The additional cost of phased stripping can often be cost effective when compared to intensive and often costly methods to treat site water with a high suspended solids content.	magnitude of works being undertaken close to watercourses. As detailed in S-W8 of the Outline CEMP [APP-346], a sediment control plan and appropriate monitoring programme will be further developed as part of the Main Contractor's working method statements
A.36 Detailed Construction Environmental Management Plan (CEMP): Issue and impact	S-GS13 states a weekly inspection of watercourses, this seems inappropriate considering the high number of watercourses, and the risk posed by the construction of a large linear scheme. It is advised that watercourses in high risk areas and where construction activities are more intensive are subject to more regular checks, and clear actions defined such as reporting when limits (such as turbidity NTU levels) are reached such so that pollution incidents are appropriately reported to Environment Agency and issues are resolved.	
A.37 Detailed Construction Environmental Management Plan (CEMP): Issue and impact	Detention basins are designed for the operational phase of the scheme, as such these should not be relied upon to deal with the large volumes of contaminated water that are associated with construction activities, as they are highly unlikely to be able to cope, and therefore result in pollution incidents and impacts upon ecology throughout the scheme.	The detention basins would not be used as part of the construction mitigation measures. A temporary surface water drainage strategy would be implemented to limit the uncontrolled run-off entering surrounding surface watercourses, including installing cut off ditches around the perimeter of the construction area to prevent sediment entering the watercourses during periods of heavy rainfall. This is secured in the Outline CEMP [APP-346] in S-GS9.
A.38 Detailed Construction Environmental Management Plan (CEMP): Issue and impact	Dedicated sediment traps and settlement ponds should be designed into the scheme, and where these are unlikely to be effective, treatment systems such as lamella tanks and chemical dosing should be costed into the scheme.	Sediment traps are included as part of the Outline CEMP [APP-346] in A-W15 and B-B23 to treat surface water runoff. Settlement ponds are included as part of the Outline CEMP [APP-346] in S-W10 to dewater shallow groundwater with a high sediment load. The Outline CEMP [APP-346] contains the roles and responsibilities of the 'Environmental Manager' which is considered to be the equivalent of the Environmental Clerk of Works (EnvCoW)].
A.39 Detailed Construction Environmental Management Plan (CEMP): Issue and impact	Environmental pollution risks should be monitored by a suitably experienced Environmental Clerk of Works (EnvCoW) who is a member of organisations such The Association of Environmental Clerks of Works (AECoW). This role is likely to differ from an Ecological Clerk of Works, who is primarily focused on monitoring the protection of protected species and habitats, as is ideally accredited by CIEEM (https://cieem.net/i-am/current-projects/accredited-ecow/). The responsibilities of the team required to fulfil the EnvCoW and ECoW should be discussed with the Environment Agency before being clearly defined in the CEMP. It should also be noted that, by definition, a Clerk of Works role is to 'oversee the management of the risks on construction sites' (CIEEM https://cieem.net/i-am/current-projects/accredited-ecow/), they are there to monitor site activities and it is the contractor's responsibility to ensure they are complying with environmental and wildlife legislation.	Table 2-1 in the Outline CEMP [APP-346] contains the roles and responsibilities of the 'Environmental Manager'-which is considered to be the equivalent of the Environmental Clerk of Works (EnvCoW)
A.40	The Outline Construction Environmental Management Plan (CEMP) details a number of measures in which those species listed above would be protected and invasive species managed. Although checks are described	The manner in which mitigation is addressed for the Scheme is that the dDCO provides for there to be a CEMP derived from the Outline CEMP [APP-346]. The content of the Outline CEMP governs the content of the CEMP that will be

Reference	Comment from Relevant Representation	Applicant's Response
Detailed Construction Environmental Management Plan (CEMP): Solution	within the CEMP, a detailed protected species mitigation plan as part of the CEMP should be produced as part of the DCO.	submitted for approval to the Secretary of State under Requirement 4, Schedule 2 of the dDCO [APP-015]. As such, the following are already provided for in the Outline CEMP and hence, the CEMP: - Great crested newts (A-B22 and A-B23) - Otter (S-L3, A-B2, A-B8, A-B10, A-W4, A-W5, A-W6, A-W9, A-W11, A-W12 and A-B17) - Fish (S-G5, S-B14, S-W12, A-B9, A-W2, A-W3, A-W5, A-W6, A-W8, A-W9, A-W12, A-W13, A-B29, A-B30, A-B33, A-W15, B-B5, B-B24 and B-B25) - Invasive non-native species (S-B8, S-B13, A-B7, A-B17 and A-B39) As mitigation is already secured for these species through measures in the Outline CEMP, there is no need for a protected species mitigation plan. This would be unnecessary duplication.
A.41 Detailed Construction Environmental Management Plan (CEMP): Solution	We recommend that a requirement is included in the DCO requiring the submission of a Detailed CEMP to protect against damage and mitigate any damage to fish species, great crested newt, white clawed crayfish and otter as well as manage INNS. Without this requirement, we would object to the proposal because it cannot be guaranteed that the development will not result in harm to fish species, great crested newt, white clawed crayfish and otter as well as cause spread on INNS. It is not necessary for the Detailed Construction Environmental Management Plan to be provided prior to the granting of planning permission.	
A.42 Fisheries: Issue and Impacts - Timing of Works	S-W12 of the Outline CEMP refers to avoiding critical periods for fish migration and spawning. We agree that in water works should be carried out between 1st June to 30th September to avoid sensitive period for migratory fish which is between 1st October and 31st May inclusive. This is to avoid disturbance to spawning fish and/or their habitat and eggs. If work is carried out outside this window there is a risk of committing an offence under the Salmon and Freshwater Fisheries Act 1975 (SAFFA). It is noted that one of the DCO documents states that work will be undertaken during the spawning period.	Surveys and desk study data identified migratory fish (namely salmon, brown trout, eel and/or lamprey) within the River Coquet, Longdike Burn and the River Lyne for Part A (see Tables 7.1 and 7.2 of Appendix 9.3 Aquatic Ecology Survey Report Part A [APP-229]) and Denwick Burn and Shipperton Burn for Part B (see Tables 4-2 and 4-6 of Appendix 9.10 Aquatic Ecology Assessment Report Part B [APP-308]. The Environment Agency confirmed within an email dated 24/12/2020 the comment: *"It is noted that one of the DCO documents states that work will be undertaken during the spawning period*" relates to EM014 of Table 9-23 of Chapter 9: Biodiversity Part A [APP-048]. A full response regarding the timing of works associated with the construction of the new River Coquet Bridge is detailed in A.50. In relation to Longdike Burn, in accordance with S-W12, A-B31 and A-B32 of the Outline CEMP [APP-346], culvert extension works would be undertaken outside the period September to May (accounting for the presence of brown trout and lamprey). In relation to the River Lyne, the Applicant has amended S-W12 and A-B31 to make reference to the River Lyne. As such, in accordance with S-W12, A-B31 and A-B32 of the Outline CEMP [APP-346], culvert extension works would be undertaken outside the period September to May (accounting for the presence of brown trout and lamprey). In relation to Shipperton Burn, in accordance with S-W12, culvert extension works would be conducted outside the period September to April to account for the presence of brown trout. This timeframe is appropriate for the geographical location (northern England) of the Scheme and the spawning period of brown trout (September to March). In relation to Denwick Burn, in accordance with B-B24, culvert extension works would be conducted outside the period September to the end of May, to account for the presence of brown trout and salmon.

Reference	Comment from Relevant Representation	Applicant's Response
		The timing of works, as detailed above, would mitigate the risk of committing an offence under the Salmon and Freshwater Fisheries Act 1975 (SAFFA).
A.43 Fisheries: Solution	We would welcome clarity regarding the timing of works. It is vital that fish passage should be maintained at all times to ensure the works do not present a barrier to fish movement. Failure to maintain fish passage could result in committing an offense under SAFFA and the Eel Regulations 2009 (Eel Regs).	The Scheme would include in-channel works associated with culvert extensions/creation/reinstatement and the construction of the southern pier of the new River Coquet Bridge. These works would require the creation of a dry area and the Applicant agrees that this has the potential to impact on fish. Therefore, the Outline CEMP [APP-346] includes requirements for fish rescue during in channel works (S-W12, A-B29, A-B33). The detailed methodology of fish rescue operations will be documented within the Main Contractor's CEMP. The Applicant agrees with the statements made by the Environment Agency regarding the prevention of ingress of fish into any pump used, the rescue of fish with hand nets and relocation to a safe distance and the completion of fish rescue in accordance with best practice and under an appropriate licence. The Applicant has updated S-W12 of the Outline CEMP to capture these statements. The updated Outline CEMP is issued at Deadline 1.
A.44 Fisheries: Issue and Impacts - Dewatering	With regards to dewatering and fish, S-W12 of the outline CEMP refers to the creation of a dry working area. This could have a potential impact on fish.	
A.45 Fisheries: Solution	A fish rescue should be undertaken prior to any in-channel works and fish captured relocated a safe distance away. This must apply to all in water works and must be reflected in the CEMP. The pump(s) used for dewatering will need to be appropriately screened to prevent ingress of fish. Screening is a requirement of both SAFFA and Eel Regs. Any remaining fish found in dewatered areas should be rescued with hand nets and relocated a safe distance away. Fish Rescues must be carried out to best practice and with appropriate licence e.g. FR2 - Application for authorisation to use fishing instruments other than rod and line.	Lamprey and European eel are known to be present within the River Coquet, Longdike Burn and River Lyne based on data from the Environment Agency (Table 9-16 of Chapter 9: Biodiversity Part A [APP-048]). Lamprey and ell were recorded within Longdike Burn (Part A) (Table 7.2 of Appendix 9.3 Aquatic Ecology Survey Report Part A [APP-229]) and lamprey are listed on the citation of the River Coquet and Coquet Valley Woodlands SSSI. Lamprey were not identified within the aquatic assessment for Part B [APP-308]. The Applicant agrees with the response provided by the Environment Agency and has updated the Outline CEMP [APP-346] to capture this detail in S-W12. Point g of S-W12 reads "*Any excavated sediment will be left on the channel edge below or close to the low water mark to allow Lamprey juveniles (ammocoetes) and European eels (if present) to return to the water. After a period of 24 hours the material can then be removed*." The updated Outline CEMP is submitted at Deadline 1.
A.46 Fisheries: Issue and Impacts - Bank Excavation Activities	Lamprey juveniles (ammocoetes) and European eels may be present in the wetted sediment on the channel edge and could be adversely impacted.	
A.47 Fisheries: Solution	Any excavated sediment should be left on the channel edge below or close to low water mark to allow eels to return to the water. After a period of 24 hours the material can then be removed. We would welcome reference to this within the DCO documents.	The Applicant has updated S-B14 in the Outline CEMP [APP-346] and it is submitted at Deadline 1.
A.48 Fisheries: Issue and Impacts - Poisonous matter	S-B14 of the outline CEMP refers to working with concrete in or within close proximity to waterbodies.	The Applicant has updated S-B14 in the Outline CEMP [APP-346] and it is submitted at Deadline 1. This includes the proposed approach to protecting adjacent watercourses when working with concrete close to watercourses detailing that dry working areas would be created.
A.49 Fisheries: Solution	In order to minimise the impact on fish, contamination of the river by any cementatious material or leachate from mixing and/or applying concrete must be avoided as this can be lethal to fish and is an offence under SAFFA (Part I, sect 4.1). Dry working when using concrete, allowing	The approach to piling associated with the construction of the River Coquet Bridge and proposed mitigation has been discussed with the Environment Agency and Natural England. The Environment Agency stated during a meeting held on 19

Reference	Comment from Relevant Representation	Applicant's Response
	concrete to dry before it is exposed to water and the use of quick drying cement should reduce any associated risk. We would welcome reference to this within the DCO documents.	December 2018 that construction noise will affect fish and therefore advised works to be undertaken during daylight hours between the months of May and October, as fish normally move at night. Natural England also confirmed that they spoke with the Environment Agency in March 2019 to verify this advice and confirmed that the timeframes could be relaxed, subject to additional measures. Additional measures adopted include stop-start / intermittent working techniques and supervision by an Ecological Clerk of Works (ECoW). The advice has been captured within mitigation measures A-B29 within the Outline CEMP [APP-346], which states that "*installation of the* [sheet piled cofferdam] *is proposed outside the 'in river works' period (end April to end September). As such, to reduce the impact to migratory and spawning salmon and brown trout, installation will be in accordance with the following:* *a. In river works will be restricted to daylight hours.* *b. In river works are anticipated to be short in duration (two-three weeks).* *c. Supervision to be provided by the ECoW throughout installation (fish rescue to be implemented as required, refer to S-W12 and A-B33 of this Outline CEMP). The ECoW may also temporarily suspend works should evidence be obtained to suggest works may impact fish migration/spawning (such as migration during the period of works).* *d. Soft-start and intermittent working techniques outlined will be applied*". The Applicant has updated measure A-B29 of the Outline CEMP to include "piling activities during the period October to May would be restricted to low flows. Should water levels rise during works, work shall cease and only recommence once water returns to low flow levels." The updated Outline CEMP is issued at Deadline 1. Whilst Section 1.2.5 of the Outline CEMP [APP-346] refers to night-time work in relation to the construction of the River Coquet Bridge, this does not relate to piling works and shall not contradict mitigation measure A-B29.
A.50 Fisheries: Issue and Impacts - Piling	Piling can pose a barrier to fish and adversely affect fish migration as a result of noise and vibration.	The approach to piling associated with the construction of the River Coquet Bridge and proposed mitigation has been discussed with the Environment Agency and Natural England. The Environment Agency stated during a meeting held on 19 December 2018 that construction noise will affect fish and therefore advised works to be undertaken during daylight hours between the months of May and October, as fish normally move at night. Natural England also confirmed that they spoke with the Environment Agency in March 2019 to verify this advice and confirmed that the timeframes could be relaxed, subject to additional measures. Additional measures adopted include stop-start / intermittent working techniques and supervision by an Ecological Clerk of Works (ECoW). The advice has been captured within mitigation measures A-B29 within the Outline CEMP [APP-346], which states that "*installation of the* [sheet piled cofferdam] *is proposed outside the 'in river works' period (end April to end September). As such, to reduce the impact to migratory and spawning salmon and brown trout, installation will be in accordance with the following:* *e. In river works will be restricted to daylight hours.* *f. In river works are anticipated to be short in duration (two-three weeks).*
A.51 Fisheries: Solution	We require confirmation regarding the timing of works and the proposed piling within the vicinity of the watercourse. It is vital that fish passage is maintained. If possible, piling in or near water should avoid the sensitive period for migratory fish (Oct –May). Alternatively, piling activities could be restricted to low flows. During a rise in levels we would expect piling activities to stop and not restart until levels drop; this will enable windows for migratory fish to pass by the intake and outfall construction areas.	
A.52 Fisheries: Solution	Section 1.2.5 of the OCEMP refers to night-time working in relation to the construction of the River Coquet bridge. Confirmation of the timing of all works should be provided as part of the DCO. Piling should also be restricted to day time hours.	

Reference	Comment from Relevant Representation	Applicant's Response
		g. Supervision to be provided by the ECoW throughout installation (fish rescue to be implemented as required, refer to S-W12 and A-B33 of this Outline CEMP). The ECoW may also temporarily suspend works should evidence be obtained to suggest works may impact fish migration/spawning (such as migration during the period of works). *h. Soft-start and intermittent working techniques outlined will be applied*". The Applicant has updated measure A-B29 of the Outline CEMP to include "piling activities during the period October to May would be restricted to low flows. Should water levels rise during works, work shall cease and only recommence once water returns to low flow levels." The updated Outline CEMP is issued at Deadline 1. Whilst Section 1.2.5 of the Outline CEMP [APP-346] refers to night-time work in relation to the construction of the River Coquet Bridge, this does not relate to piling works and shall not contradict mitigation measure A-B29.
A.53 Fisheries: Issue and Impacts - Culverts	We are happy that fish passage has been considered for most of the proposed new culverts and culvert extensions. However, the ES fails to make reference to fish passage for the culvert extension on the Shipperton Burn.	The Shipperton Burn culvert extension would be tied into the existing downstream bed and the step weir currently present would be removed. A gravel bed would also be provided within the culvert extension. This is shown in Structures Engineering Drawings & Sections [APP-012] Drawing reference HE551459-WSP-SBR-A2E-DR-CB-2165.
A.54 Fisheries: Solution	The existing culvert appears to be perched and the extension to ~47m long may make fish passage even more difficult. Brown trout were recorded during electric fishing surveys. Therefore, fish passage needs to be considered at this site.	As noted in A.53 a gravel bed has been included in the culvert extension. This is shown in Structures Engineering Drawings & Sections [APP-012] Drawing reference HE551459-WSP-SBR-A2E-DR-CB-2165. It is not considered viable to include fish baffles or a low flow channel given the size of the culvert and requirement to tie in with existing.
A.55 Appendix 10.7 Geomorphology Assessment: Issues and Impacts - River Coquet parameter 10	The Geomorphology Assessment, Appendix 10.7 has outlined the current condition of the Study Reach and has assessed the impact of the temporary and permanent works on the geomorphological processes (erosion, transportation and deposition of sediment) over 4 scenarios and 7 flow regimes.	Noted
A.56 Appendix 10.7 Geomorphology Assessment: Issues and Impacts - River Coquet parameter 10	The 7 flow regimes tested are baseline (existing), 10 year, 5 year, 485 year, 525 year, 100 year, 30% climate change and 100 year , 50% climate. 1. Scenario A – Existing (baseline) conditions with no new structures; 2. Scenario B – Design prepared for the DCO application; 3. Scenario C – A design option which relates to a channel width constrained to the width of the Southern pier with no bypass flow behind the Southern pier 4. Scenario D – A design option which relates to a channel width constrained to the width of the Southern pier with bypass flow behind the Southern pier.	The Applicant clarifies that the flow regimes tested are the Q10 (not 10 year), Q5 (not 5 year), 485 year, 525 year, 100 year + 30% climate change and 100 year + 50% climate. The use of 10 year and 5 year terminology in the Executive Summary of the assessment is incorrect but the main body of the report used the correct terminology. However, in order to assist the Examining Authority, the Applicant's Geomorphologist is undertaking 2D hydraulic modelling of the River Coquet using LiDAR data. The methodological approach was proposed and discussed in advance with the Environment Agency on 10 December 2020 with Meeting minutes captured and shared with the Environment Agency and no concerns have been raised about the approach proposed. Meeting Minutes are provided in Annex D.

Reference	Comment from Relevant Representation	Applicant's Response
		During this meeting, the Environment Agency Geomorphologist requested a specific range of return periods to model, including climate change scenarios, thus the result of this modelling will address concerns raised about flow regimes tested. In addition, the methodological approach proposed to the Environment Agency is designed to specifically address the list of Relevant Representations presented below. A Technical Note is being produced presenting the results of the assessment and will be provided for Deadline 3.
A.57 Appendix 10.7 Geomorphology Assessment: Issues and Impacts - River Coquet parameter 10	In the absence of any modelling the methodology outlined in the report is suitable, provided the data used is accurate and robust. It is noted that modelling was scoped out on flood risk grounds and not hydrogeomorphological grounds.	The data used is accurate and robust. Field data was collected by an experienced fluvial geomorphologist using well-established industry standard methods for fluvial geomorphological assessment. Those methods are stream reconnaissance survey (Thorne, 1998) and Wolman (1954) sediment sampling method. The methodological approach was presented to the Environment Agency Geomorphologist prior to commencing the assessment. These survey techniques comprise detailed information of fluvial form and process of the river and its valley setting. The sediment sampling approach was stratified with one sample comprising ten cross sections spaced along the river to take in two meander wavelengths to provide quantitative substrate data to characterise the river reach. A second sediment sample was taken localised to the existing and proposed bridge to characterise the depositional zone observed in the vicinity in recognition of its importance as fluvial habitat. This sample comprised ten transects across the depositional zone in accordance with the sampling methodology. This provided quantitative data on the substrate characteristics of the river bed in the vicinity of the river crossing. Therefore quantitative data of the river bed substrate was collected to both characterise the river reach and for specific data on the depositional zone. Thus the data are robust and quantitative. Modelling would have provided more robust assessment, however the need for this was de-scoped unless the need for a temporary pier was brought back into the design. As stated in the Meeting Minutes of 19 December 2018 (item 4.9 of the Meeting minutes dates 19 December 2018), the EA also agreed to the de-scoping of hydraulic modelling on geomorphology grounds following presentation of baseline findings following a site investigation. Item 4.9 of the Meeting Minutes states, '*EA geomorphologist agreed with WSP geomorphologist that following initial results no hydraulic modelling is required for the geomorphological assessment – prompted by findings – amount of bedrock present on river bed, size of sediment. The cable stay option would further support this decision, however; should the temporary pier option be taken forward, the hydraulic modelling required for that would provide extra re-assurance'*. Subsequently, in response to the Relevant Representations, the Applicant is undertaking 2D hydraulic modelling of the River Coquet for baseline, construction and operation for a number of return periods. The method is such designed to address the Relevant Representation presented here for Geomorphology. This

Reference	Comment from Relevant Representation	Applicant's Response
		approach was proposed by the Applicant's Geomorphologist and understood to be agreed in consultation with the Environment Agency's Geomorphologist on 10 December 2020 with Meeting Minutes circulated (see Annex D). Note that the results of the 2D modelling are confirming the original assessment undertaken of no significant effects. A Technical Note will be submitted at Deadline 3.
A.58 Appendix 10.7 Geomorphology Assessment: Issues and Impacts - River Coquet parameter 10	The report describes the study reach as a predominantly bed rock channel with localised pockets of sediment, ranging in size from boulder to coarse sand. In general, the dominance of bedrock in the channel and on the banks means the channel is very resilient. This dominance of bedrock makes the reach a sediment transport reach, meaning that pockets of mobile sediment disproportionately valuable (at the reach scale) as they add diversity to the flow regime and instream habitat.	Potential construction impacts upon the River Coquet are of greater potential consequence than operational impacts. However, the assessment undertaken considers both the construction and operational impacts, with a specific sediment sampling and sediment transport assessment undertaken on this sediment deposition zone in recognition of its importance in terms of fluvial form and function and the associated habitat the feature provides. The reach is predominantly a sediment transport zone, as stated in the report. The Applicant agrees that any depositional features provide valuable in-stream habitat and flow diversity within the reach given that it is a bedrock channel, which makes these deposits disproportionately valuable. This is why specific analysis was undertaken on this depositional zone to determine the potential for an increase in sediment entrainment and mobility arising due to both construction and operation. Thus, one of the specific objectives, as stated in paragraph 1.2.2 of Section 1 of Appendix 10.7 Part A Geomorphology Assessment [APP-260] of the ES is to '*assess the risk of increasing the erosion risk and sediment transport during construction and operation*'. The results indicate that there would be no risk to increased sediment entrainment, and thus sediment mobility, as a result of the Scheme.
A.59 Appendix 10.7 Geomorphology Assessment: Issues and Impacts - River Coquet parameter 10	The report rightly argues that the boulders are hiding or protecting the smaller sized sediment, and that the presence of moss suggests long term stability. However, as these boulders are sitting directly on bedrock, the forces necessary to initiate movement would generally be less as they are not embedded into the bed. Movement to or the loss off any boulder will have a disproportionately high impact on the surrounding sediment given the "hiding effect". Understanding how these boulders will respond to the new flow regimes, resulting from the new bridge pier are crucial for assessing the risks to the current sediment regime.	The sediment deposits are imbricated, thus embedded within a poorly sorted sediment matrix. The imbrication, coupled with poor sediment sorting, results in higher forces being required to entrain and then mobilise sediment. This is well cited in the scientific literature (e.g. Sear, Newson and Thorne (2010) and Knighton (1998)). Also, as stated in the report and clearly visible in the site photographs and aerial imagery, these deposits are vegetated not only with moss, a key indicator of stability, but also terrestrial species, again a key indicator of the deposits being stable. This vegetation, in turn, results in even higher forces being required to overcome friction and enable entrainment of sediment. The Applicant understands the need to prove that there would be no impact to these deposits, which is why specific assessment was undertaken on the sediment transport processes associated with this deposit comparing baseline, construction and operation. The Applicant agrees that the movement or loss of any boulders from the depositional zone would have a disproportionately high impact as it is these boulders that provide the anchor around which the deposit has formed. This is why specific assessment was performed on the risk of these boulders being mobilised as a result of construction and operation impacts under a range of flow regimes compared with the baseline. The results indicate that in both the construction and operational phase, there would be no alteration to the risk of entrainment or transport of these boulders. Thus, the anchor around which the deposit forms, along with the hiding effect for smaller particle size fractions, would remain intact. This is

Reference	Comment from Relevant Representation	Applicant's Response
		addressed within the analysis thus providing the evidence crucial for assessing the risks to the current sediment regime. The geomorphology assessment focused in particular on the potential for changes to the sediment regime for a range of flow regimes as a response to the Scheme. Thresholds for entrainment and mobilisation were examined for a range of particle sizes to ensure there would be no significant impact arising. The analysis accounted for the dominance of bedrock in this assessment. The shear stress values calculated were below the threshold for entrainment, therefore, even with particles sat directly upon bedrock, albeit imbricated also, the results indicate that the shear stress values would be too low to initiate entrainment and mobilisation of the boulders. Furthermore, it is well cited in the scientific literature that poorly sorted sediment, as is the case at this depositional feature on the River Coquet, requires stronger flows to entrain (initiate motion) and mobilise sediment compared with a uniform bed (see Newson, Sear, Thorne, Knighton, Lewin, Gregory, Petts, Gilvear, Bravard, Brookes etc). Refer to Section 4.3 of Appendix 10.7 Part A Geomorphology Assessment [APP-260] of the ES. Thus it is not anticipated even that the coarse substrate deposited on this feature is mobilised to any significant extent in such river environments and any sediment transport is highly infrequent and episodic. Given the size of the sediment, any mobilisation of large substrate would only likely move short distances before being redeposited, thus trapping smaller sediments again behind the boulders. 2D hydraulic modelling is now being undertaken, as described above. The results are confirming no significant effects between baseline, construction and operation. Thus, no notable difference to the sediment regime: erosion, deposition or sediment transport is identified in any of the modelled runs. A Technical Note will be submitted at Deadline 3.
A.60 Appendix 10.7 Geomorphology Assessment: Issues and Impacts - River Coquet parameter 10	The methodology used in the report relies on accurate field data to develop the findings. There are a number of areas where the robustness of the data used is weak or not clearly explained. We therefore believe that the report as it stands does not clearly demonstrate that the construction and operation of the proposed new River Coquet bridge do not cause significant alteration to the fluvial processes operating within the study reach and have no adverse impact on either the sediment entrainment and transport capability of the watercourse or the erosion and depositional processes.	The Applicant does not consider that the data is weak as is conforms to industry standards for geomorphological assessment that were adopted for this study, (i.e. Stream Reconnaissance Survey (Thorne, 1998) and Wolman's sediment sampling method (1954). The field data collection using these methods was undertaken by an experienced fluvial geomorphologist. The methods used are clearly explained within the report and were communicated to the Environment Agency during two separate consultation meetings held on 14 December 2018 and 19 December 2018. The methodology included the use of the broad calculations of stream power and shear stress used as a proxy for sediment transport. This is an industry standard means of analysing fluvial processes and the potential for geomorphic change, using industry standard equations as stated in the *Guidebook of Applied Fluvial Geomorphology (Sear, Newson and Thorne, 2010),* which is considered a key reference guide for fluvial geomorphological assessment in the UK. The Applicant does not consider that the data is weak as is conforms to industry standards, as stated above.

Reference	Comment from Relevant Representation	Applicant's Response
		The methods used are clearly explained in the methodology section [refer to Section 2 of Appendix 10.7 Part A Geomorphology Assessment [APP-260] of the ES]. The results of the analysis clearly demonstrate that the Scheme would not have an adverse impact upon sediment entrainment, sediment transport capability, erosion or depositional processes. The analysis revealed very low shear stress values for all scenarios tested for baseline, construction and operation. These low shear values mean that the threshold for initiating the onset of entrainment then sediment transport would unlikely be exceeded, therefore there would be no change to the processes of sediment transport, erosion or deposition. In addition, due to the poor sorting of sediment coupled with the hiding effect offered by the boulders, the scientific literature states that stronger flows are required to overcome the frictional forces for entraining sediment thus it was concluded that sediment entrainment and transport would not be adversely impacted by the Scheme and consequently, the depositional feature would not be lost. It should be noted that the boulders present are angular, blocky and rectangular in shape, which further impedes sediment entrainment and transport. Refer to Section 4.3 of Appendix 10.7 Part A Geomorphology Assessment [APP-260] of the ES. This presence of this coarse substrate, likely derived from the valley sides, is crucial for the formation of the depositional feature; it is this substrate that traps the smaller particle sizes moving through the system, thus immobilising it resulting in accretion and the formation of this stable mid-channel bar feature. 2D hydraulic modelling of the geomorphological processes is now being undertaken, as described above. The results confirm no significant effects between baseline, construction and operation. Thus, there are no perceivable differences in the sediment transport capability of the river and associated erosion and deposition processes. A Technical Note will be submitted at Deadline 3.
A.61 Appendix 10.7 Geomorphology Assessment: Solution	Given our concerns around an adverse change to the form and processes of the reach, we have significant concerns regarding the proposed development and require further information and clarity on the following:	Responses provided to each question in turn below (Questions 1 – 10). In addition, the 2D hydraulic modelling being undertaken will provide the evidence required to address these Relevant Representations for Geomorphology below. A Technical Note presenting the results of the 2D modelling will be submitted at Deadline 3.
A.62 Appendix 10.7 Geomorphology Assessment: Solution	1. Clarity of the cross section used to produce the physical parameters such as channel width, area, wetted perimeter, hydraulic radius. The cross section needs to be accurate, to scale, and must show the 4 scenarios and the levels of the 7 flow regimes;	A Technical Note is being produced for Deadline 3 to report the findings of the 2D hydraulic modelling of the geomorphological processes. A figure showing the cross-section used in the assessment will be included within this report. In the meantime, a copy of the cross-section has been provided to the Environment Agency Geomorphologist on 10 December 2020. This figure is presented in Annex D. Note, the methodology for the 2D modelling methodology was agreed in advance with the Environment Agency Geomorphologist at a meeting on 10 December 2020 to ensure that he is in agreement with the approach and that it would provide the robust evidence required to address these Relevant Representations (to be submitted at Deadline 3). This is captured in the Meeting Minutes, which were

Reference	Comment from Relevant Representation	Applicant's Response
		issued to the Environment Agency post-meeting on 10 December 2020 and attached in Annex D.
A.63 Appendix 10.7 Geomorphology Assessment: Solution	2. Relying on the 1 cross section to generate the conclusions feels weak. Further cross sections up stream of and downstream of the new pier will create a much better picture, and more confidence in the findings;	It is acknowledged that one cross section is not typically representative, and the lack of cross section data was raised and discussed at a meeting with the Environment Agency (19 December 2018) (refer to Chapter 10: Part A [APP-050] of the ES, paragraph 10.4.5). No objections were raised by the Environment Agency at the time for proceeding on the basis of using only one cross section. However, the cross section used was located in the zone of the depositional feature of interest, so it provides the required cross-sectional dimensions for understanding processes operating locally, also there was not much bed variation observed in this immediate zone. Slope was calculated and compared over a 1km and 3km reach, with both returning the same channel slope. The sediment data used was quantitative and used to inform the assessment of sediment transport potential, for which the cross-sectional data was required. The data available for the assessment was sufficient to determine the risk of the Scheme altering the erosion and sediment transport capability of the river. The results indicated no significant difference compared to baseline. Given the nature of this river type, and the scientifically proven nature of sediment transport in these river types where sediment transport is rare and episodic, the risk of the Scheme altering the sediment transport processes is unlikely. Thus the Applicant's Geomorphologist is confident in the conclusions, that the findings are robust and no further cross-sections are required to confirm the outcomes reported. However, the Applicant is now undertaking 2D hydraulic modelling using LiDAR data for the river, for which there is good coverage. Again, this methodological approach has been agreed in advance with the Environment Agency Geomorphologist at a meeting on 10 December 2020 with Meeting Minutes issued to the Environment Agency following the meeting (see Annex D). The modelled reach spans from the weir upstream to the downstream weir, thus covering approximately a 1.3km reach. The results confirm no significant effects upon fluvial processes of sediment transport, erosion or deposition between baseline, construction and operation for a wide range of flood return periods. A report presenting the results of the 2D modelling will be submitted at Deadline 3.
A.64 Appendix 10.7 Geomorphology Assessment: Solution	3. Clarity on the flow data used. How were the numbers for velocity and discharge derived? What is the reasoning behind using a 485 and 525 yr flow, why no 100yr flow The description of mean flow, Q10 and Q5 in the executive summary appears to be different to the flows used in Table 4.3;	The data used for the flood risk assessment (refer to Appendix 10.1 Part A Flood Risk Assessment [APP-245] of the ES) was used to inform the geomorphology assessment (refer to Appendix 10.7 Part A Geomorphology Assessment [APP-260] of the ES). Using the peak flow recorded for the River Coquet, an event magnitude analysis was undertaken using the historic peak flow records. From this, the velocity and discharge was derived and the flows resulting from the event magnitude analysis were related to a 485 and 525 year flow. In the absence of hydraulic modelling, standard return period flow data (such as the 100 year flow) was not available; therefore, for the geomorphology assessment available flow data was used and the results of the event magnitude analysis. For a geomorphology assessment, using flow data instead of flood levels is acceptable as

Reference	Comment from Relevant Representation	Applicant's Response
		it is the flow that is important in driving fluvial processes. As stated in Sear, Newson and Thorne (2010), '*a river channel is governed by the water flow through it, particularly flood peak* flows', peak flow data has been used to inform the assessment in the absence of hydraulic modelling. Whilst in fluvial geomorphology, flood levels provide a convenient means of comparing different flow events, in the absence of data on flood return periods, the use of available and calculated flow data is acceptable. 2D hydraulic modelling is now being undertaken for a range of flood return periods to assess geomorphological processes. The flood return periods being modelled are those suggested by the Environment Agency Geomorphologist at a meeting on 10 December 2020. A Technical Note presenting the results of the 2D modelling will be provided at Deadline 3. Regarding Q10 and Q5 query, clarification is being provided in the Technical Note being produced for Deadline 3.
A.65 Appendix 10.7 Geomorphology Assessment: Solution	4. Rational for using a single manning's number for all scenarios. The number feels high for a bedrock channel, especially mid channel where the majority of the sedimentary deposits are located;	For the assessment, 2b was used from the Manning's table, which is the most suitable category for the River Coquet; here the Manning's values range from 0.040 to 0.070. For the original assessment, different Manning's values to represent changes in roughness for high flows and the construction phase had been used. For the Parameter 10 assessment, the flow data provided for the geomorphology assessment had used a static Manning's n value. The use of 0.060 provides more of a worst-case scenario than the previous assessment as it represents a rougher surface than smooth bedrock. Therefore, using a Manning's value from the upper range of 2b does account for the sedimentary deposits within the depositional zone. This was further explained to the Environment Agency Geomorphologist at a meeting on 10 December 2020, who accepted the justification provided. However, the Applicant is now undertaking 2D hydraulic modelling of fluvial processes to provide a robust assessment of potential impacts to the River Coquet. During the meeting with the Environment Agency Geomorphologist on 10 December 2020, the Applicant shared a physical habitat plan of the channel with the Environment Agency Geomorphologist and proposed Manning's values for the different physical habitat zones within the river. The Environment Agency Geomorphologist agreed to the proposed values of Manning's for each physical habitat zone. Thus, a variety of Manning's values, as agreed with the Environment Agency Geomorphologist, have been incorporated into the 2D model. Minutes of the meeting were recorded and issues to the Environment Agency the same day. A report presenting the results of the 2D modelling will be submitted at Deadline 3.
A.66 Appendix 10.7 Geomorphology Assessment: Solution	5. The data collected during the sediment analysis does not truly reflect the composition and makeup of the mobile sediment within the reach. The inclusion of bedrock in the sediment analysis massively skews the results. The sediment analysis needs to focus on mobile sediment rather than the makeup of the bed;	The Applicant disagrees that the sediment analysis does not truly reflect the makeup of the 'mobile' sediment within the reach. Two sets of sediment data were collected in order to build a representative picture of the sediment characteristics of the river reach assessed. One set was a general character of the structure and substrate of the river bed, which is a predominantly bedrock channel. A second set of sediment data was collected from the deposition zone observed around the existing bridge. Specific focus was given to this sediment given the recognition of its

Reference	Comment from Relevant Representation	Applicant's Response
		importance within a bedrock channel. The sediment data was collected in accordance with the Wolman unbiased sampling approach to ensure that the data are statistically robust for the sediment transport analysis. Due to the poor sorting of the substrate, there were pockets where the sampler hit bedrock using the unbiased sampling approach. This is a symptom of the poorly sorted bed, not sampling error. Thus the data truly reflects the makeup of the sediment in this zone. Using bedrock in the analysis does not skew the analysis for assessing the mobility of the channel substrate deposited in the vicinity of the existing and proposed bridge. When one considers the geomorphological processes operating for the formation of the depositional feature, it is the presence of the boulder sediment fraction that is critical, thus the inclusion of the bedrock results in a large particle size for the D50, which we focus the assessment of any adverse changes in sediment entrainment and transport. (However, in the assessment, we also included sediment transport analysis for the D16 and D84 particle size fractions to account for any changes in sediment transport characteristics from small to large particle size classes observed.) Thus, it is the correct approach to focus on the risk of mobilising the large, particle size fractions (i.e. the boulders and large cobbles) in this assessment as any disturbance and mobilisation of the large substrate fraction would potentially result in the loss of the depositional feature. At this location on the River Coquet, it is the presence of the large angular, blocky boulders and large cobbles that form the 'anchor' around which this depositional feature has formed. Thus, it is the retained stability of these sediment sizes that is critical for maintaining the depositional feature. Thus, with this in mind, we set out our methodology to explore the potential for mobilisation of the key substrate, the anchors, around which the depositional feature forms. If the anchors should be washed out, there would be no depositional feature. If the anchors are retained, then the depositional feature would endure. The analysis addresses the mobile sediment because in order to determine whether the depositional feature would become mobilised during wither the construction or operation of the Scheme, one needs to determine whether the boulders and large cobbles, which provide the anchors around which the deposit forms, would become mobilised. Thus it is appropriate to assess the potential changes to the entrainment and transport capability of the river for the large particle size fraction. It is these boulders and large cobbles that trap sediment which would otherwise be transported through the system. If these boulders or large cobbles were to become mobilised, then the smaller particle size classes would also become mobilised and washed away. If the large sediment remain *in situ*, then the smaller particles will remain *in situ* also due to the hiding effect, the imbrication and due to higher frictional forces being required to mobilise such sediment.

Reference	Comment from Relevant Representation	Applicant's Response
		Thus, it is the potential for the loss of the large substrate as a result of the construction and operation of the Scheme that is critical for the assessment of potential impacts and the acid test for the retention of this feature. Note that the depositional material is a stable feature. It is poorly sorted with much of the large, angular substrate coming from the valley sides. Poorly sorted material is indicative of having not been transported very far at all from its source, which is well cited in the scientific literature. Due to the hiding effect and imbrication of the sediment, it becomes harder to overcome the frictional forces required for sediment entrainment and transport. Note, sediment transport will only be possible where there is sufficient energy to overcome the frictional forces required for entrainment. In other words, without entrainment, there can be no transport. 2D modelling has been undertaken, as described above. The results demonstrate no change in the sediment dynamics between baseline, construction and operation for a wide range of flood return periods. This is also the case for a wide range of particle sizes from sand through to boulders. The results of the 2D modelling will be provided in a Technical Note at Deadline 3.
A.67 Appendix 10.7 Geomorphology Assessment: Solution	6. The footprint of the sheet piling and the foundations of the pier will be greater than the pier itself. The impact will be greatest during construction, has this been taken into account;	The potential construction impacts of the pier and its foundations were included in the assessment, including consideration of the construction methods and footprint of the sheet piling and foundations. Assessment of both construction and operational impacts were assessed (refer to Appendix 10.7 Part A Geomorphology Assessment [APP-260] of the ES). The Applicant's Geomorphologist is now doing 2D hydraulic modelling to assess potential impacts of construction and operation of the Proposed Scheme on the geomorphological processes compared with baseline. The footprint of the sheet piling and foundations of the pier has been included within the modelling for the construction phase for a range of flood events, as agreed with the Environment Agency Geomorphologist on 10 December 2020 and included within the circulated Meeting Minutes. A report presenting the results of the 2D modelling will be submitted at Deadline 3.
A.68 Appendix 10.7 Geomorphology Assessment: Solution	7. Appendix 10.4 implied that the working area was vulnerable to low magnitude, high frequency flood events, meaning that the risk to the working area is high. Appendix 10.7 does not highlight this, therefore will this risk be adequately assessed and mitigated for within the CEMP; and	The risk of the working area to low magnitude, high frequency flow events was considered within the assessment and has been considered and adequately mitigated within A-W15 in the Outline CEMP [APP-346], which is also detailed in Chapter 10: Part A [APP-050] of the ES (paragraph 10.9.14-10.9.17). The mitigation recommended in both Appendix 10.4 Part A Geomorphology Assessment [APP-257] of the ES and Appendix 10.7 Part A Geomorphology Assessment [APP-260] of the ES is congruent. The 2D hydraulic modelling of the potential impact of the Scheme upon the geomorphological processes accounts for the risk of inundation and will be reported in the Technical Note being produced for Deadline 3.

Reference	Comment from Relevant Representation	Applicant's Response
A.69 Appendix 10.7 Geomorphology Assessment: Solution	8. It's also worth noting that the cross sections shown in the two geomorphological reports is different. Why is this, and does it influence the outputs from question 1?	The same cross section was used in the analysis for both Appendix 10.4 Part A Geomorphology Assessment [APP-257] of the ES and Appendix 10.7 Part A Geomorphology Assessment [APP-260] of the ES. The figures provided in the report do not reflect the cross-section assessed therefore they have no influence upon the results presented. The cross-section used to inform the geomorphology assessment has been provided to the Environment Agency on 10 December 2020 (see Annex D) and will also be provided in the Technical Note being produced for Deadline 3 to report on the results of the 2D modelling.
A.70 Appendix 10.7 Geomorphology Assessment: Solution	9. A detailed field map/plan should be produced that shows in-channel features, the location of the different flow types, any depositional areas, along with the accurate location for the two piers and the footprint of any temporary works.	A map will be produced of the in-channel features, flow types and depositional features as requested using Froude derived from the 2D hydraulic model. This will be provided at Deadline 3 in the Technical Note being produced to report on the results of the 2D modelling. It should be noted that a visual representation of the in-channel features, flow types, depositional features and the existing bridge is already provided in both Appendix 10.4 Part A Geomorphology Assessment [APP-257] of the ES and Appendix 10.7 Part A Geomorphology Assessment [APP-260] of the ES. This is in the form of a photographic record from the upstream survey extent to the downstream extent with a description of the channel features.
A.71 Appendix 10.7 Geomorphology Assessment: Solution	10. Given that we now know that the existing pier was built within the active channel, does this change the interpretation of channel form downstream of this point? The previous summary suggests that the widening of the channel, the formation of the bar etc. and natural processed. Is it possible that this change was driven by the work associated with the first bridge?	This does affect the description of the channel form in this location. However, the river has since adjusted to the presence of this river training and, given the confined valley setting, this new information is unlikely to affect the outcomes of the assessment. A change to the description will be provided in the Technical Note being produced for Deadline 3.
A.72 Appendix 10.7 Geomorphology Assessment: Solution	In conclusion, overall, the geomorphology assessment methodology is appropriate and assesses all of the areas that we would expect to see in a report of this nature. However, we would welcome clarity regarding the above matters. Until this information is provided, and the report is updated, we are unable to verify the assessment, the impacts and the conclusions outlined in the assessment.	The Applicant notes that the Environment Agency concludes that the geomorphology assessment methodology is appropriate and assesses all areas they would consider necessary. This is congruent with the consultation discussion held on 19 December 2018 (refer to Chapter 10: Part A [APP-050] of the ES). As stated in the Meeting Minutes of 19 December 2018 (item 4.9 of the Meeting minutes dates 19 December 2018), the EA agreed to the de-scoping of hydraulic modelling on geomorphology grounds following presentation of baseline findings following a site investigation. Item 4.9 of the Meeting Minutes states, '*EA geomorphologist agreed with WSP geomorphologist that following initial results no hydraulic modelling is required for the geomorphological assessment – prompted by findings – amount of bedrock present on river bed, size of sediment. The cable stay option would further support this decision, however; should the temporary pier option be taken forward, the hydraulic modelling required for that would provide extra re-assurance*'.

Reference	Comment from Relevant Representation	Applicant's Response
		The 2D modelling that has been undertaken will be presented in a Technical Note for Deadline 3. The results indicate no significant effects upon geomorphological processes for a range of flows, including extreme events.
A.73 Discharge of Treated Water and Outfall Construction: Issue and impact	Any outfall structure / discharge that is required to be constructed near a Main River may require a flood risk activity permit under the Environmental Permitting (England and Wales) Regulations 2016. As part of this application the Environment Agency will assess the application in relation to Fisheries, Biodiversity and Geomorphology, we'll also assess its compliance with the Northumbria River Basin Management Plan (RBMP) (2016). The RBMP states that the water environment should be protected and enhanced to prevent deterioration and promote the recovery of water bodies.	Comment noted. The Flood Risk Activities Permit (FRAP) applications will be progressed following the DCO Examination and consenting process [APP-016]. Refer to S-W13 in the Outline CEMP [APP-346]. The Scheme is not predicted to prevent the attainment of the River Basin Management Plan (RBMP) objectives when compared to the baseline situation, as will be considered as part of the FRAP application process.
A.74 Discharge of Treated Water and Outfall Construction: Solution	The development should be designed to help meet the objectives of the Northumbria RBMP and to promote the recovery of water bodies. The DCO application should also take into account impacts to protected and notable species and habitats along these watercourses, with survey information informing these impacts within the permit.	The FRAP application and design of outfalls will not prevent the attainment of the objectives of the Northumbria RBMP when compared to the baseline situation and will give due consideration to the protected and notable species and habitats. This will be demonstrated as part of the FRAP application process. This requirement has been updated in S-W13 in the Outline CEMP [APP-346] and submitted at Deadline 1. The overarching approach to outfall design will be presented in a technical note submitted as Deadline 3.
A.75 Discharge of Treated Water and Outfall Construction: Solution	The design of any outfall should be sympathetic to the water environment with low impact design options that mimics greenfield runoff should be considered, and not drain onto or impact Habitats of Principal Importance.	All watercourses within the DCO order limits have been identified as Habitats of Principal Importance. It is therefore not possible to not drain to these features as the surface water management strategy is to discharge to adjacent watercourses in accordance with the NPPF SuDS hierarchy; however, the outfalls will be designed in consultation with the relevant authority as part of the FRAP or Ordinary Water Consent (OWC) process (as appropriate) to be sympathetic to the receiving watercourse.
A.76 Water Framework Directive (WFD) Assessment: Issue and impact	HE must have regard to the Northumbria RBMP and the legally binding environmental objectives it contains. The Northumbria RBMP has been prepared in line with Ministerial guidance and fulfils the requirements of the WFD. With the exception of some of fish easement proposals, the scheme does not identify nor deliver any measures identified in the Northumbria RMPB that are required to achieve its waterbody objectives.	The Scheme is not predicted to prevent the attainment of the RBMP objectives when compared to the baseline situation, noting that many of the proposed culverts are immediately upstream or extensions of existing structures that pose existing constraints. As discussed in A.15, the Scheme has identified opportunities to mitigate and improve existing conditions. A gravel bed has been included within most new culverts unless there is insufficient baseflow to have the potential to support aquatic species. Proposed replacement culverts have included a gravel bed as standard where this is feasible in line with engineering constraints, noting that this is an addition not currently provided within many of the existing culverts. All proposed culvert extensions maintain the same baseline conditions as the existing culverts, as minimum, with improvements to the River Lyne culvert to introduce baffles to aid fish passage, and improvements to Shipperton Burn culvert with the addition of a gravel bed in the new culvert section and removal of an existing step-weir to aid fish passage. The proposed realignment of Fenrother Burn, tributary of Earsdon Burn and tributaries of Kittycarter Burn also aim to provide greater in-channel flow variation and aquatic vegetation compared to the baseline condition of these features. As highlighted by the EA, the two main river crossings of the River Coquet and Longdike Burn would be via bridge structures. This is detailed in Appendix 10.2: Water Framework Directive Assessment - Part A [APP-255] and Appendix 10.2: Water Framework Directive Assessment - Part B [APP-312].

Reference	Comment from Relevant Representation	Applicant's Response
		In addition to the consideration of fish passage, the Scheme would include of c.38ha of wet woodland and c.12ha of wetland marginal planting within the River Basin District (RBD), with c.11ha of wet woodland and c.1.5 of wetland marginal planting within the River Lyne WFD waterbody catchment. A concise summary of proposed mitigation is provided within the Culvert Mitigation Summary (Annex 2). As the key measures within the RBMP include easement of barriers to fish, improvement to the condition of the riparian zone and wetland habitat, and modification of engineering structures it is considered that the proposed mitigation measures included in the design are in line with the objectives of the RBMP. The Scheme would also include robust treatment of surface water runoff using Sustainable Drainage Systems (SuDS) techniques that goes beyond the minimum requirements of the DMRB. The proposed detention basins would also include a permanent depth of water to enhance biodiversity value. This is detailed in Appendix 10.3: Drainage Network Water Quality Assessment - Part A [APP-256] and Appendix 10.3: Drainage Network Water Quality Assessment - Part B [APP-313].
A.77 Water Framework Directive (WFD) Assessment: Issue and impact	The WFD Assessment for the scheme concludes there will be no detrimental impact or change to the WFD status of the river catchments within the DCO boundary and connected waterbodies if appropriate mitigation measures are implemented. The four catchments are: - Wansbeck from Font to Bothal Burn (HMWB) - Lyne from Source to Tidal Limit (not HMWB) - Longdike Burn Catchment (not HMWB) - Coquet from Forest Burn to Tidal Limit (not HMWB)	Noted
A.78 Water Framework Directive (WFD) Assessment: Issue and impact	Section 1.4 of the WFD Assessments for both Part A and Part B details the legislative framework around WFD, making reference to the 4 overarching objectives of the WFD; Objective 1: To prevent deterioration in the ecological status of the water body. Objective 2: To prevent the introduction of impediments to the attainment of Good WFD status for the water body. Objective 3: To ensure that the attainment of the WFD objectives in other water bodies are not compromised. Objective 4: To ensure the achievement of the WFD objectives in other water bodies within the same catchment are not permanently excluded or compromised.	Noted
A.79 Water Framework Directive (WFD) Assessment: Issue and impact	Section 1.4.14, Part a. of the assessment process refers to 'Screening of the preferred option'. The WFD assessment should be used to inform the Options Appraisal stage and not just be limited to the schemes preferred option. It is unclear whether a WFD assessment been carried out for any of the options that have been scoped out and what the conclusions were for those assessments. This information should be included within the WFD assessment.	The Options Selection Stage Environmental Assessment Report, 2017, informed the options appraisal (refer to Chapter 3: Assessment of Alternatives [APP-038] of the ES) and considered impacts to aquatic species and the fluvial geomorphology of watercourses crossed by the Scheme, including the extension of existing culverts and construction of new culverts. The WFD assessment presented in the DCO submission for the preferred scheme only focusses on the Scheme. The options selection process is independent from the proposed DCO application and therefore it is not considered appropriate to include information contained within the options

Reference	Comment from Relevant Representation	Applicant's Response
		appraisal reports that has been superseded by more detailed assessments of the Scheme.
A.80 Water Framework Directive (WFD) Assessment: Issue and impact	The WFD assessment methodology applied to HE preferred option for this scheme appears to be appropriate. However, the level of detail within the assessment itself is poor. We tend to agree that overall the scheme will not result in a WFD deterioration at a waterbody scale and we acknowledge HE propose to deliver mitigation for fish passage through culvert design. However, mitigation and compensation does not go far enough. The localised impacts of the scheme will be significant. There is no reference as to how HE will provide compensation or mitigation at a local level for the culverting of water courses and surface water drainage structures and the resulting loss of riparian and river habitat. (The Biodiversity No Net Loss Assessment Reports, Part A and B conclude, in total there will be 62.69% net loss of watercourse through this scheme, (5% for Part A and 57.69% for Part B)). HE should be doing more to support the attainment of Good Ecological Status by 2027 in the waterbodies within the DCO boundary and those connected waterbodies.	The WFD assessments in Appendix 10.2: Water Framework Directive Assessment Part A [APP-255] and Appendix 10.2: Water Framework Directive Assessment Part B [APP-312] was considered proportionate to the size and generally low aquatic value of the upland watercourses that are crossed by the Scheme. The Applicant notes the importance of these features to supporting downstream habitats and maintaining hydraulic continuity was an important aspect of the proposed design. However, many of the assessed watercourses were not found to be suitable to support aquatic ecology. The Applicant does not agree with the total stated loss of watercourse length of 62.69% for both Part A and Part B of the Scheme as when considered cumulatively the total loss would be much less than this. The Applicant is currently preparing a Biodiversity No Net Loss Assessment in line with Defra Metric 2.0 for the Scheme. This will be submitted at Deadline 2. The assessment will verify the extent of watercourse habitat lost to the Scheme. As discussed extensively above, it is not considered viable to create new lengths of open watercourse to mitigate for this loss as this would rely on a water source to create the habitat. Instead, consideration has been given to enhanced planting as part of the proposed landscape strategy, with the introduction of c.38ha of wet woodland and c.12ha of wetland marginal planting. s. Culvert extensions and new culverts have also maintained baseline conditions and, where practicable, included mitigating features such as natural beds and fish passage measures. The realigned watercourse channels have aimed to provide betterment where possible through the introduction of in-channel variation. The proposed mitigation for each watercourse and WFD catchment is summarised in the Culvert Mitigation Summary (Annex A). This does not change the previous assessments submitted but consolidates the findings of these assessments.
A.81 Water Framework Directive (WFD) Assessment: Issue and impact	As referred to above, it is apparent HE's preferred option for highway watercourse crossings as part of this scheme is the development or betterment of culverts. We understand HE consider it not economically viable to develop bridge structures as part of the scheme, other than the two on the Coquet and Longdike main river crossings. In total, 15 culverts will either be developed or modified to provide betterment as part of this scheme. This equates to around 400m plus of increased culverting of watercourse as well as the re-alignment of a further 2 watercourses. The culverting of any water courses goes against the principles of the WFD, (Objectives 1 and 2) as this will contribute towards a waterbody receiving a Heavily Modified Water Body (HMWB) classification in the future. In turn, this will contribute towards a risk of deterioration under WFD as HMWB are unable to attain Good Ecological Status.	The Scheme design has taken the sensitivity of the affected watercourses into account and, as highlighted by the EA, the two main river crossings would be via bridge structures. The other watercourse crossings would be via culverts, noting that these would comprise extensions or replacements of existing culverts, or new structures upstream of existing culverts that are to be retained. The approach to the design is as summarised in A.2. The design of the proposed culverts has taken the aquatic value of the watercourses into account and measures have been installed (such as gravel beds and baffles) where appropriate and where the size of the culvert permits. The predicted flow and aquatic value of the watercourse is highlighted in the Culvert Mitigation Summary. As noted in A.80, the Scheme would also introduce c.38ha of wet woodland and c.12ha of wetland marginal planting. The hydraulic connectivity of all watercourses has also been maintained to mitigate downstream effects. This is considered to be appropriate mitigation given the low aquatic value and small catchment size of many of the affected watercourses along with the proposed

Reference	Comment from Relevant Representation	Applicant's Response
		improvements to the existing culverts and measures included in replacement/new culverts and realigned channels., This is summarised in the Culvert Mitigation Summary (Annex A).
A.82 Water Framework Directive (WFD) Assessment: Solution	We have identified a number of opportunities that are available within waterbodies linked to the scheme. For example, the river Lyne waterbody and a number of its tributaries (Floodgate burn, Fenrother burn and Earsdon burn) are impacted by HE current strategic road network and will be further impacted by this Scheme. Rather that delivering a 'scatter gun' approach to mitigation, there is an opportunity to deliver significant, meaning actions in one geographical area to mitigate against the 62.69% net loss of watercourse as well as the associated riparian habitat. The river Lyne would provide the ideal opportunity for this. HE direct links to the river include:	The Applicant agrees that providing an unfocussed approach to improving watercourses that are unlikely to ever support valuable aquatic ecology would not provide meaningful betterment. However, the proposed approach to mitigation is not 'scatter gun', with measures comprising at-source mitigation to proposed culvert design, increased woodland and wetland planting in appropriate locations, and enhanced design of realigned watercourses. This is discussed further in A.83 below. As noted in A.80, the Applicant does not agree with the total stated loss of watercourse length of 62.69% for both Part A and Part B of the Scheme as the cumulative loss would be much less than this. The Applicant is currently preparing an updated Biodiversity No Net Loss Assessment in line with Defra Metric 2.0 for the Scheme. This will be submitted at Deadline 2. The assessment will verify the extent of watercourse habitat lost to the Scheme. The response to earlier comments provides a summary of the mitigation that is proposed for the loss of watercourse channel and the design of culvert extensions and new culverts. This is also summarised in the Culvert Mitigation Summary (Annex A) submitted at Deadline 1.
A.83 Water Framework Directive (WFD) Assessment: Solution	- Floodgate Burn (NZ1853191270), new culvert will see a further 13m of channel culverted, in addition to new wing walls and scour protection. - River Lyne (NZ1855491633) will see a net loss of 53m (this number doesn't include wing walls, scour protection) of river channel as the line of the new A1 deviates from the existing route. The existing culvert will be left intact and a new 53m culvert will be built to take the new road. - Fenrother Burn (NZ1827291993) is one of two watercourses that will be re-aligned as part of the scheme. The proposed line of the new burn is very restricted and passes through two new culverts. - Earsdon Burn (NZ1892294574), existing line of the A1 is to be retained, no proposal to daylight the existing culverts, the design proposals for the Earsdon Burn and tributaries will see a further 4 culverts totalling an additional 204m of watercourse culverted.	Within the River Lyne WFD waterbody that includes the Floodgate Burn, Fenrother Burn and Earsdon Burn it is proposed to provide c.11ha of wet woodland and c.1.5ha of wetland planting. This is summarised within the Culvert Mitigation Summary (Annex A), which is submitted at Deadline 1. The following at-source mitigation is proposed for each watercourse crossing: · The proposals for the Floodgate Burn include a replacement of an existing culvert that would introduce a new gravel bed and mammal ledge. Approximately 50m of new wet woodland would also be planted along the Floodgate Burn. · The proposals for the River Lyne include a new 3.75m high and 4.0m wide box culverts that is larger than the existing downstream culvert and that would include a gravel bed, low flow channel and mammal ledge that are features not included within the existing culvert. The proposals also include retrofitting baffles in the existing downstream culvert. Approximately 30m of new wet woodland would also be planted along the River Lyne. · The Fenrother Burn currently passes through a c.120m long 0.5m diameter culvert. This would be replaced with larger culverts that include a gravel bed where culverting is required. Although the realigned section is illustrated as a straight channel there would be in-channel variation provided that is considered an improvement compared to the existing straightened trapezoidal channel. The total culverted length would be c.30m less than the existing culverted length and provide a larger structure. · As highlighted the existing culverts for the Earsdon Burn would remain unchanged. New culverts are required to pass under the Scheme and

Reference	Comment from Relevant Representation	Applicant's Response
		adjacent access track; these have been kept as short as possible (measuring 47.2m long) and (for the Earsdon Burn) include a gravel bed and mammal ledge that is not provided within the existing culverts. The tributary that is to be culverted and realigned is assessed to be an ephemeral ditch with a catchment less than 0.5km2 with low aquatic value. As discussed in A.2, the Applicant does not consider it viable to create new lengths of open watercourse to mitigate for the loss of watercourse, as this would rely on a water source to create the habitat. Therefore, in the absence of a natural source, a watercourse cannot be readily created. In addition, the diversion of water from an existing watercourse or the modification of an existing watercourse to increase its length (for example, by meandering the channel) is also not considered a viable option for mitigation or compensation, as this would increase the impacts of the Scheme.
A.84 Water Framework Directive (WFD) Assessment: Solution	Furthermore, funding from HE could support the delivery of a feasibility study and capital works to ensure that the management and restoration of the river Lyne is successful over the long term. Measures and activities need to be guided by an overarching "Strategy" that sets out an aspirational approach to restoring the natural processes necessary to support the whole river ecosystem of the Lyne. This 'process-based' approach will aim to restore natural geomorphic processes and reinstate the natural form and function of the river environment. It is a sustainable approach which allows the river to adapt to future changes so that the benefits of restoration can be maintained with minimal intervention over the long term.	Our response to earlier comments provides a summary of the mitigation that is proposed for the loss of watercourse channel and the design of culvert extensions and new culverts. This is also summarised in the Culvert Mitigation Summary (Annex A).
A.85 Water Framework Directive (WFD) Assessment: Solution	By restoring a more natural balance of the hydrological and geomorphological processes in the river, other significant environmental and social gains can be achieved. These might include enhanced habitats, improved water quality, better understood erosion and sediment regimes and improved flood management. The viability and sustainability of restoration measures is essential, and techniques need to be integrated within the catchment landscape (be that natural, economic or social), so that river and land management are complementary to each other.	In addition to the mitigation measures discussed in sections above and as summarised in the Culvert Mitigation Summary (Annex A), mitigation includes improvements to approximately 850m of Longdike Burn to improve nutrient management and bankside stabilisation, and the design of new channels to increase their biodiversity value through enhanced in-channel variation and aquatic planting. This would contribute to improvements to enhanced habitats, improved water quality and erosion control as highlighted by the EA, and with greater biodiversity value that those lost to Part A of the Scheme. This is detailed in Appendix 10.2: Water Framework Directive Assessment - Part A [APP-255] and Appendix 10.2: Water Framework Directive Assessment - Part B [APP-312]. The proposed improvements to approximately 850m of Longdike Burn are discussed in EM047 of Chapter 9: Biodiversity Part A [APP-048] of the ES. This is considered to be appropriate mitigation proportionate to the size and value of the affected watercourses. Flood risk has been considered separately within Appendix 10.1: Flood Risk Assessment Part A [APP-254] and Appendix 10.1: Flood Risk Assessment Part B [APP-311].
A.86 Water Framework Directive (WFD) Assessment: Solution	The fore mentioned project could also be a HE Designated Fund 'Legacy' themed proposal for betterment. Such a proposal could be submitted by the HE Major Project Team to HE Central, requesting support to deliver mitigation and compensation for the net loss realised by this schemes current design.	Highways England Designated Funds cannot be used for mitigation or compensation purposes; the fund is specifically set up to fund enhancement across Highways England network and not to mitigate the effect of new schemes.
A.87	1. HE's corporate strategy includes a Key Performance Indicator to achieve no net loss of biodiversity by 2025. 2. As outlined in the Government's 25	1. The Applicant highlights that this target applies to the national Highways England network and is not intended to be a project-specific target. As an NSIP, the overall

Reference	Comment from Relevant Representation	Applicant's Response
Water Framework Directive (WFD) Assessment: Solution	Year Environment Plan, we would expect HE to explore any feasible opportunities to deliver biodiversity and/or environmental net gain through any of their schemes. 3. This scheme will see the partially re-alignment of 2 watercourses, and the loss of over 400m of watercourse due to culverting (a 62.69% net loss of watercourse), locally, habitat will be lost or degraded. 4. With this in mind, we would expect to see the creation of a minimum of 3 times the compensation lengths of water course to the same condition, if not better than those lost as a result of the scheme. This could be delivered through the for mentioned project proposal for the River Lyne.	goal is to achieve no net loss, in line with the NPS NN. Biodiversity No Net Loss Assessments have been undertaken for the Scheme [APP-246] [APP-309]. 2. The Scheme is a NSIP and is therefore governed by the NPS NN rather than the NPPF. Therefore, there is currently no legal requirement to achieve net gains in biodiversity, however opportunities for enhancement are detailed within Section 9.9 of Chapter 9: Biodiversity Part A [APP-048] and Chapter 9: Biodiversity Part B [APP-049]. 3. The Applicant does not agree with the total stated loss of watercourse length of 62.69% for both Part A and Part B of the Scheme, as when considered cumulatively the total loss would be much less than this. The Applicant is currently preparing an updated Biodiversity No Net Loss Assessment in line with Defra Metric 2.0 for the Scheme. This will be submitted at Deadline 2. The assessment will verify the extent of watercourse habitat to the lost Scheme. As discussed in item 2, the Scheme would include c.38ha of wet woodland and c.12ha of wetland marginal planting. 4.The Applicant understands the objectives of the WFD to be as set out in A.78. The Applicant is not aware of any requirement under the WFD to create a minimum of 3 times the compensation lengths of the affected watercourses. Instead the approach adopted for the Scheme has been to provide at-source mitigation to maintain hydraulic connectivity, provide fish and mammal passage where viable and appropriate, provide significant wet woodland and marginal planting, provide channel realignments that enhance current watercourse conditions, and improve nutrient management and bankside stabilisation along the Longdike Burn.
A.88 Water Framework Directive (WFD) Assessment: Solution	1. With respect to the River Coquet, section 12 of the WFD Assessment does not reflect our most up to date understanding of the scheme. 2. During a meeting on the 7th October 2020 it was suggested that the positioning of the permanent pier on the south bank for the new south bound carriage way Road Bridge over the river Coquet is to be move and therefore will be offset to the existing pier. Section 12.2.3 states, 'The proposed piers would be on the same alignment as the existing piers on the existing northbound bridge. Section 12.2.4 states, 'The new structure would be located outside of the normal water levels of the River Coquet. 3. The Section 12 of the WFD assessment needs to be reviewed and updated to reflect the most up to date designs for the scheme.	1. The WFD Assessment assesses the most up to date design for the Scheme as submitted to the Planning Inspectorate. 2. The potential realignment of the piers has been considered as part of Parameter 10. Appendix 10.7: Geomorphology Assessment - River Coquet Parameter 10 Part A [APP-260] assess the potential implications of the potential pier relocation to the geomorphological conditions of the River Coquet. This is being supplemented by further 2D hydraulic modelling of the River Coquet as discussed in A.87. 3. The results of the hydraulic modelling to assess the implications pf Parameter 10 confirm no significant effects between baseline, construction and operation. Thus, there are no perceivable differences in the sediment transport capability of the river and associated erosion and deposition processes. A Technical Note is to be submitted at Deadline 3 to summarise the approach and findings of the assessment. The potential amendments of Parameter 10 are not considered to change the findings of the WFD Assessment on other WFD quality indicators.
A.89 Surface Water Drainage: Issue and impact	1.Although the WFD assessment recognises the requirement for mitigation as a result of the surface water drainages impact on water quality, it fails to do this for the proposed surface water drainage structures. 2 As discussed above, culverting a watercourse will contribute towards a HMWB status. 3. This is also the case for the development of surface water outfall structures.	1. It is correct that the WFD assessment assess the impact of the outfalls on water quality but does not assess the impact of the outfalls on WFD ecological indicators. This is because the design of the outfalls has not yet been undertaken and therefore it was considered appropriate to include this within the WFD assessment. The impact of the outfalls is likely to be negligible with the inclusion of an

Reference	Comment from Relevant Representation	Applicant's Response
	4. With this in mind, we would expect to see an assessment of these structures within the WFD assessment as well as consideration for the subsequent required mitigation.	appropriate design that is sympathetic to the ecological quality of the receiving watercourse. The outfalls will be designed in consultation with the relevant authority as part of the FRAP or Ordinary Watercourse Consent (OWC) process (as appropriate) which are detailed in S-W13 in the Outline CEMP [APP-346]. A summary of the proposed approach to outfall design will be submitted at Deadline 3. 2. As discussed in previous comments above, a significant amount of mitigation has been included to mitigate and compensate the impacts of the new culverts on waterbody status, including HWMB aspects noting that many of the affected watercourses have already been straightened and heavily modified as part of their baseline condition. This is summarised in the Culvert Mitigation Summary (Annex 2) and also takes into account the aquatic value of the watercourses, many of which are small with low aquatic value. 3. As discussed in point 1 above, the outfall design will be designed in consultation with the relevant authority as part of the FRAP or OWC process (as appropriate) which are detailed in S-W13 in the Outline CEMP [APP-346] The design will take into account the ecological quality of the receiving watercourse. 4. A summary of the proposed approach to outfall design will be submitted at Deadline 3. This will include measures such as angling the outfall in line with the flow of the channel, providing protection to prevent scour of the river bed and setting the outfall back from the channel bank to provide a more naturalised discharge point to the channel. As discussed in A.74, the FRAP application and design of outfalls will consider the objectives of the WFD and the Northumbrian RBMP.
A.90 Surface Water Drainage: Solution	It is also worth noting the recent AECOME North East Highways Fish Pass Feasibility Investigations Report, commissioned by HE. The report investigates issues of fish passage at 12 high priority locations on HE's Strategic Road Network. Two of these site are relevant to this scheme, the River Lyne culvert and the Cawledge Burn culvert.	The Scheme crosses the River Lyne as identified by the EA. The existing culvert will be fitted with baffles to aid fish passage. The new culvert will also include a gravel bed, low flow channel and mammal ledge. These measures are aligned within the recommendations of the report to improve fish passage. The measures ares summarised in the Culvert Mitigation Summary (Annex A). The Scheme does not cross the Cawledge Burn.
A.91 Surface Water Drainage: Solution	Consideration also needs to be given to the scheme's potential impact on any future opportunities for weir removal within the River Coquet catchment. We would expect to see reassurance that the bridge crossing over the Coquet will not inhibit weir removal both up and down stream of the structure.	Two shallow weirs are located approximately 0.5km upstream and downstream of the A1 crossing of the River Coquet. The weirs may be restricting the supply of sediment, however, no notable accumulation of sediment upstream of the weirs was observed at the time of field observation. If the weir was breached, collapsed or removed, there would likely be an increase in the delivery of fine sediment (such as gravels and sand) to the downstream reaches. This would likely have a positive impact upon the fluvial form and function of the river and its habitats, and thus WFD quality elements and status. The bridge and its piers would not alter the hydraulic loading on the weir structures, so assessment of the weirs was not pertinent to the study. Any changes to these weirs would not impact upon the bridge structure or its piers, and the similarly the proposed bridge piers do not impact on the functioning or future removal of the weirs. This is detailed in Appendix 10.7 - Geomorphology Assessment - River Coquet Parameter 10 Part A [APP-260].
A.92 Drainage Network Water Quality Assessment	The DNWQA uses method A and D from HE Water Risk Assessment Tool (HAWRAT) to assess the impact of the proposed mitigation measures as part of the surface water management strategy. This document concludes	Noted

Reference	Comment from Relevant Representation	Applicant's Response
(DNWQA): Issues and impacts	there would be no significant effects on the receiving surface water features as a result of the scheme with the implementation of the proposed mitigation measures.	
A.93 Drainage Network Water Quality Assessment (DNWQA): Issues and impacts	We welcome the inclusion of natural solutions for the identified drainage impacts that have been incorporated. Solutions such as Sustainable Drainage Systems (SUDS) and swales need to be as natural as possible in their design and development to encourage biodiversity.	Comment noted. It is highlighted that the proposed detention basins are proposed to have a permanent wet area to enhance biodiversity value as discussed in the Drainage Network Water Quality Assessment (DNWQA) reports detailed in in Appendix 10.3: Drainage Network Water Quality Assessment - Part A [APP-256] and Appendix 10.3: Drainage Network Water Quality Assessment - Part B [APP-313].
A.94 Drainage Network Water Quality Assessment (DNWQA): Solution	Within section 2.2.2. Surface Water Feature Importance, it is understood that the importance of a surface water body or feature will be dependent on its sensitivity. However, it is considered that a waterbody that is classified as poor under WFD such as the River Lyne would benefit from additional protection and mitigating from potential pollution risks such as surface water runoff from a highway. We would welcome consideration of this within this document and the WFD assessment.	The River Lyne chemical and physico-chemical status both assessed as Good WFD status. Run off to the River Lyne will receive 2 stages of treatment. The Highways England Water Risk Assessment Tool (HEWRAT) assessment detailed in in Appendix 10.3: Drainage Network Water Quality Assessment - Part A [APP-256] indicates all discharge to River Lyne and tributaries passed the acute and Environmental Quality Standards (EQS) assessments of copper and zinc without consideration of mitigation, therefore inclusion of 2 stages of mitigation is considered to go beyond the requirements of DMRB standards. An increase in the sensitivity of the watercourse would not alter the findings of the assessment and further protection is not considered a requirement of the scheme.
A.95 Drainage Network Water Quality Assessment (DNWQA): Solution	As the drainage strategy will still involve the introduction of new surface water outfalls as part of the Scheme - please refer to previous comments for the WFD assessment.	Noted.
A.96 Drainage Network Water Quality Assessment (DNWQA): Solution	We would also welcome the inclusion of design features to stop and/or reduce pollution as a result of an incident on the highway, such as the ability to close off outlets from SUDS on the watercourse crossings such as the River Coquet, Longdike Burn and River Lyne at the very least.	The HEWRAT Method D assessments detailed in in Appendix 10.3: Drainage Network Water Quality Assessment - Part A [APP-256] and Appendix 10.3: Drainage Network Water Quality Assessment - Part B [APP-313] determined maximum 0.06% probability of spillage risk to any of the watercourses that would receive outflow from the Scheme. This is well below the 1% DMRB requirement (or 0.5% for the River Coquet). Risks would be reduced by inclusion of SuDS measures as secured by requirement 8 of the DCO [APP-014]. and no further measures are considered necessary to comply with DMRB requirements.
A.97 Flood Risk Assessment (FRA): Issue and impact	The FRA covers all of the points expected and discussed at previous meetings. However, the section of the FRA for the River Coquet element of the works does not match our most up to date understanding of the scheme. At the meeting on the 14th April and subsequent meetings on the 7th October, it was discussed that the permanent piers will need to be moved and be offset to the existing. The FRA still discusses the piers being aligned with the existing. This section of the FRA should be updated to reflect the latest designs.	The Flood Risk Assessment (FRA) [APP-254] assesses the most up to date design for the Scheme as set out in the Application.
A.98 Flood Risk Assessment (FRA): Solution	Following these meetings, we have a good understanding of the proposed pier locations and are satisfied with the manning's calculation approach for providing evidence. However, the FRA needs to be updated/addendum supplied to reflect these changes and provide the necessary evidence to support the claims of no increase in flood risk and that detailed modelling is not required.	An addendum to the FRA has been prepared to consider the flood risk implications of this potential realignment and is submitted at Deadline 1 (Annex B). In summary, the addendum assessment concluded that although there would be some loss of channel width if the new southern pier moved, it would be insignificant in comparison to the overall channel width. On this basis it is concluded that the findings of Appendix 10.1: Flood Risk Assessment Part A [APP-254] submitted to support the DCO remain valid.

Reference	Comment from Relevant Representation	Applicant's Response
A.99 Flood Risk Assessment (FRA): Solution	For the culvert extensions and replacements, we welcome that these are like-for-like or provide betterment in some cases. Although, the FRA does discuss that the increases in flood risk do not affect any receptors, it can still increase the flood risk to land. We would insist that local land owners are contacted with regards to increase in flood risk, if outside of the DCO boundary.	A technical note and supporting figure overlaying the baseline fluvial flood risk, post-development flood risk and Scheme Order limits will be submitted at Deadline 3 to highlight where any increase in flood risk extent may extend to outside of the Order limits. Areas outside of the Order limits that are indicated to be at increased risk of flooding will be confirmed with the local landowner by agreement. Review of the hydraulic modelling completed to inform the FRA indicates that the increase in flood risk outside of the Order limits is minimal and will have no detrimental or measurable effect to the use or value of the affected land.
A.100 Flood Risk Assessment (FRA): Solution	Note: any works on the main river or within 8m of a main river will may require an environmental permit from the Environment Agency. Once detailed designs and, more importantly, the method of works are known contact should be made with the Environment Agency's flood risk permitting team and an application made.	This is detailed and secured through the Outline CEMP [APP-346], see Table 4-1 – Consents and Permissions potentially required during Construction.
A.101 Groundwater: Issue and impact	We are pleased to see that the proposed highway drainage scheme design ensures separation of rainfall and surface run off from groundwater, discharging it to the nearest watercourses. The lining of the drainage scheme in particular the SUDS attenuation basins is an acceptable mitigation measure. Unfortunately, we have not been able to find the details of this lining and how it will be maintained over the lifetime of the scheme.	A drawing of this detail has not yet been prepared as this would be undertaken as part of the detailed design. This is secured through requirement 8 of the DCO [APP-014] in consultation with the relevant authority. Drainage systems will be maintained by Highways England in the normal manner for Highways England drainage assets. To the extent that any specialist maintenance is required this would be defined in the Handover Environmental Management Plan (HEMP).
A.102 Groundwater: Solution	Details of this lining and how it will be maintained over the lifetime of the scheme should be provided as part of the DCO.	The details of the detention basin will be confirmed and developed during the detailed design stage. This is secured through requirement 8 of the DCO [APP-014] in consultation with the relevant authority. Drainage systems will be maintained by Highways England as per A.101 above.
A.103 Groundwater: Solution	A scheme where there is no infiltration component will protect both the quality of the groundwater from pollution arising from the highway and the enhance flood risk from groundwater and potential reduced capacity in the storage and attenuation basins. On the basis that this proposal remains unchanged, we have no groundwater concerns with the proposed development, subject to a long term management plan being submitted.	The Applicant confirm that the SUDS attenuation basins would be lined to prevent infiltration of attenuated runoff to ground. The design and associated requirements are secured through requirement 8 of the DCO [APP-014] in consultation with the relevant authority. Drainage systems would be maintained by Highways England as per A.101 above.
A.104 Groundwater: Solution	However, the proposed drainage scheme will affect the local hydrological conditions adjacent to the road and potentially the water quality of the receiving watercourses. The impact assessment on water quality only looks at copper and zinc to surface waters. There remains a residual risk to pollute surface waters from other pollutants e.g. hydrocarbons. The risk of a direct discharge of priority hazardous substances to groundwater remains low if surface drainage is kept separated from the groundwater regime as per the current design and the superficial confining layer is not breached.	It is highlighted that the assessments provided in Appendix 10.3: Drainage Network Water Quality Assessment - Part A [APP-256] and Appendix 10.3: Drainage Network Water Quality Assessment - Part B [APP-313] were undertaken in accordance with the recommendation of DMRB LA113 to include assessment of risks associated with routine runoff and spillage and the benefit provided by proposed treatment systems. The Applicant confirms that all drainage basins will be lined to separate from groundwater.
A.105 Groundwater: Solution	This view is based on our understanding that the groundwater is shallow, close to ground level but generally confined by low permeable superficial deposits such as boulder clay. Providing the confining layer is not breached during either the construction phase or the proposed drainage scheme the risk of change is low. However, in areas where the groundwater is unconfined and or perched groundwater exists there is a high risk that the construction phase and drainage scheme could impact the hydrology,	Works may extend below groundwater levels. The potential impacts of the Scheme on groundwater flow impacts and subsequent receptors (e.g. groundwater dependent terrestrial ecosystem (GWDTEs)) caused by the works extending to below groundwater levels (including proposed drainage basins) were assessed in Appendix 10.6: Road Drainage and the Water Environment DMRB Sensitivity Test Part A [APP-259] and Appendix 10.5: Road Drainage and the Water Environment DMRB Sensitivity Test Part B [APP-315]. The assessments concluded that there

Reference	Comment from Relevant Representation	Applicant's Response
	reducing water inputs and levels. Thus, potentially adversely impacting any protected groundwater dependent habitat adjacent to the scheme. Where this is considered unacceptable further information would be required, such as: 1. Assessment as to whether groundwater conditions are confined or unconfined could be made using available licensed datasets from the British Geological Survey assessing drift thickness and type and /or 2. Further site investigation and/ or 3. Groundwater monitoring could be required.	would be no change to the conclusions of Chapter 10: Road Drainage and The Water Environment Part A [APP-050] of the ES or Chapter 10: Road Drainage and The Water Environment Part B [APP-051] of the ES.
A.106 Groundwater: Solution	If the proposed drainage scheme is modified to mitigate any risks and impacts to the environment, ecology and water quality, the Environment Agency must be consulted on this.	As set out in item 105, it is not considered necessary to amend the drainage scheme as the risk assessment identified no significant impact.
A.107 Historic Landfill Sites: Issue and Impact	There is a small historical landfill site (around 2,000m3 area) at grid reference 418996, 569003 around 400m south of Helm and 70m east of the A1 carriageway. This was operational prior to the introduction of Waste disposal licencing in 1976 and used for the disposal of 'farm wastes' by Thirston Parish Council. This historical landfill is not identified on the ES figure 11.7 'Potential Contamination and Shallow Mine related Features – Part A.' document.	This historical landfill lies within the 250m Study Area but outside of the Order limits, it is noted that the landfill lies more than 250m away from the proposed online works and it would therefore not be disturbed during the construction works. It is stated within Chapter 11 Geology and Soils Part A [APP-052] that water resulting from the dewatering of excavations would be captured and tested prior to appropriate disposal either under licence to foul sewer or to surface watercourse subject to environmental permit. Given the distance of the landfill from the proposed works it is considered unlikely that leachate associated with the landfill will be encountered during excavation., However, should groundwater containing contaminants associated with the landfill be encountered during excavation there would be measures in place to ensure the limitation of potential pollution of controlled waters. Based upon the above, the identification of this historical landfill is not considered to alter the assessment.
A.108 Historic Landfill Sites: Solution	ES figure 11.7 'Potential Contamination and Shallow Mine related Features –Part A.' document to be updated.	Figure 11.7: Potential Contamination and Shallow Mine related Features Part A [APP-119] has been updated and submitted at Deadline 1 (Annex C). This historical landfill lies within the 250m Study Area but outside of the Order limits, therefore the identification of this historical landfill is not considered to alter the assessment.

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